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Perceptions of pubertal timing and discrimination among African American and
Caribbean Black girls

Eleanor K. Seaton

T. Denny Sanford School of Social and Family Dynamics
Arizona State University

Rona Carter

Department of Psychology
University of Michigan

Abstract

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The present study used a nationally representative sample of African American and Caribbean Black adolescent females to examine the relation between perceived pubertal timing relative to peers and discriminatory experiences. Participants included the 607 girls who participated in the National Survey of American Life-Adolescent (NSAL-A), and ranged in age from 13 to 17. Most African American girls perceived their development as on-time relative to their same-aged peers; whereas the majority of Caribbean Black girls perceived their development as earlier than their same-aged peers. The results indicated that girls who perceived that their pubertal development was earlier than their same-aged peers reported more general and racial discrimination experiences.

Keywords: African American, Caribbean Black, females, perceived pubertal timing, racial discrimination experiences

Perceptions of pubertal timing and discrimination among African American and Caribbean Black girls

Pubertal development includes biological processes designed to prepare individuals for sexual maturation and sexual reproduction (Bleil, Booth-LaForce, & Benner, 2017). Among girls, pubertal development begins with breast development, the growth of pubic hair, and changes in body height and weight. Pubertal development culminates with menarche (e.g., the first menstrual cycle), which begins roughly two years after the onset of breast development (Biro et al., 2006). Although puberty is a normative and universal biological transition, pubertal timing (e.g., variation when youth begin and complete specific physical milestones) varies such that African American girls tend to go through puberty earlier than White, Latino and Asian American girls (Biro et al., 2010; Ge & Natsuaki, 2009; Keenan, Culbert, Grimm, Hipwell, & Stepp, 2014; Mendle, Harden, Brooks-Gunn, & Graber, 2010). Prior work indicated that African American girls were in the stages for breast and pubic hair development approximately nine and eleven months earlier than White girls (Keenan et al., 2014; Susman et al., 2010).

Accommodation to earlier pubertal timing may be difficult for African American girls because it creates a period of contrast in which they differ significantly from their same-sex and same-aged

peers with respect to noticeable physical attributes such as height, breast size, distribution of subcutaneous fat, and hip-to-waist-ratio.

There are two ways of measuring self-reported pubertal timing: 1) stage-normative pubertal timing and 2) peer-normative pubertal timing (Cance, Ennett, Morgan-Lopez, & Foshee, 2012). The current study examined peer-normative pubertal timing, which is based on youth's perceptions of pubertal development relative to their peers (Cance et al., 2012). Perceived pubertal timing indexes whether girls see themselves as being non-normative in one direction (e.g., early) or the other (e.g., late) relative to their peers (Carter et al., 2017). Perceived pubertal timing affords the opportunity to assess youth's interpretation and meaning of pubertal changes offering information about the onset of puberty at the social level rather than the biological level (Carter et al., 2011; 2015). A recent study examined similarities between adolescents and their friends using stage-normative pubertal timing, perceived pubertal timing and age at menarche (Kretsch, Mendle, Cance, & Harden, 2016). African American girls reported similar development to their same-sex friends on the perceived pubertal timing indicator despite being classified as early developers on the standardized pubertal timing indicator (Kretsch et al., 2106). Perceived pubertal timing relative to peers assessed distinct aspects of pubertal development compared to stage-normative pubertal timing offering important information (Cance et al., 2012).

The bulk of prior research on pubertal timing has focused on African American girls even though the Black American population is comprised of ethnic groups with diverse languages, histories and cultural beliefs (Rastogi, Johnson, Hoeffel, & Drewery, 2011). Caribbean Blacks, who are ethnically distinct from African Americans, are a significant proportion of the U.S. immigrant population (Acosta, & de la Cruz, 2011), and more than half of foreign-born Blacks in the U.S. are of Caribbean origin (U.S. Census Bureau, 2010). The current study defines Caribbean Black as 1) girls who were born in Caribbean countries and immigrated to the United States or 2) girls with at least one parent born in a Caribbean country who immigrated to the United States (Jackson et al., 2004). Ethnic differences may influence the meaning that girls attribute to the physical changes associated with puberty. Although research examining ethnic differences among the Black population is scant, one study examined differences in pubertal timing (e.g., menarche and relative pubertal timing) using the female sample of the National Survey of American Life-Adolescent (NSAL-A; Carter, Caldwell, Matusko, Antonucci, & Jackson, 2011). The NSAL-A includes nationally representative samples of African American

and Caribbean Black adolescents (see Heeringa et al., 2004; Jackson et al., 2004). The results indicated that Caribbean Black girls were more likely to perceive their pubertal timing relative to peers as early, whereas African American girls were more likely to perceive their pubertal timing as average compared to girls of their respective age (Carter et al., 2011). Carter and colleagues (2011) suggested that African American and Caribbean Black girls differ in their preparation for pubertal development, which might account for ethnic differences. Whereas African American families may celebrate menarche as an important milestone (Martin, 1996), Caribbean Black families may not be as celebratory, and “differences in preparation for puberty and responses from other individuals to their pubertal development may serve to assist African American adolescent girls in a successful adaptation to the bodily changes associated with puberty” (Carter et al., 2011, p. 1403).

Pubertal Timing and Discrimination Experiences

While Black youth are undergoing the pubertal transition, they also experience discrimination which begins in middle childhood and increase throughout adolescence into adulthood (Brody et al., 2014; Coker et al., 2009). Prior research using NSAL-A indicated that the majority of African American and Caribbean Black youth reported discriminatory incidents in the prior year (Seaton, Caldwell, Sellers, & Jackson, 2008), and the common attribution for these experiences were race/ethnicity (Seaton, Caldwell, Sellers, & Jackson, 2010). Racial discrimination is defined as the systematic actions of dominant group members that have negative and differential effects on subordinate racial/ethnic group members (Williams, Neighbors, & Jackson, 2003). Advanced pubertal development may result in some African American and Caribbean Black girls being perceived as older than their chronological age, and treated differently. Prior research indicated that African American children were perceived to be older than White children despite being the same chronological age (Goff, Jackson, Di Leone, Culotta, & DiTomasso, 2014). Thus, the overestimation of age may be exacerbated for early developing African American and Caribbean Black girls who appear “older” (Keenan et al., 2014). The overestimation of age may result in increased discrimination experiences for early developing African American and Caribbean Black girls compared to their on-time and late developing Black female counterparts because others respond differently to early developing African American and Caribbean Black girls (Carter et al., 2017; Reynolds & Juvonen, 2011).

The increase in discrimination experiences may be due to the substantial differences between early and late developers with respect to noticeable physical attributes (e.g., breast size, height). These physical attributes may trigger adults and peers to respond differently to early developing African American and Caribbean Black girls, and these same physical attributes may be the comparative standard that early developing girls use to compare their pubertal development to other girls in their age cohort. Thus, early developing girls may perceive that they are developing early because of the distinct physical differences between themselves and other same-age girls. The distinct appearance of early developing girls may trigger differential treatment from peers and adults, which can include increased discrimination experiences.

The Present Study

Theoretical support for examining associations between pubertal timing and discrimination experiences is drawn from the Phenomenological Variant of Ecological Systems Theory (PVEST; Spencer, 2006). PVEST considers the unique and cumulative individual-context interactions that stem from being a member of a social group, which are hypothesized to shape individual experiences and influence individual behaviors over time (Spencer, 2006). PVEST posits that discrimination experiences based on race and gender are omnipresent phenomena enacted through multiple societal levels (e.g., social, cultural), which are pervasive and normative for ethnic/racial minority youth (Spencer, 2006). PVEST further argues that biological-based normative challenges, such as early pubertal maturation, may result in increased stressful experiences among Black youth due to appearing older than their chronological age (Spencer, 2006). Examination of the relation between perceived pubertal timing relative to peers and discrimination experiences is consistent with PVEST's articulation of the intersection of social context, pubertal development and individual experiences (Spencer, 2006).

The relation between perceived pubertal timing relative to peers and discrimination experiences was examined with the female sample of the NSAL-A (Jackson et al., 2004). It was anticipated that girls who perceived that their pubertal development was early relative to their peers would report more discrimination experiences relative to their on-time and late developing counterparts. We also examined ethnic subgroup membership as a moderator in the relation between relative pubertal timing and discrimination experiences. Although prior research illustrated ethnic differences in relative pubertal timing (Carter et al., 2011), other research indicated no differences in discriminatory experiences among African American and Caribbean

Black youth (Seaton et al., 2008). Thus, it was unclear if the relation between perceived pubertal timing and discrimination experiences would be stronger for Caribbean Black girls relative to African American girls.

METHOD

Participants

Data were drawn from the female participants ($N = 607$) in the National Survey of American Life-Adolescent component (NSAL-A; Heeringa et al., 2004; Jackson et al., 2004). The sample includes 412 African American and 195 Caribbean Black girls, aged 13 to 17, ($M = 15$ years; $SD = 1.0$). Approximately 96% of the sample was still enrolled in high school and 9th grade was the average. The median maternal education level was 12th grade, and the mean family income was \$38,314. Specifics of the original NSAL-A sample have been described elsewhere (see Carter et al., 2011; 2017; Seaton et al., 2008).

Procedure

A national probability sample of households was drawn based on adult population estimates and power calculations for detecting differences among the adult samples. Every household that included an adult participant in the NSAL was screened for an eligible adolescent in the targeted age range (e.g., 13 to 17). Adolescents who met eligibility criteria were selected with a random selection procedure. The adolescent supplement was weighted to adjust for non-independence in selection probabilities and non-response rates within households, across households and individuals. The weighted data were post-stratified to approximate the national population distributions for gender and age subgroups among African American and Caribbean Black youth. The specific sampling procedures for identification and recruitment of African American and Caribbean Black households have been described elsewhere (see Carter et al., 2011; 2017; Seaton et al., 2008). Informed consent was obtained from the adolescent's legal guardian as well as the adolescent prior to the interview. Many of the adolescent interviews were conducted with same-race interviewers using computers in their respective homes, and a small minority (18%) were conducted entirely or partially by telephone. For privacy purposes, the adolescent interviews were conducted with no family members present. The adolescents were paid \$50 for their participation.

Measures

Demographic variables. Adolescents were asked their age in years at the time of the interview. Ethnicity and parents' nativity status were assessed with standard questions used in the household sampling procedure. Imputed family income was calculated based on information provided by the adult respondent for the household in which the adolescent lived for the year prior to the interview.

Perceived Pubertal Timing. Perceived pubertal timing (overall) relative to peers was assessed with one item which asked "How advanced would you say your physical development is compared to other girls your age?" The response scale included the following: 1 (*I look younger than most*), 2 (*I look younger than some*), 3 (*I look about average*), 4 (*I look older than some*), and 5 (*I look older than most*). Higher numbers indicated greater perceptions that one's pubertal development was early relative to same-sex and same-age peers. Studies have demonstrated reasonable confidence in using a one-item variable to measure youths' perceptions of their pubertal timing relative to peers (see Dubas, Graber, & Petersen, 1991; Graber et al., 1997). Dubas and colleagues (1991) demonstrated that feelings about puberty were related to perceived pubertal timing but not an objective measure of pubertal timing. Moreover, the perceived pubertal timing item is a well-established and effective method for assessing perceptions of the timing of pubertal changes compared to peers (see Coleman & Coleman, 2002; Dubas et al., 1991; Negriff & Susman, 2011).

Everyday Discrimination Scale. The Everyday Discrimination Scale assesses chronic, routine and less overt experiences of discrimination that have occurred in the prior year (Williams, Yu, Jackson, & Anderson, 1997). The revised measure includes 13-items and psychometric analyses indicated that the measure was valid and consistent with results from African American adult samples (see Seaton et al., 2008). The stem question is: "In your day-to-day life, how often have any of the following things happened to you?" A sample item includes: "You are followed around in stores." The Likert response scale ranges from 1 (*never*) to 6 (*almost every day*). Internal consistency was acceptable for the African American female ($\alpha = .89$) and the Caribbean Black female ($\alpha = .85$) samples. The responses were coded to indicate whether an event occurred versus an event never occurring. A count score was created such that higher scores indicated a greater number of events that occurred in the previous year.

Discrimination attribution. After the discrimination items were completed, participants answered the following question: "Thinking of those things that have happened to you, overall

what do you think was the main reason for this/these experiences?” Participants were instructed to choose one attribution for their experiences, and selections included race/ethnicity, gender, age, physical appearance (e.g., height or weight) or other (Williams et al., 1997).

Data Analytic Strategy

STATA 15.0 was used to calculate the complex design-based estimates of variance. Actual numbers are reported for sample sizes, while weighted data are used in the analyses. Poisson regression analyses were conducted to examine the main effects of perceived pubertal timing and ethnicity on discrimination experiences. Poisson regression was chosen because discrimination is a count variable and does not assume a normal distribution. An ethnicity x perceived pubertal timing discrimination term was included to determine if the relation between perceived pubertal timing and discrimination varied across the two ethnic groups. The analytical techniques adjusted the standard errors to account for the complex sample design of the NSAL-A, which involved multiple stages, clustering and stratification. Standard errors adjusted for complex design effects are usually larger than non-adjusted standard errors. In this study, the standard errors for Caribbean Black girls were typically higher than those for African American girls because the Caribbean Black sample is significantly more clustered than the African American sample. Consequently, ethnic differences that appeared to be large were not necessarily statistically significant.

RESULTS

General Discrimination Experiences

African American girls reported an average of 5.4 ($SE = .28$) general discriminatory incidents, and Caribbean Black girls reported an average of 6.1 ($SE = .86$) general discriminatory incidents. Poisson Regression analyses were conducted to determine whether perceived pubertal timing relative to peers predicted general discrimination experiences. The main effects included perceived pubertal timing and ethnicity, and the interaction term (e.g., perceived pubertal timing x ethnicity) while controlling for family income, nativity status and age. There was a significant main effect for perceived pubertal timing ($B = .13, p < .01$) indicating that among girls who reported at least one discriminatory incident in the prior year, girls who perceived themselves to be more physically developed relative to their peers reported more discriminatory incidents (see Table 1). The main effect for ethnicity and the perceived pubertal timing x ethnicity interaction were not statistically significant.

Discrimination Attributions

The breakdown for the discrimination attributions included: race/ethnicity ($n = 272$; 45%), gender ($n = 67$; 11%), age ($n = 121$; 20%), physical appearance ($n = 97$; 16%) or other ($n = 48$; 8%). Given the small sample sizes for the attribution groups, analyses were restricted to the subsample of African American and Caribbean Black girls ($n = 272$) who chose race/ethnicity as the attribution for their discriminatory experiences. African American girls reported an average of 6.2 ($SE = .43$) racially discriminatory incidents, and Caribbean Black girls reported an average of 7.2 ($SE = 1.3$) racially discriminatory incidents.

Poisson Regression analyses were conducted to determine whether perceived pubertal timing relative to peers predicted racial discrimination experiences. The main effects included perceived pubertal timing and ethnicity, and the interaction term (e.g., perceived pubertal timing x ethnicity) while controlling for family income, nativity status and age. There was a significant main effect for perceived pubertal timing ($B = .13, p < .01$) such that among girls who reported at least one discrimination experience in the past year, and attributed the discrimination to race/ethnicity, those who perceived themselves to be more physically developed relative to peers reported more racially discriminatory incidents (see Table 2). The main effect for ethnicity and the perceived pubertal timing x ethnicity interaction were not statistically significant.

DISCUSSION

Although past research has focused on how adults and peers treat early developers, less research has focused on girl's discrimination experiences. This study contributes to the existing literature by examining associations between girl's perceptions of their pubertal timing relative to their same-age peers, and discrimination experiences among a nationally representative sample of African American and Caribbean Black girls. The results demonstrated that among girls who reported at least one general discrimination experience in the past year, those who perceived themselves to be more physically developed relative to peers reported more discriminatory incidents. Similarly, among girls who attributed their discrimination experiences to race/ethnicity in the previous year, perceiving themselves to be more physically developed relative to peers was linked with experiencing more racially discriminatory incidents. Although prior research indicated differences in perceived pubertal timing by ethnicity (Carter et al., 2011), the association between relative pubertal timing, general discrimination and racial discrimination experiences did not vary by ethnic subgroup membership. The results suggest that

early pubertal timing results in additional stressful experiences for African American and Caribbean Black girls, namely discrimination experiences. Early pubertal timing increases discrimination experiences, which have been unequivocally linked to detrimental outcomes. For example, one meta-analysis indicated a positive correlation between racial discrimination and socioemotional distress among minority adolescents (Benner et al., 2018), and another meta-analysis indicated a stronger relation between racial discrimination and psychological distress for African American youth compared to African American adults (Lee & Ahn, 2013). Thus, discrimination experiences may be exacerbated for early developing Black girls compared to their on-time and late developing counterparts.

Two important variables that may influence the relation between perceived pubertal timing and discrimination experiences are school and neighborhood context. It is possible that the relation between perceived pubertal timing and racial discrimination experiences may be exacerbated among Black girls attending schools in which their ethnic/racial group is a numerical minority. Prior research among African American adolescents indicates that racially discriminatory incidents increase in schools with greater racial diversity (Seaton & Yip, 2009). Other studies indicate that school context influences the relation between pubertal timing, ethnic/racial identity and depressive symptoms among Black girls (Seaton & Carter, 2018), perceived school Latino representation and deviation from a Latina body norm influences the relation between pubertal status and school connectedness among Latina girls (Morales-Chicas & Graham, 2015), and neighborhood context influences the relation between pubertal timing and depressive symptoms among Mexican-origin girls (White, Deardoff, & Gonzalez, 2012). Future research should assess the influence of school and neighborhood context in the relation between pubertal timing and discrimination experiences among ethnically and racially diverse youth.

Implications

Our findings provide partial support for PVEST, which posits that vulnerability to adverse outcomes vary according to individuals' perceptions of social interactions with others in unique cultural contexts (Spencer, 2006). Consistent with PVEST, the results suggest that individual variation in pubertal timing influences general and racial discrimination experiences among African American and Caribbean Black girls. Yet, our findings have theoretical implications. The Intersectionality framework may provide a more precise theoretical lens for understanding the intersection of pubertal development, race and gender among African

American and Caribbean Black girls. Intersectionality argues that race, gender, and class are intersectional systems of inequality, which differentially advantage and disadvantage individuals based on their social location (Anderson, & Collins, 2013). Thus, racism and sexism intersect to create multiple forms of discrimination rather than singular forms (Cho, Crenshaw, & McCall, 2013). In a recent article, Velez and Spencer (2018) suggested that a fusion of PVEST and Intersectionality would enhance future research in developmental science. Specifically, they suggested that an inclusive approach would acknowledge how external systems (e.g., racism, sexism) and internal factors (e.g., biological, affective) provides understanding of the how and why of specific outcomes (Velez & Spencer, 2018). Future research should consider using this fusion when examining discriminatory incidents at the nexus of racism and sexism in the context of pubertal development. One way to interpret the current findings in light of PVEST and Intersectionality is that increased discriminatory incidents may be evident for Black girls with early pubertal timing compared to Black girls who are on-time or late developers. One question that arises is whether increased discriminatory incidents are also evident for early-developing Mexican-American girls compared to their on-time and late developing peers, given that Mexican-American girls also begin pubertal development earlier than White girls (Sun et al., 2005). The second theoretical implication concerns the *weathering hypothesis*, which posits that Blacks in the United States have early aging and health deterioration as a consequence of living in a society burdened with racism and other social stressors (Geronimus, Hicken, Keene, & Bound, 2006). African Americans and Caribbean Blacks may experience accelerated aging and poor health throughout the lifespan as a result of coping with these stressors (Geronimus et al., 2006). Thus, early pubertal timing may be a manifestation of accelerated biological aging due to exposure to chronic and acute racial discrimination experiences (Bleil et al., 2017), which begin in childhood for African American youth (Coker et al., 2009). Future longitudinal research should explore if discrimination experiences predict early pubertal timing among African Americans and Caribbean Blacks.

The findings also have methodological and practical implications. Given that the current study used a measure that forced youth to choose one attribution, future research would be improved with utilization of intersectional measures among Black girls. Measures are needed that examine the gendered racially discriminatory incidents that Black girls experience (Cho et al., 2013), which would enhance estimates and understanding of the relation between pubertal

timing and discrimination measures. Another implication is the need to understand protective factors in the context of pubertal development and discrimination experiences. A promising protective factor is ethnic/racial identity, which refers to youth's attitudes, values, and beliefs about the significance and meaning of their ethnicity/race (Umaña-Taylor et al., 2014) .

Ethnic/racial identity might be a crucial factor in the relation between pubertal timing and discrimination experiences given its' importance and salience during the adolescent period. A recent study indicated that a positive ethnic/racial identity protected African American boys and girls from the negative effects of early pubertal timing (Carter, Seaton, & Rivas-Drake, 2017). Thus, a positive ethnic/racial identity may be critical for combating discriminatory experiences linked to pubertal development.

Limitations

While the current study represents an important contribution, additional considerations would benefit the growth of this literature. The cross-sectional nature of the study prevents causality from being inferred such that we cannot assert that perceived pubertal timing predicted discrimination experiences over time or vice versa. Future research is needed to examine the longitudinal relation between perceived pubertal timing and discrimination experiences. A second limitation concerns utilization of a single-item measure for perceived pubertal timing, which can introduce bias in parameter estimates due to measurement error. If a construct is not adequately represented by a measure, then that construct may not be fully controlled in the statistical analyses. Moreover, when girls are asked to compare their development “to other girls your age”, it remains unclear which standard they are using to make their comparisons. We can assume it's the physical attributes that are noticeable, however, they may use other attributions such as race and ethnicity. An additional limitation of the Everyday Discrimination Scale is the annual time period, which may not precisely capture discrimination experiences among African American and Caribbean Black girls like smaller time periods evidenced in experiential sampling procedures (see Seaton & Douglass, 2014). Similarly, the small sample sizes for the other discrimination attributions (e.g., gender, age, physical appearance) prevented examination of whether perceived pubertal timing was linked to other discrimination types. Perceived pubertal timing may be linked to gender discrimination since the physical changes of puberty result in a heightened awareness of gender identity and gender roles (Hill & Lynch, 1983). Yet, prior research using the Everyday Discrimination Scale among ethnic/racial minority adolescents

indicates a small minority chose gender as a discrimination attribution consistent with the current results (see El-Sheikh, Tu, Saini, Fuller-Rowell, & Buckhalt, 2016; Majeno, Tsai, Huynh, McCreath, & Fuligni, 2018). Lastly, it is possible that Black girls may report more discrimination experiences when physical differences are more noticeable, and research is needed to examine discrimination experiences during the beginning of the pubertal transition when early maturing Black girls are the only ones in their age cohort showing visible signs of pubertal development. Examining puberty as a multimodal construct (e.g., replicating pubertal timing, extending to pubertal tempo, integrating relative pubertal timing) will move the field toward a mechanistic understanding of how pubertal timing is related to discrimination experiences.

Conclusion

This study contributes to existing literature by examining associations between girl's perceived pubertal timing relative to their same-age peers, general discrimination and racial discrimination experiences among nationally representative samples of African American and Caribbean Black girls. The findings indicate that African American and Caribbean Blacks girls who perceived their pubertal development as early reported increased general and racially discriminatory incidents. The findings provide support for PVEST's propositions that early pubertal development increases stressful experiences among Black youth (Spencer, 2006). More importantly, our study findings suggest another process through which pubertal timing may be linked to adverse outcomes among ethnic/racial minority youth. The challenge for future research is to investigate the mechanisms through which pubertal timing results in increased discriminatory experiences.

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Table 1 – Perceived Pubertal Timing as a Predictor of General Discrimination Experiences

<i>Predictors</i>	<i>B</i>	<i>Se</i>
Family Income	.00	.00
Age	.04	.03
Nativity Status	.07	.05
Perceived Pubertal Timing	.13**	.03
Ethnicity ^a	.04	.10
Perceived Pubertal Timing x Ethnicity	-.10	.08

Note. ^an. 0=African American, 1=Caribbean Black.

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

Table 2 – Perceived Pubertal Timing as a Predictor of Racial Discrimination Experiences

<i>Predictors</i>	<i>B</i>	<i>Se</i>
Family Income	.00	.00
Age	.04	.03
Nativity Status	.05	.09
Perceived Pubertal Timing	.13**	.04
Ethnicity ^a	.05	.17
Perceived Pubertal Timing x Ethnicity	-.11	.10

Note. ^an. 0=African American, 1=Caribbean Black.

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