

# Gender and Ethnic Differences in Smiling: A Yearbook Photographs Analysis from Kindergarten Through 12th Grade

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Published online: 17 April 2012  
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**Abstract** Previous research has demonstrated that women smile more frequently and more broadly than men (Abel 2002; LaFrance et al. 2003). However, little research has focused specifically on the age at which this gender difference first emerges, and even less on the ethnic differences in smiling. This study attempts to identify the age when gender differences in smiling emerge among European American and African American children and teenagers. Additionally, we looked at the level of diversity within each school and its relation to smiling behavior. In total, 18,201 yearbook photographs ranging from kindergarten through 12th grade from 17 schools in the state of Michigan were evaluated for smile type: full smile, partial smile or no smile. Results suggest that a significant gender difference in smiling emerges around age 11. In contrast to other studies (e.g., LaFrance et al. 2003) and our own expectations, differences in smiling were found to be larger between African American boys and girls than between European American boys and girls. In addition, we found that African American girls' smiling behavior did not differ as a function of school diversity while African American boys from predominantly African American schools displayed less smiling compared to those from mixed or predominantly European-American schools. This study provides insight into the emergence and progression of gender differences in smiling and indicates that gender as well as ethnicity and ethnic diversity are influential factors in smiling behavior.

**Keywords** Smiling · Gender · Ethnicity

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## Introduction

Gender stereotypes pervade the culture in the United States, categorizing women as different than men (e.g., Bem 1981; Blakemore 2003). Abundant research has supported a variety of definite gender differences between men and women in nonverbal behavior (e.g., LaFrance et al. 2003). Since the 1980s, a growing body of research in the U.S. has focused specifically on gender differences in smiling with the majority of the findings demonstrating that women smile more often and more expansively than men (e.g., Abel 2002; DeSantis et al. 2005; Dodd et al. 1999; Ellis 2006; Hall et al. 2002; LaFrance et al. 2003). Despite knowledge that differences between ethnicities within countries may exist (Matsumoto 1993), research regarding gender differences in smiling tested samples composed primarily of European American adults (LaFrance et al. 2003). Therefore, the knowledge about gender differences in smiling in children and in other ethnic groups in the United States is rather limited.

The present study examined yearbook photographs to investigate smiling behavior in both African American and European American children from Kindergarten through 12th grade living in Michigan. Specifically, this study intended to replicate the findings of Dodd et al. (1999) which indicate that gender differences in smiling among boys and girls in the U.S. first emerge in fourth grade. Unlike previous research conducted in the United States focusing gender differences in smiling, the current study examined gender differences specific to two different ethnicities. While this study is specific to the United States and limited to the Midwestern region, it may contribute to cross-cultural understandings of the relationship between ethnicity and learned gendered behavior. Additionally, identifying the age at which a gender difference in smiling emerges

contributes to research on the socialization of gender roles and the role of ethnicity in gendered behavior (Dodd et al. 1999; Hall et al. 2002). In particular, research has strongly suggested that smiling is a highly social display (LaFrance et al. 2003). From this perspective, it is important to consider the various characteristics which may contribute to differences in smiling behavior among individuals in similar social situations, as it is the case with having one's yearbook photograph taken. In examining gender differences in smiling by ethnicity and age among individuals sharing a common social experience, it is possible to examine the interconnections of age, ethnicity and gender especially in terms of gender roles. All further studies reviewed here are US-based studies unless otherwise noted.

The majority of U.S. studies regarding smiling behavior have used observational methods (LaFrance et al. 2003). However, photograph analyses have become increasingly popular with yearbook photographs presenting many advantages compared to contemporary published photographs. While published photographs are taken in a variety of settings, including a professional photography studio, yearbook photographs, with the exception of senior pictures, are taken at the school in assembly line fashion. In addition, yearbooks provide a common experience in which individuals are likely to portray themselves as they would like to be remembered (Dodd et al. 1999). Meanwhile, yearbook photographs have become extremely commonplace in schools in the U.S. Through the use of yearbooks, it is possible to examine photographs of boys and girls spanning wide age ranges and consider differences between ethnicities. Also, yearbook photographs have been established as a means of identifying gender differences in smiling (e.g., Brennan-Parks et al. 1991; Dodd et al. 1999; Morse 1982; Ragan 1982).

Because it is somewhat likely that photographers instruct students to smile, Brennan-Parks et al. (1991) investigated Canadian college students' experiences with having their yearbook photographs taken. In total, 76 students were asked to complete a survey which included questions regarding whether or not he/she wanted to smile in his/her photograph, whether he/she selected a photograph for the yearbook of him/her smiling, and the degree to which the photographer encouraged smiling. Results found that women had a stronger desire to smile and also selected a photograph showing them smiling significantly more often than men. Although women desired to smile more than men, there was no reported difference in encouragement to smile from the photographer (Brennan-Parks et al. 1991 (CA)). These results are similar to photographers' self-reports that they encourage all students to smile (Mills 1984). This general encouragement to smile by photographers supports the internal validity of this method, i.e., differences in smiling reflect the individual's choice.

The only study that focused specifically on the age at which gender differences in smiling first emerge was conducted by Dodd et al. (1999). Utilizing yearbooks primarily collected from the United States Midwest, the researchers analyzed 16,514 yearbook photographs of children in grades Kindergarten through eighth grade, high school grades 9 and 12, and the first and fourth years of college (Dodd et al. 1999). Results indicated that in fourth grade significant gender differences in smiling emerged (Dodd et al. 1999). Building on this research, the current study seeks first to replicate upon the findings of Dodd et al. (1999) in identifying the age at which gender differences in smiling first emerge through yearbook photographs analysis. Furthermore, while Dodd et al. (1999) only included ninth and twelfth grade in their sample of yearbook photographs, our sample is inclusive of grades Kindergarten through 12th enabling us to discuss changes in smiling from grade to grade. In addition, this study examined yearbook photographs of both African American and European American children in order to examine gender differences within and between both ethnicities.

Although research supports differences between men and women, the sources of these differences are disputed as researchers have attributed gender differences to either socialization, evolution, biology, or a combination of the three (Durik et al. 2006; Ellis 2006; Galambos et al. 1990). Gender affirmation refers to the desire to assert oneself as distinctly female or distinctly male (Hall et al. 2002). Yearbook photographs provide an opportunity for individuals to display their gender. An additional explanatory factor, the response to a specific situation, refers to an individual's interpretation of others' expectations (Hall et al. 2002). In the case of yearbook smiling, girls may see other girls smiling consistently while posing for their photographs while boys may see other boys not smiling creating a social expectation for girls to smile and boys not to smile. Hall et al. (2002) attribute this emergence to the socialization of gender roles, while also emphasizing the significance of preadolescence in gender schema theory which posits that preadolescent development is characterized by a developing interest in sexuality. Dodd et al. (1999) suggest that U.S. preadolescents may look toward the media, where they will most likely locate stereotypical portrayals of dominant, aggressive, nonsmiling men and passive, emotional, smiling women, to identify appropriate gendered behavior. Moreover, boys and girls are socialized differently and girls may learn to view themselves as objects to be looked at by others (Fredrickson and Roberts 1997). Objectification theory posits that cultural modes of objectification, both through interpersonal and social encounters and the media, serve to socialize girls and women to view themselves, at least partially, as objects to be looked at and evaluated solely on the basis of their physical appearances (Fredrickson and

Roberts 1997). For girls, the yearbook photograph experience may exemplify a time in which young women are evaluating themselves and positioning themselves to be evaluated by others.

Most of the research conducted in the United States investigating smiling has focused on young adults and adults (Abel 2002; LaFrance et al. 2003). In one of the first studies to focus on smiling behavior in college yearbook photographs, Morse (1982) examined individual portrait photographs from college yearbooks indicating that girls smiled more frequently than boys. In another study, Ragan (1982) examined yearbook photographs of high school seniors, university seniors, high school teachers and university professors and found that girls and women smiled more often and more expansively than boys and men. Apart from the yearbooks study conducted by Dodd et al. (1999), one exception from these studies focusing on older adolescents and adults is the one by Desantis et al. (2005). The authors examined contemporary published photographs of children, high school students, and teachers showing that a gender difference in smiling begins to appear after age 5, is significantly different by the late teen years, and remains prominent throughout adulthood (Desantis et al. 2005). It has to be emphasized that using photographs from various magazines may yield different results compared to yearbook photographs, the latter presenting more advantages: while yearbook photographs are taken in a familiar school setting and are a commonplace experience for students in the United States, published photographs may be more representative of special occasions and are more likely to be taken in an unfamiliar setting. Additionally, yearbook photographs allow more flexibility in self-expression than published photographs as the latter are more likely to have a secondary agenda, such as promotion of a particular event, activity or product.

Through a meta-analytic study, LaFrance et al. (2003) found that age played a significant role in moderating gender differences in smiling. Their meta-analysis compiled age groups as adolescents (13–17 years), young adults (18–23 years), and older adults (24–65 years). Overall, girls and women were found to smile more than boys and men throughout the age groups and across all nationalities (e.g., U.S., Canadian, Asian, Continental European, England). Specifically, gender differences in smiling were greatest for teenagers, smaller for young adults, even smaller for middle-aged adults and smallest for adults over 65 years of age (LaFrance et al. 2003). These results are consistent with gender intensification theory which states that differences between adolescent boys and girls increase with age, as pressures to fulfill traditional gender roles increase (Galambos et al. 1990; Sargent 2005).

Very few studies have focused specifically on other ethnicities in the US (LaFrance et al. 2003), despite cross-cultural psychologists strongly suggesting a need to examine differences that exist between cultural groups within one country (e.g. Matsumoto 1993). LaFrance et al. (2003) found

that while all ethnic groups in the United States exhibited gender differences in smiling, they are largest among European Americans (Cohen's  $d=.43$ ) while smaller gender differences in smiling are found among African American samples ( $d=.25$ ). Other research has illustrated that there are more significant gender differences, particularly in gender stereotypes of emotion, among European American men and women than among African American men and women (Durik et al. 2006). Durik et al. (2006) hypothesized that gender stereotypes of emotions would be related to collectivism and individualism. While African American culture is more collectivist than is European American culture, both cultures have gender roles which are related to the extent each culture values collectivism or individualism (Durik et al. 2006). European American gender stereotypes categorize women as having more passive, expressive behaviors whereas men are viewed as having more independent, instrumental behaviors (Block 1976; Durik et al. 2006). In contrast, African American women are considered to exhibit more instrumental, independent behaviors than are European American women (Durik et al. 2006). By distributing the Emotion Stereotype Questionnaire to European American and African American men and women in Midwestern cities, Durik et al. (2006) found more differentiated gender stereotypes of emotion among European Americans than among African Americans. While such information is helpful, it is not a direct measure of gender differences in smiling in African Americans. Beyond ethnicity, in the current study we were also interested in examining the role of ethnic diversity within schools and socioeconomic status in smiling behavior.

This study improves upon previous research by identifying the age at which gender differences in smiling emerge through a comprehensive sample of yearbook photographs and, unlike previous research, this study will examine gender differences between African American and European American children. Following both empirical and theoretical approaches outlined in the paper, we expect to find gender differences in smiling emerging during preadolescent years (hypothesis 1a) and reaching largest differences during late adolescent years (hypothesis 1b). We also predict a larger gender gap between European American girls and boys than between African American girls and boys (hypothesis 2). Since no empirical evidence is available for the role of ethnic diversity and SES in smiling, no specific hypotheses were formulated.

## Method

### Sample

In order to investigate gender and ethnic differences in smiling, this study used a method similar to that of Dodd

et al. (1999). In total, the sample comprised of 18,201 photographs from 34 yearbooks representative of 17 schools from Michigan located in the United States Midwest. Yearbooks spanned from 1996 through 2008. Within each yearbook, only individual portrait photographs were included. Yearbooks came from four elementary schools, seven junior high schools and six high schools. Photographs of students grades K-11 were taken at the school, during regular school hours in an assembly line photo session. In contrast, senior yearbook photographs were likely taken with a photographer of the individual student's choice and off school grounds. Senior photographs provide a unique situation as students generally choose the picture they want to appear in the yearbook from a variety of proofs in a variety of poses.

### Measures

Each photograph was coded for gender, ethnicity and degree of smile. The gender of each student was determined based on first name, hairstyle and clothing. If the gender of the student could not be confidently determined, the picture was excluded from the study. After identifying the gender of the subject, ethnicity was determined based on skin tone, hair color, hair texture, and first and last name. Only photographs of African American and European American children were included in the study.

### Smiling

Each smile was evaluated on a 3-point scale ranging from 0 (no smile) to 2 (full smile) with 1 being partial smile. For the purpose of better clarity, the definitions of each level of smile were expanded from those of previous studies done by Dodd et al. (1999) and Desantis et al. (2005). No smile was defined as closed mouth, no dimples and no upward curvature of the lips. A partial smile was defined as closed mouth, no teeth, dimples and some curvature of the lips or an open mouth with only or fewer than the front two teeth visible. A full smile was defined as mouth open, more than the front, top two teeth visible and distinct upward curvature of the lips.

### Socio-Economic Status (SES)

For each of the 17 schools used for the current study from which the yearbooks were collected, the combined percentage of children receiving free or reduced lunch was used as a proxy measure of SES. The percentage of free and reduced lunch ranged from 6.6 % to 81 % ( $M=37.68$ ,  $SD=22.58$ ). African American students came from schools with a significantly higher percentage of free and reduced lunch ( $M=56.92$ ,  $SD=12.27$ ) than European American students ( $M=34.05$ ,  $SD=22.24$ ),  $t(18199)=53.75$ ,  $p<.001$ . Due to these differences

between the two samples, SES was controlled for in the data analyses. SES was entered as a continuous variable (percentages of combined free and reduced lunches) into the analyses.

### Type of School

The schools participating in this study were coded into three categories based on ethnic diversity as follows: (1) predominantly European American (more than 60 % of the students were European Americans); (2) mixed ethnic groups (between 40 to 60 % of the students were European American, the rest consisting of Hispanic, African Americans, Asian Americans, and other ethnic groups); and (3) predominantly African American (more than 60 % of the students were African Americans). These schools significantly differed by SES, with (1) having the highest SES ( $M=25.40$  for the percentage of students receiving free and reduced lunch), followed by (2) ( $M=59.48$  for free and reduced lunch) and, finally, with (3) having the lowest SES ( $M=63.40$  for free and reduced lunch).

### Interrater Reliability

Each photo was rated by a female primary rater who is also the first author of this study. Frequencies of no smile, partial smile, and full smile for the four groups (European American boys and girls and African American boys and girls) were recorded for each grade within each yearbook as raw data. A second rating was done by a male coder, who was trained by the authors. He rated 4,883 (26.83 %) photographs. The agreement was analyzed by correlating the number of identified photos for each level of smile across all grades for the total sample as well as separated by ethnicity. The intercorrelations between each of the smiling categories were high for the total sample (all  $r_s(59)=.99$ ,  $p<.001$ ) as well as for each ethnic group (African American: all  $r_s(30)=.99$ ,  $p<.001$ ; European American: all  $r_s(27)=.97$ ,  $p<.001$ ). Paired  $t$ -tests were not significant for the total sample:  $t(60)=.61$ ,  $ns.$  for no smile,  $t(60)=1.53$ ,  $ns.$  for partial smile, and  $t(60)=1.38$ ,  $ns.$  for full smile. No differences occurred within ethnic group. For African Americans,  $t(31)=1.34$   $ns.$  for no smile,  $t(31)=.57$ ,  $ns.$  for partial smile, and  $t(31)=1.18$ ,  $ns.$  for full smile. For European Americans,  $t(28)=.64$ ,  $ns.$  for no smile,  $t(28)=1.45$ ,  $ns.$  for partial smile, and  $t(28)=.83$ ,  $ns.$  for full smile. Overall, the interrater agreement was satisfactory.

## Results

### Descriptive Statistics

A total of 18,201 yearbook photographs were evaluated, with 15,313 individual photographs of European American

children and 2,888 of African American children. The European American sample was comprised of 49.56 % ( $n=7589$ ) photographs of girls, and 50.44 % ( $n=7724$ ) photographs of boys. For the African American sample, there were more photographs of girls (59.11 %,  $n=1707$ ) compared to boys (40.89 %,  $n=1181$ ). The two samples differed in the distribution of gender,  $\chi^2(1)=88.38$ ,  $p<.001$ . Additionally, the mean value for the extent of smiling across all grades for European American girls was  $M=1.74$  ( $SD=.47$ ) while for boys  $M=1.47$  ( $SD=.61$ ). For African American girls,  $M=1.72$  ( $SD=.50$ ) and for boys  $M=1.10$  ( $SD=.79$ ). More detailed information about the extent of smiling by grade, gender, and ethnicity is presented in Table 1 as well as Fig. 1.

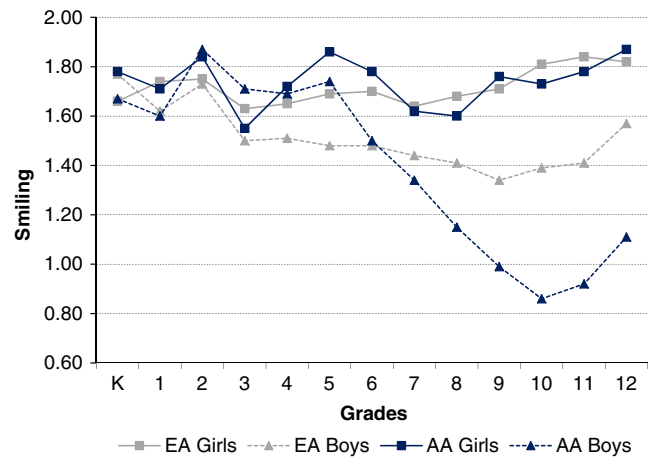
### Main Analyses

In a first step, ANOVA analyses were conducted with smiling as dependent variable, ethnicity, gender, grade as independent variables, and SES as covariate. The overall model was significant,  $F(52, 18148)=51.17$ ,  $p<.001$  and explained 13 % of the variance. All main effects, SES:  $F(1, 18148)=31.42$ ,  $p<.001$ , ethnicity:  $F(1, 18148)=4.74$ ,  $p<.05$ , gender:  $F(1, 18148)=157.13$ ,  $p<.001$ , grade:  $F(12, 18148)=15.82$ ,  $p<.001$  and the 2-way interactions, ethnicity x gender:  $F(1, 18148)=10.23$ ,  $p<.001$ , ethnicity x grade:  $F(12, 18148)=8.00$ ,  $p<.001$ , gender x grade:  $F(12, 18148)=21.31$ ,  $p<.001$ , were significant. Furthermore, the three-way interaction between ethnicity, gender and grade was also

**Table 1** Extent of smiling in photographs of European American and African American children by grade and gender

Grade	European American				African American			
	Girls		Boys		Girls		Boys	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
K	1.67	.50	1.76	.43	1.77	.44	1.61	.65
1	1.74	.45	1.62	.51	1.70	.47	1.57	.51
2	1.75	.46	1.73	.44	1.82	.39	1.87	.35
3	1.63	.54	1.51	.61	1.50	.55	1.67	.49
4	1.65	.51	1.51	.64	1.71	.47	1.69	.48
5	1.69	.49	1.48	.61	1.83	.39	1.71	.47
6	1.70	.50	1.49	.62	1.75	.49	1.47	.65
7	1.64	.50	1.44	.58	1.62	.52	1.34	.68
8	1.68	.50	1.41	.59	1.61	.54	1.15	.75
9	1.73	.47	1.36	.60	1.69	.51	.92	.79
10	1.82	.40	1.40	.60	1.69	.54	.83	.81
11	1.84	.38	1.41	.62	1.78	.46	.92	.75
12	1.84	.42	1.60	.63	1.79	.44	1.03	.83

Means are based on a 3-point scale ranging from 0 (no smile) to 2 (full smile) with 1 being partial smile



**Fig. 1** Estimated means for smile by gender, ethnicity and grade. Notes. 1) EA=European American; AA=African American; 2) Means are based on a 3-point scale ranging from 0 (no smile) to 2 (full smile) with 1 being partial smile

significant,  $F(12, 18148)=5.26$ ,  $p<.001$ . Therefore, we tested the gender and ethnicity effects for each grade separately in order to provide a more detailed overview of the results (see Table 2).

We expected gender differences in smiling to first appear during preadolescent years (hypothesis 1a) and reach largest effects during late adolescent years (hypothesis 1b). No gender differences occurred before sixth grade when consistent gender differences started to occur,  $F(1, 1512)=26.13$ ,  $p<.001$ , and they became more pronounced during high school years (see Table 2), with girls smiling to a greater extent compared to boys. Although there is a shift towards lower gender differences at 12th grade compared to previous high school grades, the difference remained highly significant (see Table 2). These results confirmed hypothesis 1a and 1b.

Ethnicity effects did not occur in the lower grades, with the exception of fifth grade where African American children were found to smile more broadly than European American children,  $F(1, 1286)=4.08$ ,  $p<.05$  (see Table 2). Differences systematically occurred starting with eighth grade ( $M=1.38$  for African American children and  $M=1.55$  for European American children),  $F(1, 1686)=20.06$ ,  $p<.001$ , and continued until 12th grade ( $M=1.49$  for African American children and  $M=1.70$  for European American children),  $F(1, 1970)=17.46$ ,  $p<.001$ , with African American children smiling significantly less than European American children (see Table 2 and Fig. 1).

Starting with eighth grade, the interaction effect between gender and ethnicity was found significant,  $F(1, 1486)=6.14$ ,  $p<.05$  (see Table 2). A closer inspection of the interaction shows that African American boys presented the strongest difference from all other groups (see Table 3 and Fig. 1), smiling significantly less compared to both groups

**Table 2** Effects of gender and ethnicity on smiling for separate grade levels (*F* values)

	Grades												
	KG	1	2	3	4	5	6	7	8	9	10	11	12
N (EA/AA) <sup>1</sup>	317/26	401/34	268/32	749/18	826/30	1260/29	1363/152	1444/341	1422/267	2013/559	1900/517	1787/473	1563/410
SES <sup>2</sup>	4.80*	2.31	1.22	3.02	.09	4.70*	6.70**	1.93	5.83*	8.50**	2.30	.01	6.75**
Gender	.01	1.78	.01	.01	.61	2.63	26.13***	51.50***	91.01***	448.36***	525.03***	518.10***	244.88***
Ethnicity	.02	.06	1.86	.18	1.40	4.08*	.88	3.31	20.06***	13.43***	54.60***	44.02***	17.46***
Ethnicity*gender	1.28	.01	.07	.99	.26	.21	.53	1.65	6.14*	54.11***	63.48***	57.85***	65.46***
R <sup>2</sup>	.03	.02	.01	.02	.02	.04	.04	.04	.08	.17	.21	.21	.13

1) EA European American; AA African American; 2) SES socio-economic status

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

of girls and the European American boys. While African American girls did not significantly differ from European American girls (see Table 3), African American boys smiled significantly less compared to European American boys (for example,  $M = .99$  for African American boys and  $M = 1.34$  for European American boys in ninth grade,  $F(1, 2569) = 46.72$ ,  $p < .001$ ), and these differences were consistent from grades 8 to 12 (see Table 3). In 12th grade, although still lower compared to girls, both groups of boys showed more smile compared to previous grades, and the gap continued to be significant between African American boys and European American boys (see Fig. 1 and Table 3). All analyses were controlled for SES.

In order to test the hypothesis whether the gender gap was greater among European Americans than among African Americans (hypothesis 2), Cohen's  $d$  was used for effect sizes, defined as the difference between the means for girls and boys divided by the pooled within-sex standard deviation. According to Cohen (1977), effect sizes of .20, .50, and .80 indicate small, medium, and large effects. Positive values for  $d$  are interpreted as greater smiling by females than by males. Among all European American students, a significant effect size of  $d = .50$  indicated that girls showed greater smiling than boys, with a 95 % confidence interval of .49 to .51. Larger gender differences were found for African Americans ( $d = .98$ ), with girls showing more smiling than boys (95 % confidence interval of .96 to 1.03). Thus, our results indicated the opposite of what hypothesis 2 predicted.

To compare these results more directly with those reported by LaFrance and Hecht (2000), we conducted analyses specifically for the age group 13 to 17 and found that girls in this age group showed greater smiling compared to boys,  $d = .74$  with a 95 % confidence interval of .73 to .76 (LaFrance and Hecht reported an effect size of  $d = .43$ ). Regarding ethnicity, results showed larger gender differences among African American teenagers ( $d = 1.23$ ) compared to European American teenagers ( $d = .67$ ).

Further analyses were conducted for school type. We included only African American high school students in this type of analyses because only for high school grades we had a substantial number of photographs of African American students. We did not include European American students in these analyses because the sample for school type 3 (predominantly African American schools) was very small. African American girls' smiling did not differ as a function of school type whereas African American boys coming from schools with a majority of African American student population ( $M = .81$ ) showed less smiling compared to those coming from school with a majority of European American student population ( $M = 1.25$ ) or schools with a mixed ethnic population ( $M = 1.29$ ) (see Fig. 2). These results indicated that the ethnic diversity of a school is an important environmental factor for the African American boys participating in

**Table 3** Contrast results for significant interaction effects between ethnicity and gender on smiling for grades 8 to 12 with SES as covariate

Grade	European American		African American		F-values for contrasts		
	Girls <i>M</i> ( <i>n</i> )	Boys <i>M</i> ( <i>n</i> )	Girls <i>M</i> ( <i>n</i> )	Boys <i>M</i> ( <i>n</i> )	EA girls vs. AA girls	EA boys vs. AA boys	EA boys vs. all girls
8	1.68 (708)	1.41 (714)	1.60 (127)	1.15 (140)	1.92	25.27***	43.95***
9	1.71 (1032)	1.34 (981)	1.76 (325)	.99 (234)	1.22	46.72***	178.35***
10	1.81 (897)	1.39 (1003)	1.73 (328)	.86 (189)	3.16	102.68***	158.17***
11	1.84 (903)	1.41 (884)	1.78 (313)	.92 (160)	1.60	83.23***	191.53***
12	1.82 (815)	1.57 (748)	1.87 (286)	1.11 (124)	1.07	52.11***	64.06***

1) EA European American; AA African American; 2) Means are based on a 3-point scale ranging from 0 (no smile) to 2 (full smile) with 1 being partial smile

\*\*\*  $p < .001$

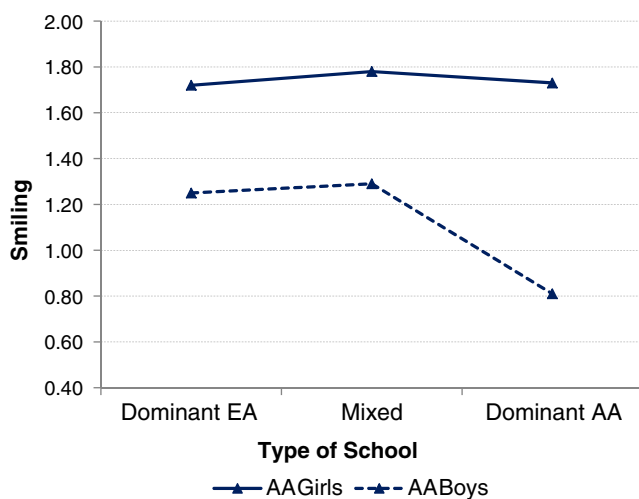
this study. Interestingly, there were no major differences in SES between schools with a majority of African American students and those with mixed ethnic population, as presented in the [Method](#) section.

## Discussion

This study aimed to identify when gender differences in smiling first emerge and to examine differences in smiling between and within samples of African Americans and European Americans by examining yearbook photographs of children from kindergarten to high school seniors. Overall, our results were in line with those found by Dodd et al. (1999) in showing that boys start smiling less expansively than girls during late preadolescent years. Different from our expectations, we found greater gender differences in smiling

within the African American sample compared to the European American sample. One interesting result was that African American boys displayed less smile compared to both groups of girls as well as European American boys. Additionally, we considered the influence of environmental factors such as SES and the overall ethnic make-up of the school on smiling behavior and found that African American boys displayed less smile in schools with a majority of African American student populations.

Our results are consistent with the findings of other research studies on gender differences in smiling (e.g., Brennan-Parks et al. 1991; Dodd et al. 1999; Desantis et al. 2005; Morse 1982; Ragan 1982) in demonstrating that girls and women in the United States smile more expansively than boys and men. Dodd et al. (1999) cite fourth grade as the first time when differences are statistically significant and those differences strengthen through sixth grade. Our results indicate that a gender difference in smiling emerges as statistically significant at sixth grade and remains stable until 12th grade suggesting that smiling behavior does not become gendered until approximately the ages 10 to 11 years old. Children acquire knowledge about gender norms and roles throughout childhood (Blakemore 2003). As children age, their knowledge about gender norms increases as they learn information about their designated gender roles from the media, their peers and parents (Blakemore 2003). Because knowledge about different gender norms increases with age, different behaviors and characteristics are categorized as gendered at different time periods. In identifying the age at which gender differences in smiling first emerge, it is possible that we have also identified the period when smiling becomes internalized as gendered. Based on our results, it is possible that in grade 6, children begin to recognize the smile as an indication of femininity or lack of masculinity. Because both African Americans and European Americans illustrated similar, although more differentiated, differences in smiling behavior, it is possible that aspects of gender roles are first acquired at similar developmental stages for both



**Fig. 2** Estimated means for smiling in African-American high school students by type of school. Notes. 1) EA=European American; AA=African American; 2) Means are based on a 3-point scale ranging from 0 (no smile) to 2 (full smile) with 1 being partial smile

ethnicities. We found larger gender differences in our study compared to those reported by LaFrance et al. (2003), which can be due to the nature of the samples included in their meta-analyses (teenagers and adults whereas we used children from K to high school seniors) and the measures used for smiling behavior.

This study expands on previous research by including separate analyses for gender differences in smiling for both African Americans and European Americans. First of all, we showed that ethnic differences appear starting with grade 8. This is an interesting finding since research suggests that the importance of racial identity to the self-concept starts to increase around 8th to 10th grade (e.g., Steele 1997). In our study, African American males show less smiling starting with grade 8. The results indicate a much more significant difference between African American boys and girls than between European American boys and girls. This evidence is in contrast to the results reported in the meta-analysis conducted by LaFrance et al. (2003). While African American girls and European American girls in our study followed a similar smiling pattern, African American boys and European American boys followed different smiling patterns. Specifically, African American boys were found to display less smiling compared with any other group. These differences may be explained by differences in experiences as well as differences in culture. They may be indicative of the nature of masculinity with African American boys feeling more pressure to adhere to standards of masculinity. Constructions of masculinity ideology may be shaped differently for different ethnic groups (Pompper 2010). Recently, masculinity has been characterized by African American males as appearing “tough,” or more specifically, as not appearing weak (Carlson 2008; Wisdom, Rees, Riley & Weis, 2007). Moreover, demonstrating one’s adherence to masculine gender roles becomes increasingly important in the presence of others, therefore depending on the social context (Carlson 2008). Schools present a particular type of social context and the environment of the school may be an important factor to consider. In schools with a majority of African American student population, African American boys smiled less broadly than in schools with mixed or majority European American student populations suggesting that these are contexts that foster race centrality. However, the ethnic make-up of the student population had no impact on the smiling behavior of African American girls.

The majority of the African American photograph sample was from urban areas and was representative of schools with low SES, making it likely that our particular sample of African American youth have high risk factors. For instance, in comparison to youth from other ethnic backgrounds, African American youth face higher rates of poverty, crime and violence partially due to the urban neighborhoods in

which many African American youth live (Edelman 1988; Glick 1988; Guerra et al. 1995). Heightened displays of masculinity by these African American boys may be a result of having similar exposure to risk factors such as poverty, violence and crime therefore experiencing a similar need to appear tough. Interestingly, African American boys from predominantly African American schools smiled less expansively compared to African American boys from ethnically mixed schools, although they were only slightly different in terms of SES. This suggests that something else other than SES may play a role here. Because the social context can be important in displaying gender roles (Carlson 2008), it is likely that these boys feel they must necessarily appear masculine to gain social approval from their peers. Yearbook photographs present a unique opportunity for boys and girls to present themselves as appropriately masculine or feminine for the social approval of their peers.

An interesting result of our study is that African American girls are not different from European American girls in their smiling behavior. Both standards of masculinity and femininity appear in media images, emphasizing male power and female passivity (Ricciardelli et al. 2010; Rohlinger 2002). While boys and men may connect their masculinity to toughness, girls and women may likely connect their femininity to cultural standards of beauty (Wisdom et al. 2007). These cultural standards of beauty are imposed on women throughout their lives through various processes of objectification (Fredrickson and Roberts 1997). Because U.S. culture is saturated with objectifying images of women, it is likely that all women are, at some level, affected by objectification (Fredrickson and Roberts 1997). In particular, the cultural standards of beauty are determined by the dominant culture, which is composed of white males, therefore the beauty standards imposed on all women may be more Euro-centric (Fredrickson and Roberts 1997). Furthermore, it is possible that due to historical context, African American males might be engaging in negative reactance by not displaying the “Uncle Tom” image of the smiling Black man which was popular in 1940s and 1950s. This idea emerges from interviews and autobiographies of well-known musicians (e.g., Miles Davis, John Coltrane), who suggested that they were against smiling because of how it historically was associated with clowning around and being simple-minded and subservient. There is no indication that women were expected to display similar facial expressions.

Because the sample was a convenience sample, the results are not entirely generalizable. As the yearbooks are representative of only the state of Michigan, generalizing results beyond the United States Midwest may not be possible. In addition, many of the yearbooks obtained were from predominantly European American or predominantly African American schools. Although there were some yearbooks that presented diverse populations, many of the



students in these yearbooks were Hispanic or Asian. For this reason, it is possible that due to sampling, some of the results of the study may be due to the location and environment of the schools. Although SES did play a significant role, when statistically controlled, gender and ethnicity were still significant factors in smiling behavior, demonstrating that while SES plays a role, it does not overshadow the influence of gender or ethnicity. We should emphasize that SES was an estimate of the entire school rather than specific to each individual student in our sample. Therefore, it is possible that many students in the sample were above or below the overall level of the SES of the school. Furthermore, the overall sample for African Americans was relatively small in comparison to the sample for European Americans making direct comparisons difficult.

Despite these limitations, this study provides insight into the emergence and progression of gender differences in smiling and indicates that gender as well as ethnicity are influential factors in smiling behavior. Future studies should more closely examine gender differences in smiling among African Americans and other ethnic groups in the US as well as conduct further testing for smiling behavior among African American boys.

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