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SKIN-TONE AND ACADEMIC ACHIEVEMENT AMONG 5-YEAR-OLD MEXICAN
CHILDREN

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science
at Virginia Commonwealth University.

By
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Abstract

SKIN-TONE AND ACADEMIC ACHIEVEMENT AMONG 5-YEAR-OLD MEXICAN CHILDREN

By: Selamawit Hailu, B. A.

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science at Virginia Commonwealth University.

Virginia Commonwealth University, 2018

Director: Michael Southam-Gerow, Ph.D.
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Skin-tone based social stratification has been characterized as an enduring part of the U.S. racial landscape (Hunter, 2002). Despite the plethora of research that examines the racial disparities in education (e.g., Reardon & Portilla, 2015), and an emerging literature finding that lighter skin-tones are associated with higher educational attainment among adults (Hunter, 2002) few studies have examined whether similar processes emerge during early childhood. Thus, grounded in Garcia Coll and colleagues' (1996) integrative model, we tested whether skin-tone predicted children's academic achievement, and whether these relations were modified by children's ethnic-racial identification (i.e., positive ethnic-racial attitudes and centrality). Consistent with expectations, darker skin-tones were associated with lower math scores. Positive attitudes did not significantly moderate the relation between skin-tone and academic achievement. However, contrary to our hypothesis, high levels of ethnic racial centrality *strengthened* the association between skin-tone and academic achievement. **Conclusions:** These

findings contribute to the literature by providing evidence for the early development of within race skin-tone based disparities in academic achievement and underscoring the need for further exploration of ethnic racial identification as protective or risk factors in the positive development of minority children.

Letter-Word Identification (*Identificación de letras y palabras*) and Applied Problems (*Problemas aplicados*).

Keywords

Skin-tone, academic achievement, race, ethnic-racial identity, minority youth development, centrality

Racial disparities in academic achievement have been extensively studied in education, psychology, and policy research areas. Studies have consistently shown that African Americans and Latinos have lower GPAs, higher dropout rates, and lower educational attainment as compared to their white counterparts (Bodenhorn, 2006; Goldsmith, Hamilton, & Darity, 2006; Hersch, 2006; Telles & Ortiz, 2008). Research indicates that these differences across race and ethnicity exist as byproducts of historical disenfranchisement due to inequitable housing, education, and judicial policies (Reardon & Portilla, 2016). However, *within* race variation in academic achievement based on skin-tone, has been less researched. Considering similar historical issues with discrimination and social stratification based on skin-tone, further exploration of disparities in academic achievement based on skin-tone differences is needed.

Background and Literature Review

Colorism—a term used to describe prejudice and discrimination based on phenotypic characteristics such as skin-tone, hair texture, and other facial features—within the U.S. context has its roots in colonialism and slavery (Hall, 2010; Maddox, 2004). With an ideology of European superiority at its center, the system of colonization and slavery elevated European culture, language, religion, and physical aesthetics. Simultaneously, the characteristics and cultures of African or indigenous peoples were made irrelevant and unappealing (Jordan, 1968, 2012; Jordan, 1974). Despite resistance by both indigenous people as well as enslaved Africans, cultural norms driven by White superiority became pervasive and universal (Fanon, 1952). As these norms became ubiquitous across society, it is important to note that the colonized *and* the enslaved internalized the dominant ideology (Hall, 2011; Hunter, 2005). Further, having phenotypic characteristics that were closer to European ideals meant more privileges for African Americans during and even after the end of slavery. During the same time period, for Latina/os

outside the U.S., similar colonial practices—this time by the Spanish—disparaged indigenous and enslaved Africans’ culture, language, religion, and aesthetics, while asserting preference for European characteristics (Telles, 2014). In both contexts, lighter-skinned individuals gained privileges and more desirable jobs, while darker-skinned individuals were limited to low-status social and economic positions (Frazier, 1957; Ruiz, 2008).

Skin-tone based social stratification, where lightness increases privilege, continues today. African American and Latina/os continue to face skin-tone based disadvantages in housing, criminal justice sentencing, mental health outcomes, as well as employment among other things (Viglione, Hannon, & DeFina, 2011; Thompson & Keith, 2001; Chavez-Duenas, Adames, & Organista, 2014; Bodenhorn & Ruebeck, 2007; Keith & Herring, 1991). Additionally, these differences are also evident in educational experiences as well as, more recently, the school-to-prison pipeline as black and latino children are often over represented in school suspension and expulsion rates (Bodenhorn & Ruebeck, 2007; Fergus, Noguera, & Martin, 2014; Kim, Losen, & Hewitt, 2010).

Few studies have examined how colorism may be related to academic achievement for Latino populations, especially youth. However, existing research indicates similar patterns of colorism in Latino adult populations that have been found in African American populations. For example among Latino adults, skin-tone variation is more predictive of occupation and income than other demographic and background characteristics including family socioeconomic status (Keith & Herring, 1991; Telles, 2007, 2014). Moreover, Telles and colleagues (2007, 2014) found this to be the case in the majority of countries in Latin America and the Caribbean. Furthermore, Keith and Herring (1991) found that between-group differences in skin-tone corresponded to roughly half an additional year of education. That is, individuals classified as

“light” attained more than two additional years of education, on average, than individuals classified as “very dark.” Similarly, in a study using the National Chicano Survey, light-skinned Mexican Americans attained roughly two more years of education than dark-skinned Mexican Americans (Murguia & Telles, 1996). Both studies found these results even when controlling for background and demographic characteristics such as age, family socioeconomic status, parent’s education, and birth cohort (Keith & Herring, 1991; Murguia & Telles, 1996). Furthermore, in an investigation of the intersectional impact of gender and colorism, Hunter (2002) found skin color to be a significant predictor of educational attainment for both African American and Mexican American women. Finally, Hochschild and colleagues (2004) found that lighter-skinned African American and Latino persons of the Multi-City Study of Urban Inequality (MCSUI) were more likely to attain a college degree than their darker skinned counterparts.

Interested in the independent and interactive effects of hierarchies based on race and skin-tone, Thompson and McDonald (2016) investigated the inter- and intra-racial skin-tone differences in educational achievement. Using a nationally representative sample and drawing from Bonilla-Silva’s (2004) tri-racial argument, Thompson and McDonald (2016) predicted lower GPAs both within and between races as skin-tone goes from light to dark. Consistent with their predictions, results indicated that on average, darker skin-tone was associated with lower GPAs. When looking only at race, results showed that African Americans, Latinos, Native Americans, and multiracial students had significantly lower grades than Whites. Asian Americans however, had significantly higher GPAs than Whites. However, when the model consisted of both race and skin-tone, skin-tone remained statistically significant. More specifically, when accounting for skin-tone, the racial differences in achievement relative to

Whites decline in magnitude. Further, the authors found that GPA differences based on skin-tone maintains independently of other family characteristics.

Thompson and McDonald's study, coupled with previous work that found that skin-tone is associated with less academic achievement among Latino adults, underscores that there are still relevant differences in individuals' experiences in the U.S. based on skin-tone. Although this previous work on skin-tone and academic achievement has focused on adolescents and young adults, Garcia Coll et al.'s integrative model of developmental competencies of minority children provides a useful framework for understanding how this relation may exist among young children.

Theoretical Model for the Association between Skin-Tone and Academic Achievement

The integrative model (1996) theorizes the underlying factors that inform minority children's developmental competencies. The integrative model (1996) emerged because of the absence of appropriate theoretical models for research on minority populations that address issues specific to those populations, and that capture individuals' actual lived experiences. Their theoretical model builds upon, but is different from, prior ecological theories, such as Bronfenbrenner's bioecological theory (Bronfenbrenner & Morris, 2006). The integrative model (Garcia Coll, Lamberty, Jenkins, McAdoo, Crnic, Wasik, and Vazquez, 1996) elevates characteristics that define social position (e.g., race, gender) and social stratification (e.g., systems of racism, prejudice) to central issues in the model, rather than considering them as peripheral. Thus, social positions and stratification systems are thought to influence the process of child development directly.

The social position variables include aspects of individual attributes that are used to stratify societies in a social hierarchy. These variables include, race, ethnicity, and social class

among other possible variables. As Garcia Coll and colleagues describe, “these position factors represent social addresses that influence or create alternative developmental pathways to competence in these children (Garcia Coll et al., 1996, pg. 1895).” Although not mentioned specifically as a social position variable, skin-tone can be conceptualized as a component of race, or as a stand-alone social position variable itself. Therefore, guided by notions of the integrative model (Garcia Coll et al., 1996), skin-tone (a social position variable) would be expected to inform academic achievement (a developmental competency) among children.

In addition, another component of the integrative model (Garcia Coll et al., 1996) includes the notion that there are additional variables that modify the relation between social position variables and developmental competencies. Regarding the links between skin-tone and academic achievement specifically among children, one such variable may include ethnic-racial identity/identification.

Ethnic Racial Identity/Identification as a Moderator

Identity development has been identified as a crucial aspect of adolescence in developmental theory (Erickson, 1968). A particular kind of identity development, ethnic-racial identity (ERI), has been shown to be particularly important and protective for minority adolescents (Phinney, 2003; Reyes, Elias, Parker, & Rosenblatt, 2013; Umaña-Taylor & Updegraff, 2007). Early work in the study of ethnic racial identity distinguished between ethnic identity development and racial identity development. More recently however, prominent researchers in both areas collaborated in favor of a meta construct identified as Ethnic Racial Identity (ERI; Umaña-Taylor et al., 2014). According to this work, the meta construct of ethnic-racial identity is sufficient over creating a distinction between ethnic and racial identity due to the following reasons: a) research indicates that both formations of identity follow similar

developmental trajectories, b) children and youth often do not hold their racial and/or ethnic identity distinctly from the other, c) measures have not been designed to assess either phenomenon distinctly, d) distinction of the two are no longer salient for today's youth as opposed to previous generations, e) both constructs have considerable overlaps. Thus, consistent with this theory, the current paper will address ethnic-racial identity as a meta construct that takes into consideration both ethnic and racial components of identity. Ethnic-racial identity refers to a "multidimensional, psychological construct that reflects the beliefs and attitudes that individuals have about their ethnic-racial group memberships, as well as the processes by which these beliefs and attitudes develop over time," (Umaña-Taylor et al., p. 23).

Although a great deal of work has focused on ethnic-racial identity during adolescence, much less has focused on children. However, the process of ethnic and racial identity development does not exclude children. For example, according to theorists in the social identity development literature, children as young as 2 years old become aware of social categories such as ethnicity, race, and gender (Kohlberg, 1966). During the early childhood years, their growing understanding of social identities begin to inform their own self-identification and then the exploration and formation of their identities in adolescence. Based on recommendations by scholars to distinguish between the processes that occur during adolescence and childhood, I use the term *ethnic-racial identification* to refer to processes that occur during childhood, and *ethnic-racial identity* when I refer to processes that occur during adolescence (Umaña-Taylor et al., 2014). Because of the limited work of ethnic-racial identification (during early childhood), below I present theory and research on ethnic-racial identity (during adolescence).

When it comes to academic achievement, ethnic-racial identity has been posited as a protective factor by several different ethnic identity theories. For example, according to Cross's

(1995) model of identity, individuals with more developed racial identities are expected to have higher academic achievement. This is because individuals with advanced racial identities may have more confidence, more positive racial attitudes about their performance abilities, and are thus more able to focus and be less affected by both implicit and explicit racism. Following this line of reasoning, it is possible that youth who have higher ethnic-racial identity have more focus and are less affected by any environmental treatment (e.g., racism) based on skin-tone that would negatively affect academic achievement. In other words, children's ethnic-racial identity may be protective in buffering against the effects that skin-tone may have on academic achievement.

Although no work to date has tested how components of ethnic-racial identity *moderate* the relation between skin-tone and academic achievement, support for this possibility can be drawn from prior work that suggests that ethnic-racial identity is associated *directly* with better academic achievement. For example, Miller-Cotto and Byrnes (2016) conducted a meta-analysis of studies looking at different dimensions of ethnic identity and academic achievement. Across the 43 studies, the study found that individuals who reported more ethnic-racial identity affirmation (i.e., positive affect/attitudes regarding their racial or ethnic group membership), as well as those who reported more ethnic-racial identity exploration had higher achievement scores. Similar to these findings, another meta-analysis that focused on ethnic-racial identity affirmation found that there was a positive relationship between ethnic affirmation and academic performance and psychosocial functioning (Rivas-Drake, Markstrom, Lee, Umaña-Taylor, Yip, Seaton, ...French, 2014). Collectively, these prior studies summarized in two large meta-analytic summaries support that components of ethnic-racial identity predict greater academic achievement among adolescents. Given these promising effects of ethnic-racial identity as a

protective factor among adolescents, it is important to test how this may also play a protective role against the negative effects of skin-tone on academic achievement.

Present Study

As reviewed, race and skin-tone have been consistently shown to be associated with academic outcomes, such that minority and darker skinned adolescents and adults have lower academic achievement than their white and lighter skinned counterparts (see Thompson & McDonald, 2016). Because most of these studies focused on African American populations, the present study will examine whether and to what extent the findings extend to Mexican-origin child populations. According to developmental theories, children as young as 3 years old have an understanding of and are able to label ethnic and racial identity (Swanson, Cunningham, Youngblood, & Spencer, 2009). Thus, it is important to understand how and when children may begin to be vulnerable to the effects of colorism and social stratification to identify and develop preventative interventions earlier in a child's life.

My first aim is to investigate whether or not there is an association between skin-tone and academic achievement in a sample of 5-year-old Mexican-origin children. Grounded in theoretical notions from the integrative model (Garcia Coll et al., 1996), I hypothesize that darker skin-tone will be associated with less academic achievement. The second aim is to investigate how components of children's ethnic racial identification (i.e., centrality and positive ethnic-racial attitudes) influence the association between skin-tone and academic achievement. Drawing on ethnic-racial identity theory (Cross, 1995), I hypothesize that positive ethnic-racial affect and centrality will moderate the relationship between skin-tone and academic achievement. Specifically, I anticipate that more positive ethnic racial affect and centrality will serve as a buffer in the relationship between skin-tone and academic achievement, such that skin-

tone effects will be less pronounced when individuals have higher levels of positive ethnic affect and centrality.

Method

Participants and Procedure

The current study is a secondary data analysis drawn from a longitudinal study of 204 Mexican-origin young mothers, their mother figures (e.g., mother, aunt), and their children (Supporting MAMI; Umaña-Taylor et al., 2015). In the Supporting MAMI study, Mexican-origin pregnant adolescents who were 15 to 18 years old were recruited from community agencies and high schools in a Southwestern metropolitan area. Participants were interviewed annually for six years in their homes and in their preferred language (i.e., Spanish or English). Data collection occurred when mothers were in their third trimester of pregnancy (Wave 1; W1), and when children were 10 months (W2), 2 years (W3), 3 years (W4), 4 years (W5), and 5 years of age (W6). Mothers received \$60 for their participation at W6. They received an additional \$25 for their child's participation at each wave. All procedures were approved by the Human Subjects Review Board. There were high participation rates across all six waves (i.e., 96% at W2, and 88% at W3, W4, W5, and W6).

For the current study, I focused on Wave 6 data because that was the only wave in which children's ethnic-racial identification was assessed. Given the study's research questions, I only included children who understood and labeled themselves as Mexican, therefore, the current study's analytic sample included 79 children. At Wave 6, children were five years old and 53.2% were male.

Measures

Measures were translated into Spanish and back translated into English by two bilingual individuals. Final translations were reviewed by Mexican-origin individuals and discrepancies were resolved by the research team (Knight, Roosa, & Umaña-Taylor, 2009).

Children's skin-tone. Children's skin-tone was independently assessed by two researchers in-person after children were interviewed and before researchers left the families' home. As part of the ethnic-racial identification interview, children selected a doll from a group of five dolls that ranged in skin-tone. Simultaneously, two researchers independently rated children's skin-tone by examining the child's right arm, and rating which of the five dolls best matched the child's skin-tone. Children's skin-tone was coded on a scale of 1 (lighter skin-tone) to 5 (darker skin-tone), corresponding to the skin-tone of the best-matching doll. Discrepancies between the skin-tone ratings were discussed and reconciled until one value was assigned before leaving the families' home.

Children's ethnic-racial identification. A brief 2-minute puppet show designed by the research team was shown to orient children to the term Mexican. After the video, children were shown five gender-matched dolls (e.g., girls were shown female dolls, and boys were shown male dolls), ranging from lighter to darker skin-tones. Children were asked to identify which of the presented dolls is the Mexican girl/boy (e.g., "Now I would like you to look at these girls/boys, and please give me the girl/boy doll that you think is the Mexican girl/boy." Each child's selected doll was used for subsequent tasks to provide a concrete object to help the child keep the abstract concept of 'Mexican' salient. Three indicators of children's ethnic-racial identification were assessed in the current study: ethnic-racial attitudes, ethnic-racial centrality, and self-labeling as Mexican.

Children's positive ethnic-racial attitudes. Children's positive attitudes toward Mexican culture at W6 was measured by adapting Williams, Best, and Boswell (1975) Preschool Racial Attitudes II measure. In the original measure (Williams et al., 1975), children were shown a series of 24 pictures and related stories that featured either a positive adjective (e.g., good) or a negative adjective (e.g., naughty). Each story contained a drawn picture of a White person and an African American person, and children selected which person the story was about. In a later revised version by Kowalski (2003), children were not forced to choose between the two groups. Instead of pictures, dolls were used and children completed the task separately for each doll. In this adaptation, children were presented a series of 14 positive and negative adjectives read aloud by the experimenter and printed on cards, one at a time, and had the option of saying "yes" or "no" to whether each adjective applied to each of the two dolls. An adapted version of Kowalski's (2003) revised measure was used in the present study, however, because of our interest in children's attitudes toward their *own* ethnic-racial group, we only assessed children's attitudes toward a doll that children selected as Mexican. Additionally, two adjectives (i.e., unfriendly and helpful) were omitted and another two were reworded (i.e., kind and dumb) during the Spanish translation process so that the English and Spanish adjectives would be equivalent (Derlan et al., 2016). Thus, the final list of 12 adjectives included: smart, good, mean, ugly, pretty, clean, bad, friendly, kind, dumb, naughty, and dirty.

Prior to the start of the task, children were given instructions that corresponded to their gender. For example, girls were instructed "I am going to show you a card, and if the word on the card describes the Mexican girl, then you put it in front of the Mexican girl. If the word on the card does not describe the Mexican girl, then you put the card in front of the garbage can." Due to anticipated variability in children's reading abilities and consistent with Kowalski's

(2003) procedure for this task, all children were told what word was on the card (e.g., “This card says _____. Some children are _____. Is the Mexican girl_____?” This was repeated for all 12 cards. A 6-item positive attitudes subscale and a 6-item negative attitudes subscale was created using Stokes-Guignon’s (2011) scoring recommendations. The present study only focused on the 6 positive items, in which a score of 1 was given each time the child assigned a positive adjective to the Mexican doll. Scores were then summed across the 6 items, and ranged from 1-6. Reliability was .82 for children who completed the English version and .78 for children who completed the Spanish version. Higher scores indicated more positive attitudes about Mexican culture.

Children’s ethnic-racial centrality. An adapted version of Turner and Brown’s (2007) identity ranking task was used to assess children’s ethnic centrality at W6. In order to make it developmentally appropriate for 5-year-old children puppets and concrete items were used. Children were shown a gender-matched puppet named María or Tomás and told: “This is María/Tomás. María/Tomás has this blindfold over her/his eyes and cannot see you, but we are going to teach her/him about you.” Then, five clear acrylic boxes, each containing a card that had a picture of a social category (i.e., daughter/son, five-year-old, friend, Mexican, and girl/boy) was presented to them. Children were then given a marble with which they were instructed to put in the box that represented the most important thing they wanted María/Tomás to know about them. After the child placed the marble in a box, the box was removed, and the child was instructed to put the marble in the box that represented the *next* most important thing he/she wanted María/Tomás to know about him/her. This was repeated until all boxes were removed. The task was scored based on when the child put the marble in the Mexican box (i.e., 1st, 2nd, 3rd,

4th, 5th choice). The assigned value was then reverse-coded so that higher scores indicated higher ethnic-racial centrality (i.e., if the Mexican was chosen first, the child received a score of 5).

Academic Achievement. Children's academic achievement was assessed at W6 using the Woodcock Johnson III Tests of Achievement (WJ-III; Woodcock, McGrew, & Mather, 2000) or for primary Spanish speakers with the *Batería III Woodcock-Muñoz* (Batería-III; Muñoz-Sandoval, Woodcock, McGrew, & Mather, 2005). Both tests have been designed and validated indicating high internal and test-retest reliability among respondents ranging in age from 2 to 90. Each test provides a standardized, normative score that enables a comparison of the respondent's score against the national average for same-age peers. In the present study, we used results from two subtests from the WJ-III and Batería-III that were identified as appropriate for preschool-aged children: (a) Letter-Word Identification (*Identificación de letras y palabras*) and (b) Applied Problems (*Problemas aplicados*). On each test, the child's raw score (i.e., sum of correct responses) was converted to a standardized score called a *W score* using the WJ III Compuscore program provided by the test developers.

Analytical Approach

The current study examined whether skin-tone was associated with academic achievement. Additionally, I tested whether this association was moderated by two components of children's ethnic-racial identification (i.e., positive ethnic-racial attitudes and ethnic-racial centrality). To ensure that there was enough power to detect effects with our modest analytic sample size of 79 children, we ran 2 models that each included a different moderator. Models were tested via path analysis in *Mplus* version 7.11 (Muthén & Muthén, 2013).

We used three primary fit indices to examine model fit: the comparative fit index (CFI), the root-mean-square-error of approximation (RMSEA), and the standardized root-mean-square

residual (SRMR). CFI of greater than or equal to .95 (.90), RMSEA less than or equal to .05 (.08), and SRMR less than or equal to .05 was considered to indicate good or acceptable model fit (Hu & Bentler, 1999).

Consistent with Aiken and West (1991), we mean-centered continuous measures prior to the creation of interaction terms (for both ethnic-racial positive attitudes and ethnic-racial centrality). Additionally, simple slopes analysis was used to decompose the significant interaction term and the interaction was graphed and probed at one standard deviation above and below the mean of the moderator. Missing data were handled using full information maximum likelihood (FIML; Arbuckle, 1996).

Results

Data Preparation

SPSS 24.0 was used for all data preparation analyses. The original longitudinal study included 204 families. Given the study's focus on Mexican-origin children, we excluded 22 children whose fathers were not Mexican-origin. Next, of the remaining 182 children, we examined missing data, which indicated that 73.6% of children (i.e., $N = 134$) participated at Wave 6 and 26.4% (i.e., $N = 48$) children did not participate at Wave 6. Next, we examined whether there was a significant difference between children who participated at Wave 6 and children who did not participate in Wave 6 on key demographic variables at Wave 1 when there was complete data via an independent samples t-test (i.e., family income and mother's age) and Chi-Squared difference test (i.e., mother's nativity and father's nativity). This indicated that there were no differences in children's participation in Wave 6 based on mother's age and family income. However, there was a difference in those who participated and those that did not based on mother's nativity, such that children with mothers born in Mexico were less likely to

Table 1

Means, Standard Deviations, and Bivariate Correlations among Study Variables (N = 79).

	1	2	3	4	5	
1. Skin-tone	-					
2. Positive Attitudes	.08	-				
3. Centrality	.30**	-.17	-			
4. Applied Problems AA	-.20	.02	-.07	-		
5. Letter Word Academic Achievement	.01	.09	-.09	.68***	-	
	Mean	3.05	4.95	3.11	88.94	88.91
	Standard Deviation	.84	1.30	1.37	14.08	12.32

Note. AA = Academic Achievement. Means and standard deviations reported here were calculated prior to centering. Wave 5 economic hardship is calculated as a weighted summed score.

* $p < .05$. ** $p < .01$. *** $p < .001$.

participate at Wave 6 [$\chi^2(1) = 7.87, p < .01$]. Yet, given the study's focus on young children's cultural experiences, we limited our sample to only include children who self-label as Mexican. Given that children had to participate in Wave 6 in order to self-label, there was no missing cases in the current analytic sample. Further, there was no data missing at random in key study variables among the 79 children who were included in the current study. Next descriptive statistics, including means, standard deviations, and frequencies were examined and everything was within expected ranges indicating no issues with the data (Table 1). Finally, analysis of skewness and kurtosis indicated that all measures were normally distributed (i.e., skewness less than two and kurtosis less than seven; Tabachnick & Fidell, 2006).

Moderation Results

Moderation analyses were assessed using Mplus (Muthén & Muthén, 2013). To test our hypotheses we ran two models, one with each moderator. Given that our models were fully

saturated with all pathways accounted for in each model, neither model includes model fit.

Below unstandardized betas are reported, and standardized betas are reported in figures.

Regarding the first model that included centrality as a moderator, consistent with our first hypothesis, findings indicated that children's skin-tone significantly predicted their performance on applied problems ($b = -4.00, p \leq .05$; Figure 1). Skin-tone and performance on the letter-word subtest, however, was not significant. Regarding the interaction, centrality did significantly moderate the association between skin-tone and letter-word performance ($b = -2.37, p \leq .05$). Simple slopes analyses indicated that at high levels of centrality, there was a negative relation between skin-tone and letter-word performance ($b = -3.74, p = 0.02$) and at low levels of centrality the relation between skin-tone and letter word performance was not significant ($p > 0.05$; Figure 2).

Regarding the second model that included positive attitudes as a moderator, consistent with hypotheses, findings indicated that children's skin-tone significantly predicted their performance on applied problems ($b = -3.61, p \leq .05$; Figure 3). Skin-tone and performance on the letter-word subtest, however, was not significant. Regarding the interaction, positive attitudes did not moderate the association between skin-tone and letter-word performance or between skin-tone and applied problems ($p > .05$).

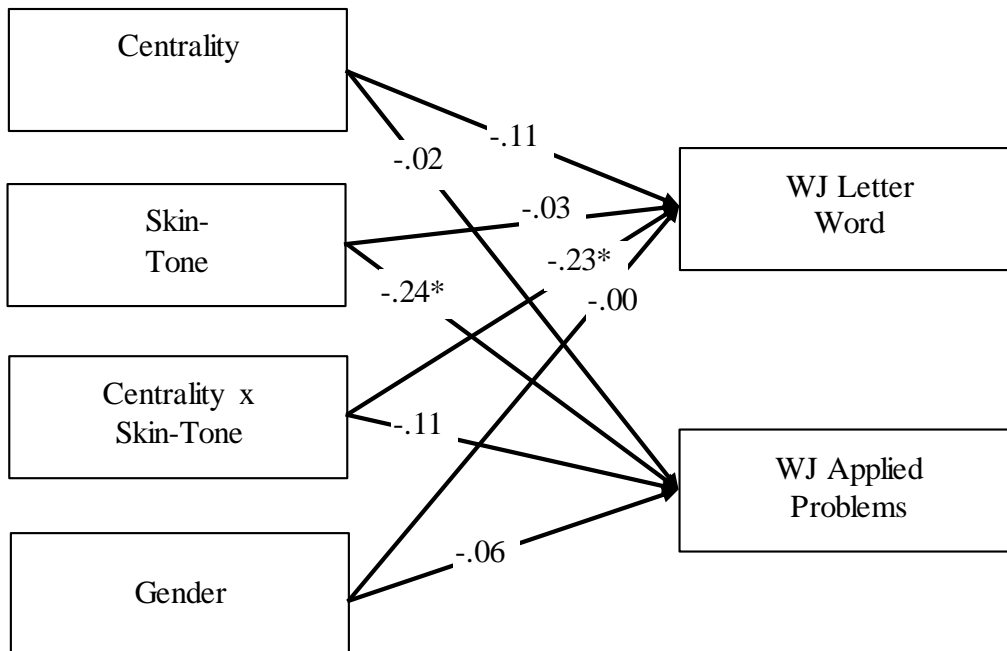


Figure 1. Hypothesized model examining how skin-tone predicts academic achievement, moderated by ethnic-racial centrality. Standardized regression coefficients are displayed. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$



Figure 2. Moderation effects of ethnic-racial centrality on the association between skin-tone and letter-word academic achievement.

Note. * denotes significant slope at $p < .05$, and ns = non-significant slope

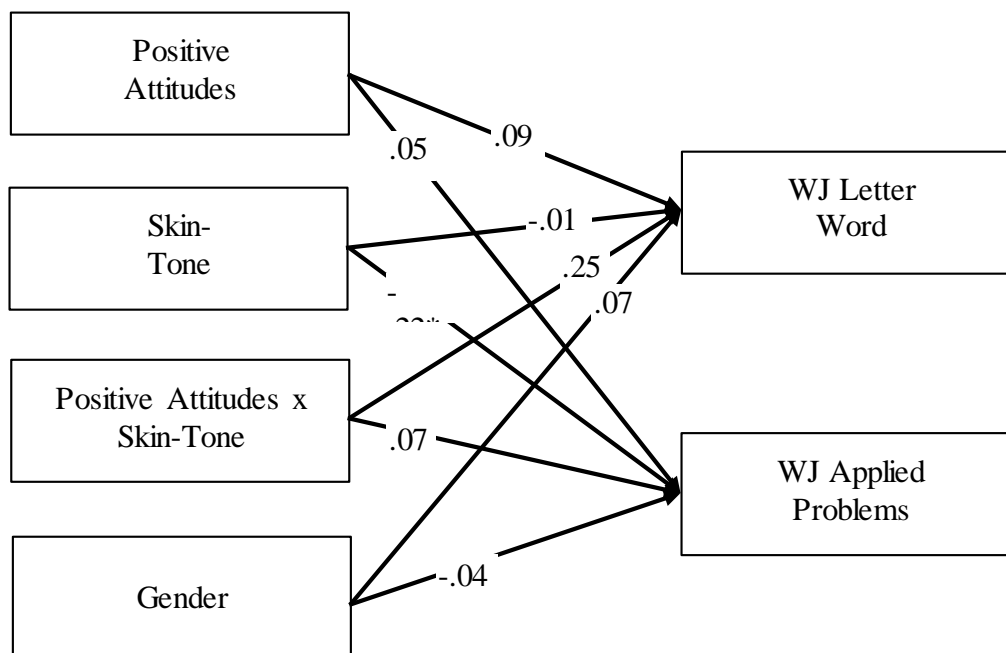


Figure 3. Hypothesized model examining how skin-tone predicts academic achievement, moderated by ethnic-racial positive attitudes. Standardized regression coefficients are displayed. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Discussion

Skin-tone based social stratification has been characterized as an “enduring part of the U.S. racial landscape” (Hunter, 2002; p. 176). Despite the plethora of research that examines the racial disparities in education (e.g., Bodenhorn, 2006), few studies have examined the skin-tone based disparities in different academic outcomes. Given the interconnectedness of racism and colorism and the abundance of literature identifying racial disparities in academics, it is important to investigate the relation between skin-tone and academic achievement and explore the possibility of protective, moderating variables. Specifically, grounded in Garcia Coll and colleagues’ (1996) integrative model, we tested whether skin-tone, conceptualized as a social position variable, predicted children’s academic achievement, conceptualized as a developmental

competency variable. Further, guided by ethnic-racial identity theory (Cross, 1995), we examined whether centrality and positive racial ethnic attitudes moderated the relationship between skin-tone and academic achievement. Although our expectations regarding the relationship between skin-tone and academic achievement were supported, only centrality moderated the association between skin-tone and academic achievement and did so in the opposite direction than was expected. Below, findings are discussed in more detail for (a) the relation between skin-tone and academic achievement, and (b) ethnic-racial identification variables as moderators.

Skin-tone and Academic Achievement

Consistent with expectations, our findings indicated that lighter skin was associated with Mexican children's higher academic outcomes in terms of applied problems. To our knowledge, this was the first study to test this association during early childhood. Results are consistent with prior research that found similar relations with skin-tone and academic achievement with older individuals (e.g., Keith & Herring, 1991; Telles, 2007, 2014; Thompson & McDonald). Importantly, results build on prior work that tested this association in Latinx adolescents and adults by indicating that skin-tone may contribute to disparities in academic achievement much earlier during the developmental period of adolescence. Although findings suggest that colorism is affecting children's early experiences, testing this notion along with specific underlying mechanisms that explain this relation were beyond the scope of the current study. However, there are various possibilities that represent important directions for future research during early childhood. For example, although the present study found that skin-tone (a social position variable) affects the development of competencies in terms of academic achievement, Garcia-Coll and colleagues' integrative model posits numerous mediating pathways that could help

explain this relation in a more nuanced way. For example, a child who is darker skinned may encounter increased levels of racism, prejudice, and discrimination that manifest in promoting/inhibiting environments (e.g., school, neighborhood, and health contexts), which then may lead to poorer developmental competencies. Limited work has tested these notions during early childhood, but findings from the present study suggest that this is an important endeavor given that skin-tone, and colorism more specifically, are already having an effect during early childhood.

As another example of the processes underlying findings in the present study we can turn to notions put forth regarding the halo effect. Specifically, with respect to education in particular, skin-tone based discrimination affects interactions among teachers, students, and families in both explicit and implicit ways (Burton, Bonilla-Silva, Ray, Buckelew, & Freeman, 2010). For example, Hunter (2016) posits that the halo effect, a psychological phenomenon that describes people's tendency to use a positively perceived trait (typically physical attractiveness) for the appraisal of other characteristics like intelligence, is one mechanism that explains the association between skin-tone and academic achievement. Hunter (2016) explains how the halo effect can have significant effects in the classroom as lighter-skinned students and parents are implicitly favored due to racialized beauty standards that then extend from "notions of physical attractiveness to perceptions of intelligence, competence, and integrity" (p. 56, Hunter, 2016). This implicit notion that lighter students are "good kids" is likely to create more positive experiences and relationships with teachers and other peers, both of which impact academic outcomes. Similarly, Hunter posits that these notions also extend to parents and their advocacy efforts as skin-tone and other aspects of racial capital influence the interactions and how they are perceived by the school. However, these notions are speculative and warrant future investigation.

Lastly, the fact that skin-tone predicted applied problems, an indicator of math ability, and not letter-word, an indicator of reading, is notable considering literature on STEM disparities in minority older children and adolescents. Therefore, this difference may have implications for later STEM disparities (e.g., Else-Quest, N.M., Mineo, C.C., Higgins, A., 2013). Moreover, the current study's finding may provide evidence indicating differences in STEM access and achievement may be happening much earlier than usually examined. Furthermore, typically achievement gap literature focuses on black and white youth, whereas less is focused on Latinx children (e.g., Bornstead & Morris, 2006). Collectively our findings indicate the need for more work focused on early childhood populations as well as Latinx populations.

Ethnic Racial Identification Variables as Moderators

Informed by theories and prior research investigating the protective effects of ethnic-racial identity variables on developmental competencies such as academics (Garcia Coll et al., 1996; Rivas-Drake, 2014; Umaña-Taylor et al., 2014), we also examined factors that may modify the association between skin-tone and academic achievement. Contrary to our hypotheses, of the two moderators we examined, only centrality moderated the association between skin-tone and academic achievement and does so in the opposite direction than was predicted. More specifically, positive attitudes did not moderate the association and centrality actually strengthened the association between skin-tone and academic achievement.

Our null findings for positive attitudes as a moderator, one dimension of ethnic racial identification observed in this study, can be explained by several different factors. First, due to children's cognitive abilities at this stage, simply having positive attitudes about their ethnic or racial group may not be enough to protect against the negative environmental factors with respect to skin-tone. To elaborate on this point, we turn to Piaget's theory of cognitive

development. According to Piaget, “knowledge is an action or event rather than a state” (p. 30, Miller, 2016). For example, a child may understand and identify a ball, however, her *true* knowledge of what a ball is comes with experiences such as bouncing or throwing --meaning once she physically or mentally manipulates it. More concisely stated, knowledge is considered to be a relationship “between the active knower and an object” guided by how information is selected and interpreted in the environment (p. 31, Miller, 2016). At this age, children are in the pre-operational stage of cognitive ability and may struggle to select and interpret this environmental information. Considering this aspect of Piaget’s theory, children may have positive attitudes toward their ethnic-racial group, but when confronted with negative messages about their skin-tone, they may not truly be able to apply these positive attitudes to combat the negative messages until they have opportunities to experience and *construct* their knowledge in more depth. It is possible that more direct, interactive experiences where children construct their knowledge about their culture must happen so that children can crystalize their knowledge to be able to combat the negative messages. For example, positive affect may be protective if it exists in tandem with daily interactive ethnic-racial socialization processes with parents (i.e., experiences that teach children about their culture; Hughes, 2006) where children have the opportunity to learn more about their culture and actively engage with this information and effectively crystalize their understanding. Future work should test this notion directly to determine if children’s positive ethnic-racial attitudes do buffer the relation between skin-tone and academic achievement when in tandem with daily, interactive ethnic-racial socialization.

Centrality as a moderator. Our findings showed that ethnic-racial centrality moderated the relation between skin-tone and letter word academic achievement. However, contrary to our hypothesis that centrality would be protective against the negative effects of skin-tone on

academic achievement, centrality actually *strengthened* the relation between skin-tone and academic achievement. In other words, darker skin-tone was associated with less letter-word academic achievement for children with *high* ethnic-racial centrality, but this relation was not significant for children with *low* ethnic-racial centrality. Although this finding was contrary to expectations, it aligns with previous findings with older youth.

Ethnic-racial centrality has been shown to be protective in predicting outcomes like health behaviors, academics, and mental health (Rivas-Drake et. al., 2014), however, some studies have shown that centrality may also increase the perceptions of bias and discrimination. For example, Sellers and Shelton (2003) found that among adolescents with high ethnic-racial centrality, depending on the types of messages and cues they received from their environments, high ethnic-racial centrality could be either protective against or increase risk. In the emerging adult literature, the role of centrality appears to be similarly inconsistent, sometimes serving as a buffer against negative outcomes, and other times triggering negative consequences. For example, Sellers and Shelton (2003) found that dimensions of ethnic-racial identity such as ethnic-racial centrality triggered the extent to which negative incidents in participants' daily lives were perceived as racial discrimination. However, in the same study, they also found that racial ideology and public regard played a protective role against the negative mental health consequences of perceived discrimination.

Taken together, the literature illustrates that although ethnic-racial centrality often plays a protective role in buffering against negative consequences of negative racial experiences (e.g., discrimination), it may also leave individuals more vulnerable to discrimination itself because they notice racial experiences more readily. This is particularly important to note for young children. As previously discussed, findings from Bernal et al. (1990) as well as Knight et al.

(1993) and Serrano-Villar and Calzada (2016) show that children first develop abilities of self-identification and constancy in the formation of their ethnic racial identity. Other components such as knowledge, on the other hand, develop and crystalize over later years, particularly during adolescence. It is possible that among young children, like the 5 year olds in the current study, children have yet to develop the knowledge necessary to combat the negative effects of discrimination further exacerbated by high levels of centrality. Overall, findings indicate that ethnic-racial centrality is an important construct to examine that has complex implications for young children's development that warrants future investigation.

Limitations and Future Directions

The current study has several limitations to note. First, for the purpose of adapting to children's developmental abilities, dolls and a puppet video were used to measure different dimensions of ethnic racial identification. Particularly, a puppet video was shown to orient children to the term "Mexican" to account for the variation in children's understanding or familiarity of the term itself. It is possible, however, that the video may have primed children to label themselves as Mexican at a higher rate than would be expected without the presence of the video. It will be important to consider this in future studies and to incorporate experimental designs to test the possibility of priming in studies with young children.

Another limitation of the present study is the absence of demographic information regarding the schools that the children in our sample attended. Ideally we would have been able to use these variables as controls in our analyses, however, we were not able to do so due to the absence of such variables. Albeit limited, there is some literature that indicates that differences in identity development and response to discrimination may vary based on school and neighborhood context (Umaña-Taylor & Shin, 2007). For example, Umaña-Taylor and

colleagues (2007) found that both the meaning and significance of ethnic identity for Asian Americans varied based on region, California versus the Midwest in this case. Additionally, depending on the heterogeneity or homogeneity of school population demographics, children may be more or less likely to experience or identify instances of discrimination with respect to skin-tone. Therefore, future work should consider collecting these variables in work focused on cultural processes during early childhood.

Next, the measurement of skin-tone was done by independent raters and discrepancies were resolved by the principal investigator. Although this is consistent with the methodology of prior studies in this area of research, new technology allows for completely objective measures of skin-tone. For example, spectrophotometers are non-invasive instruments used in dermatologic practice as well as clinical research that provide a way to objectively quantify skin-tone by measuring wavelengths of light absorbance of the skin (Dondelinger, 2011). Thus, future studies focused on the effect of skin-tone on academic achievement during early childhood should consider whether different findings emerge when using objective measures of skin-tone, such as spectrophotometers.

Despite its limitations, the present study extends the literature on skin-tone based disparities in outcomes by extending this research to young children. This aspect of the study moves the field forward by investigating how early these skin-tone based disparities begin so that preventative strategies may be developed and incorporated earlier. Our findings highlight that this is an important area for future research that may have important implications for early intervention efforts with 5-year-old children. For example, based on Hunter's (2016) theory regarding the halo effect, implicit bias training for teachers and administrators may be an important part of interventions aimed at decreasing skin-tone disparities and subsequent effects

on academic achievement. Additionally, because prior studies have not investigated the association between skin-tone and academic outcomes in young children, the results of this study indicate that this relation exists much earlier than has been tested and suggests that effective interventions designed for adolescents and adults should be adapted for young children. The adaptation of effective interventions for young children and early education systems could have significant long-term effects, as prior research has indicated that skin-tone-based disparities in education have dire lifetime outcomes by way of educational attainment and income. In conclusion, the current study builds on and contributes to our further understanding of the achievement gap, and the role that ethnic-racial identification may play in this association.

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