


Teaching Behavior and Positive and Negative Affect in High School Students: Does Students' Race Matter?

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Abstract There are clear, empirical associations between teaching behaviors and students' affect. Yet no study to date has investigated whether teaching behaviors (i.e., instructional, organizational, socio-emotional, and negative) impact students' affect differently based on race/ethnicity. This gap in the literature is concerning given the substantial academic and mental health disparities between African American (AA) and European American (EA) students. Thus, the present study examined whether differences exist in the associations between teaching behaviors and affect in AA and EA high school students. Participating AA and EA high school students ($N = 968$; 60.2% EA) completed the Teaching Behavior Questionnaire and the Positive Affect and Negative Affect Scale for Children. Using hierarchical linear modeling, we found a positive association between instructional teaching behavior and positive affect in EA but not AA students; this association was significantly stronger in EA than in AA students ($p < .05$). There was a positive association between socio-emotional teaching behavior and positive affect ($p < .05$) for AA and EA students; race did not moderate this finding ($p > .05$). Finally, there was a negative association between negative teaching behavior and positive affect in EA but not AA students; race did not moderate this finding ($p > .05$). Regarding negative affect,

socio-emotional and negative teaching behavior were positively associated with negative affect ($p < .05$) in EA and AA students, respectively. Race did not moderate these associations ($p > .05$). The implications and limitations of the study are discussed.

Keywords Adolescence · Teaching behavior · African American · Depressive symptoms · High school

Effects of Teaching Behavior on Positive and Negative Affect in High School Students: Does Students' Race Matter?

Because students spend a majority of their waking hours under the supervision of teachers (Bureau of Labor Statistics, 2014), it is important to identify specific ways teachers can positively influence their students. Previous literature demonstrates that there is an association between specific teaching behaviors and students' depressive symptoms (Pittard, Pössel, & Smith, 2015) as well as positive (PA) and negative affect (NA; Pössel et al., 2013a). However, these studies examining teaching behaviors and students' mental health have been primarily composed of European American student samples (EA; Pittard et al., 2015; Pössel et al., 2013a) and no studies to date have directly investigated the relationship between teaching behaviors and African American (AA) students' affect. This lack of research focused on AA adolescents is noteworthy because it is unclear if the relationship between teaching behaviors and EA students' mental health is generalizable to AA students and students of other racial groups. Thus, the present study fills an important gap in the literature by exploring the associations of teaching behaviors with PA and NA in AA and EA high school students,

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and to determine whether and how these associations might be different between these racial/ethnic groups.

Teaching Behavior and Adolescent Outcomes

Teaching behaviors are actions that teachers exhibit toward or in the presence of students, which have been categorized into four domains: instructional, organizational, socio-emotional, and negative (Pianta & Hamre, 2009; Pössel et al., 2013a). Instructional teaching behavior refers to the teachers' method of instruction, encouragement of student responsibility, and provision of direction and feedback to students. Organizational teaching behavior refers to how teachers manage students' behavior, encourage productivity, and engage students in learning and includes behaviors such as setting clear expectations and maximizing class time. Socio-emotional teaching behavior comprises the emotional connection teachers have with their students, the degree of responsiveness and warmth between teachers and students, and teachers' sensitivity to and regard for students (Allen et al., 2013; Pianta, LaParo, & Hamre, 2008). Negative teaching behavior encompasses counter-productive and unpleasant behaviors that the student perceives as threatening or punishing (Pössel et al., 2013a). Together, these four domains encompass the ways teachers interact with students, present material, and structure their classroom.

Evidence has converged on teaching behaviors, linking these four domains to high school students' affect (Pössel et al., 2013a; Pössel, Rudasill, Sawyer, Spence, & Bjerg, 2013b) and academic success (Allen et al., 2013; Connor et al., 2009; Pianta & Hamre, 2009). However, there is a dearth of existing literature on AA students' affect related to teaching behaviors. Thus, the present study is informed by the established links between teaching behaviors and academic success (e.g., Allen et al., 2013), and the bidirectional relationship between academic success and affect (e.g., Grimm, 2007) to connect teaching behaviors and affect. Given these findings and the links among them, it is plausible that positive teaching behaviors are associated with higher PA and/or lower NA in students, which is the opposite combination of PA and NA that accounts for depressive symptoms. Investigating the extent to which differences exist between AA and EA adolescents' affect in relation to teaching behaviors can aid teachers in making the classroom environment culturally responsive and relevant for the benefit of their students' mental health, as well as other positive outcomes (Gay, 2002; Ladson-Billings, 2006; Shevalier & McKenzie, 2012).

As mentioned above, research indicates that positive teaching behaviors are associated with higher levels of academic achievement (e.g., standardized test scores; Allen

et al., 2013; Connor et al., 2009) and fewer depressive symptoms (Pittard et al., 2015; Pössel et al., 2013a). Specifically, AA students in elementary, middle, and high school who are exposed to instructional (Pressley, Raphael, Gallagher, & Dibella, 2004) and socio-emotional (i.e., perceive a caring, supportive relationship; Howard, 2001; Pressley et al., 2004; Roeser & Eccles, 1998) teaching behaviors have increased levels of academic achievement (i.e., grades, grade point average). Additionally, AA middle school students who are exposed to organizational teaching behavior (Cholewa, Amatea, West-Olatunji, & Wright, 2012) have higher levels of academic achievement as measured by standardized test scores. Further, numerous studies composed of AA and EA middle and high school students have found a negative association between depressive symptoms and academic achievement, as measured by grades, grade point average, and scores on a standardized receptive vocabulary assessment, for both racial groups (Grimm, 2007; Humensky et al., 2010; Shahar et al., 2006).

In addition to academic achievement, teaching behaviors are associated with students' mental health. Regarding depressive symptoms, Pittard et al. (2015) found that negative teaching behavior was positively associated with depressive symptoms in a predominantly EA sample of high school students. However, they did not find a significant association between instructional, organizational, or socio-emotional teaching behavior and depressive symptoms. Pössel et al. (2013a) found that for high school students, both instructional and organizational teaching behavior were inversely associated with NA, but had no significant interaction with PA. In the same study, socio-emotional teaching behavior was positively associated with PA and NA. Finally, higher levels of negative teaching behavior were associated with less PA and more NA (Pössel et al., 2013a). The patterns of associations between teaching behaviors and depressive symptoms and affect make sense when examined through the lens of the tripartite model, which conceptualizes depression as low PA and high NA (Clark & Watson, 1991). As proposed by Pittard et al. (2015), only teaching behaviors that are significantly and inversely associated with both PA and NA are associated with depressive symptoms as well. If a teaching behavior is only associated with PA *or* NA, or if the associations with both PA and NA are in the same direction, it seems that affect would not be associated with depressive symptoms.

Based on our review, only the two aforementioned studies have investigated the associations between teaching behaviors and high school students' mental health (Pittard et al., 2015; Pössel et al., 2013a). However, no study has examined these relationships for differences between racial/ethnic groups. In addition, the sample of one of the

studies was composed of predominantly EA students (92.6 and 2.5% AA; Pittard et al., 2015). Thus, it is unclear if these results are generalizable to AA high school students.

Given the lack of research examining the relationship between teaching behaviors and AA and EA students' depressive symptoms, it is important to consider research on the characteristics these student groups prefer and perceive as important in their teachers. Pössel et al. (2013a) found that high school students' perceptions of their teachers' behavior was more predictive of student-reported depressive symptoms than teacher-reports or observer-reports of teaching behaviors. This demonstrates the importance of students' perceptions of their teachers, and thus, it is plausible that the characteristics students prefer in their teachers may play a role in student outcomes. Specifically, AA middle and high school students prefer and perceive as important warmth and niceness from teachers (i.e., socio-emotional teaching behavior), whereas EA middle and high school students prefer and perceive as important a well-organized teacher that explains classroom material clearly (i.e., instructional teaching behavior; Coleman, 2007; Sizemore, 1981). It is important to consider which teacher characteristics AA and EA high school students perceive as important, in addition to the established associations between teaching behavior and high school students' mental health outcomes (Pittard et al., 2015; Pössel et al., 2013a). It could be that some teaching behaviors are particularly culturally responsive and relevant for some AA students and select outcomes (e.g., increased academic achievement and decreased negative mental health outcomes).

Racial Disparities in Adolescent Outcomes

The criticality of culturally responsive teaching behaviors (Gay, 2002; Ladson-Billings, 2006) to promote positive outcomes in AA and EA students becomes apparent when considering the significant racial differences between AA and EA students' academic achievement and mental health outcomes. Regarding academic disparities, EA high school students are approximately 4.5 times more likely to score at or above the proficient level in math and about 3 times more likely to score at or above the proficient level in reading assessments than AA students (National Assessment of Educational Progress [NAEP], 2013). Further, EA high school students consistently obtain higher GPAs (NAEP, 2009) and score higher on national tests than their AA counterparts (Rowley & Wright, 2011). The bidirectional, inverse relationship between academic achievement and depressive symptoms (Grimm, 2007; Humensky et al., 2010; Shahar et al., 2006) points to further concern in regard to this achievement gap. Ferguson (2003) suggests

that teachers' behaviors and expectations may further exacerbate the achievement disparities noted in AA and EA students. Specifically, teachers often have biased expectations for their students, which create a self-fulfilling prophecy related to students' academic outcomes, and these biased expectations are more positive for EA students. Ferguson (2003) further noted that teachers' behaviors are perceived as less supportive by AA students.

In addition to academic achievement, teachers' behaviors are implicated in the mental health signs and symptoms evidenced in the students with whom they work every day. Given that positive teaching behaviors are associated with fewer depressive symptoms (Pittard et al., 2015; Pössel et al., 2013a), and that depressive symptoms are negatively associated with academic achievement (Grimm, 2007), promoting positive, culturally responsive teaching behaviors may be one way to combat both depressive symptoms and academic challenges and disparities.

In addition to the aforementioned discrepancies between AA and EA students academic outcomes, there is a lack of consistency in the current literature with regard to levels of depressive symptoms between AA and EA adolescents. To demonstrate this incongruence, Saluja et al. (2004) report *less* depressive symptoms in AA middle and high school students, whereas a second group of studies suggests *more* depressive symptoms in AA compared to EA students in middle and high school (Miller & Taylor, 2012; Sen, 2004) independent of socioeconomic status (Gore & Aseltine, 2003). Yet still, another group of studies demonstrates no differences in depressive symptoms between AA and EA students (Bracken & Reintjes, 2010; Diala et al., 2001; Twenge & Nolen-Hoeksema, 2002). Thus, empirical findings are mixed regarding racial differences in depressive symptoms between AA and EA students and further research is warranted. Importantly, previous empirical studies found an association between teaching behavior and high school students' depressive symptoms (Pittard et al., 2015; Pössel et al., 2013a). Given this relationship, it is critical to examine specific ways teachers may be able to promote PA and reduce NA in their AA and EA students.

Conceptualization of Depressive Symptoms

The tripartite model is one framework to conceptualize and understand the mixed findings on the rates of depressive symptoms between AA and EA adolescents. The tripartite model conceptualizes depressive symptoms as a combination of low PA and high NA (Clark & Watson, 1991). PA refers to expressions of energy and pleasure, such as feeling happy and interested, whereas NA comprises unpleasant or upsetting emotions, such as feeling angry or sad (Clark & Watson, 1991). Several

studies have found that the combination of low PA and high NA in adolescents is associated with outcomes similar to those associated with adolescent depressive symptoms (e.g., suicidal ideation, interpersonal distress; Fergusson & Woodward, 2002; Stewart et al., 2002), indicating that assessing depressive symptoms as PA and NA in adolescents is appropriate, although the extent to which it is a valid model for AA adolescents remains less clear. Toward this end, several studies found the tripartite model to be valid in EA adolescents (Joiner, Catanzaro, & Laurent, 1996; Phillips, Lonigan, Driscoll, & Hooe, 2002; Turner & Barrett, 2003). While few studies have investigated the validity of the tripartite model in AA populations, the existing literature supports the preliminary applicability of the tripartite model for depressive symptoms in AA adolescents in middle and high school (Gaylord-Harden, Elmore, Campbell, & Wethington, 2011; Lambert, McCreary, Joiner, Schmidt, & Ialongo, 2004). In a longitudinal study of AA students assessed in elementary, middle, and high school, Lambert et al. (2004) found that the tripartite model's factor structure held up in the sample composed of AA adolescents and found the tripartite model was more accurate in predicting depressive symptoms for AA adolescents than competing models (e.g., two-factor model of negative affect and physiological hyperarousal).

Despite these findings on the tripartite model in AA and EA adolescents, to our knowledge only one study has compared the validity of PA and NA between AAs and EAs. Philipp, Washington, Raouf, and Norton (2008) compared PA and NA as separate latent factors between AA and EA undergraduates. Philipp et al. (2008) found that while there was statistical non-equivalence between AA and EA subsamples, all indicators successfully loaded onto the latent factor NA in both subsamples. However, the researchers' attempt to model PA as a latent construct was unsuccessful; the indicator scores were poor for both the AA and EA subsamples. Overall, Philipp et al. (2008) findings indicate that NA is generalizable between AA and EA undergraduate students but were inconclusive regarding PA across both college subsamples due to measurement problems. Given the findings on adolescents discussed above (Lambert et al., 2004), it is possible that PA as a construct does hold up in AA adolescents. Therefore, based on the similar NA findings for AA and EA college students (Philipp et al., 2008) and support for the tripartite model in AA adolescents (Lambert et al., 2004), we would expect the model to be predictive of affect for both AA and EA adolescents. Based on this, the present study uses the tripartite model to conceptualize depressive symptoms in AA and EA high school students as low PA and high NA.

Present Study

Teaching behaviors influence students' academic and mental health outcomes (e.g., PA and NA), yet research demonstrates that there are substantial disparities in these outcomes between AA and EA high school students (Miller & Taylor, 2012; NAEP, 2009; Saluja et al., 2004). The disparities between these student subgroups on academic and mental health outcomes (NAEP, 2009; NAEP, 2013; Saluja et al., 2004; Sen, 2004) paired with the characteristics that AA and EA students prefer and perceive as important (Coleman, 2007; Sizemore, 1981) suggest that teaching behaviors (i.e., instructional, organizational, socio-emotional, and negative) impact students' affect differently based on race/ethnicity. However, previous literature has not directly investigated the relationship between teaching behaviors and students' affect differentiated by race/ethnicity of the students. Thus, filling a gap in the literature, the present study aims to investigate the associations of the four teaching behaviors with PA and NA in AA and EA high school students, and to determine whether and how these associations might be different between both racial groups.

Based on previous findings of the associations between teaching behaviors and students' affect without consideration of race/ethnicity (Pössel et al., 2013a), we expected that instructional and organizational teaching behaviors would not be associated with PA and would have inverse associations with NA in both AA and EA students. Next, we expected that socio-emotional teaching behavior would be positively associated with both PA and NA and negative teaching behavior would be negatively associated with PA and positively associated with NA in both AA and EA students. Finally, given the racial disparities in student outcomes (NAEP, 2009; NAEP, 2013; Saluja et al., 2004; Sen, 2004) and characteristics AA and EA students prefer (Coleman, 2007; Sizemore, 1981), we expected the strength of the associations for instructional teaching behavior and affect to be stronger in EA students, while the associations between socio-emotional teaching behavior and affect will be stronger for AA students.

Method

Participants

Students and teachers from one public high school, located in a medium-sized city in the Southern USA, were contacted to participate in this study. Nearly half (48%) of the students in the school were eligible for free or reduced lunch. Of the invited students, 80.1% received parental

consent and assented to participate ($N = 1247$; 53.3% male). Of all participants, 30.7% ($n = 385$) identified as AA and 46.5% ($n = 583$) reported their racial background as EA. The remaining students reported their race/ethnicity as mixed (7.9%; $n = 97$), Latino/a or Hispanic (6.1%; $n = 74$), another race/ethnicity (4.0%; $n = 49$), Asian/Pacific Islander (3.1%; $n = 38$), Native American (0.6%; $n = 7$), or did not report their race/ethnicity (1.1%; $n = 14$).

Because this study was specifically focused on better understanding the implications of teaching behaviors for AAs and how they may differ between AAs and EAs, we included only those students who self-reported their racial background as AA or EA ($N = 968$). Of the AA (39.8%; $n = 385$) and EA students (60.2%; $n = 583$), 53.4% ($n = 517$) were male (mean age = 15.69 years, $SD = 1.24$ years). About one quarter of the participating students reported being in 9th grade (26.1% or $n = 254$; 33.1% or $n = 321$ in 10th, 21.0% or $n = 203$ in 11th, and 19.6% or $n = 190$ in 12th). From the high school, 36 of 79 teachers agreed to participate (participation rate: 45.6%; 70.6% or $n = 26$ female). Of this sample, 22.2% ($n = 10$) of the teachers taught English; 13.9% ($n = 6$) taught mathematics; 11.1% ($n = 4$) taught social science; 11.1% ($n = 4$) taught technical classes (e.g., machine tools, welding); 8.3% ($n = 3$) taught foreign languages; 8.3% ($n = 3$) taught music (e.g., of band, chorus, orchestra); 8.3% ($n = 3$) taught science; 2.8% ($n = 1$) taught business; 2.8% ($n = 1$) taught health; and 2.8% ($n = 1$) taught special education. There were no exclusion criteria, and students did not receive any incentive for their participation.

Measures

Teaching Behavior Questionnaire (TBQ)

The TBQ (Pössel et al., 2013a) captures student perceptions of teaching behavior of one particular teacher. The TBQ is a 37-item instrument that includes four specific teaching behavior types: *Instructional Teaching Behavior* (13 items; e.g., “My teacher makes sure I understand the material before moving to something new”); *Organizational Teaching Behavior* (5 items; e.g., “My teacher makes sure I understand the classroom rules”); *Socio-Emotional Teaching Behavior* (10 items; e.g., “My teacher talks with me before or after class”); and *Negative Teaching Behavior* (9 items; e.g., “My teacher is easy to provoke”). A four-point scale (from 1 = *never*, to 4 = *always*) is used to record students’ responses. Next, the scores from the four TBQ scales were calculated by finding the average of the item scores for each individual

scale. Thus, higher scores represent a higher frequency of a particular teaching behavior.

An instrument to measure student perceptions of teaching behavior was chosen for this study as student-report of teaching behavior is a better predictor of students’ PA and NA than both teacher- and observer-report of teaching behavior (Pössel et al., 2013). Pössel et al. (2013b) reported the following internal consistency reliability estimates for the TBQ scales: .78 for the Organizational Teaching Behavior scale, .86 for the Socio-Emotional Teaching Behavior scale, .88 for the Negative Teaching Behavior scale, and .97 for the Instructional Teaching Behavior scale. Further, regarding predictive validity, in previous studies the TBQ has been used to predict middle and high school students’ positive and negative affect (Burton & Pössel, 2017; Cauley et al., 2017; Pössel et al., 2013a) and depression in middle school students, high school students, and college freshmen (Pittard et al., 2015; Pössel & Smith, submitted). Descriptive statistics and internal consistencies for AA and EA students in the present study are in Table 1.

Positive Affect and Negative Affect Scale for Children (PANAS-C)

The PANAS-C (Laurent et al., 1999) is a 30-item self-report instrument that measures children’s PA and NA. The PANAS-C has two subscales, Positive Affect (15 items; e.g., “happy,” “excited”) and Negative Affect (15 items; e.g., “sad,” “scared”). Students were asked to respond on a 5-point Likert type scale (1 = *very slightly or not at all* to 5 = *extremely*) based on their feelings throughout the previous few weeks. The items from the two subscales were summed separately to calculate the Positive Affect and Negative Affect subscale scores. Higher Positive Affect scores represent high levels of PA, while lower Negative Affect scores represent lower levels of NA. A combination of low PA and high NA was conceptualized as depression (Clark & Watson, 1991). Laurent et al. (1999) reported internal consistency reliability estimates of .89 for Positive Affect and .94 for Negative Affect. Regarding validity, the PANAS-C demonstrated good convergent and discriminant validity (Laurent et al., 1999). Descriptive statistics and internal consistencies for AA and EA students are in Table 1.

Procedure

Once the institutional review boards at the university and the public school system approved the study, teachers received detailed information regarding the study during a faculty meeting, and subsequently the researchers collected

Table 1 Intercorrelations, Internal Consistencies, and Descriptives of TBQ and PANAS-C Scales for African American and European American high school students

	Inst	Neg	Socio	Org	Pos Affect	Neg Affect
African American students (<i>n</i> = 385)						
Inst	.94					
Neg	-.09	.88				
Socio	.62***	.28***	.89			
Org	.55***	.24***	.52***	.74		
Pos affect	.19***	.02	.29***	.18**	.92	
Neg affect	-.11*	.20***	.04	-.10	.32***	.94
Mean ± SD	3.09 ± .73	1.96 ± .72	2.52 ± .72	2.86 ± .72	41.18 ± 14.67	24.67 ± 11.49
European American students (<i>n</i> = 583)						
Inst	.96					
Neg	-.12**	.89				
Socio	.72***	.20***	.92			
Org	.63***	.26***	.59***	.77		
Pos affect	.37***	-.08	.32***	.25***	.94	
Neg affect	-.09*	.13**	.05	-.04	.25***	.95
Mean ± SD	3.09 ± .75	1.93 ± .72	2.54 ± .77	2.87 ± .70	41.60 ± 14.18	25.04 ± 12.16

Cronbach’s alphas are represented in the diagonal

Inst instructional teaching behavior, *Neg* negative teaching behavior, *Socio* socio-emotional teaching behavior, *Org* organizational teaching behavior, *Pos Affect* positive affect, *Neg Affect* negative affect

*** *p* < .001, ** *p* < .01, * *p* < .05

consent forms from the teachers. Next, the researchers sent letters describing the study to the parents of all students in the school. Participating teachers collected parent consents during the next two weeks in the class period where researchers eventually administered the questionnaires. At the beginning of the class period during which they administered surveys, researchers invited students to participate if their parents had consented and researchers collected assent forms. Researchers then administered the questionnaires in groups in the classes of the participating teachers. Participating students provided demographic information (age, sex, and race/ethnicity) as well as responses to the TBQ and the PANAS-C. Students rated the teaching behaviors of the teacher in whose class the survey administration took place.

Statistical Analyses

To test for the proposed associations between the TBQ scales and the PANAS-C scales in AA and EA students and for possible differences in these associations between both subsamples, two separate sets of two-level hierarchical linear model (HLM) analyses in which students were nested within teachers were calculated using HLM version 7.01 (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011). HLM addresses the unit of analysis problem and enhances precision of estimates over methods that do not

account for non-independence (McCoach & Adelson, 2010; Raudenbush & Bryk, 2002). Full information maximum likelihood (FIML) estimation methods were used, as recommended for robustness (Garson, 2013). In these analyses, dummy coded race, all four types of student-reported teaching behavior, and the interaction between race and teaching behavior were simultaneously entered as predictors of students’ positive and negative affect nested in teachers. To be able to test if the associations between the TBQ scales and the PANAS-C scales are significant in AA and EA students, two sets of analyses were calculated, one set with race coded AA = 0 and one set with race coded EA = 0.

Results

Means, standard deviations, internal consistencies, and intercorrelations among all scales separated for AA and EA high school students are in Table 1. AA and EA students did not significantly differ in their view of teachers’ use of instructional (*t*(965) = 0.04, *p* = .968), organizational (*t*(963) = -0.19, *p* = .850), socio-emotional (*t*(856.47) = -0.42, *p* = .673), or negative teaching behavior (*t*(961) = 0.73, *p* = .466). In addition, there were no significant differences in AA and EA students’ PA (*t*(928) = -0.43, *p* = .671) and NA (*t*(927) = -0.46, *p* = .647) scores.

Results of the HLMs of PA and NA on racial background, teaching behavior, and their interactions are presented in Table 2. Most of the findings were consistent with our expectations. Regarding positive affect, the TBQ Instructional Teaching Behavior scale was not associated with the PANAS-C Positive Affect scores in AA participants, but, contrary to our expectations, was positively associated in EA participants. In addition, the association with the TBQ Instructional Teaching Behavior scale was significantly stronger in the EA participants compared to the AA participants. Consistent with our expectations, the TBQ Organizational Teaching Behavior scale was not significantly associated with the PANAS-C Positive Affect scores in either subgroup and the strengths of the associations were not significantly different between AA and EA participants. Also consistent with our predictions, the TBQ Socio-Emotional Teaching Behavior scale was positively associated with the PANAS-C Positive Affect scores in both subsamples. However, contrary to our expectations the strengths of the associations were not significantly different between AA and EA participants. The TBQ Negative Teaching Behavior Scale was negatively associated with the PANAS-C Positive Affect scores in EA

participants, but contrary to our expectations was not significant in AA participants. The strength of the associations between Negative Teaching Behavior and PA was not significantly different between AA and EA participants.

Regarding the PANAS-C Negative Affect scores, only the TBQ Socio-Emotional and Negative Teaching Behavior scales were significantly and positively associated with the PANAS-C Negative Affect scores in EA and AA participants, respectively. Contrary to our expectations, independent of the race of the participants, all other associations were not significant. Further, the strength of the associations between the TBQ scales and the PANAS-C Negative Affect scale was not significantly different between AA and EA participants for all four teaching behavior types.

Discussion

The primary goal of this study was to investigate the associations between specific teaching behaviors and PA and NA in AA and EA high school students, and to determine whether and how these associations might be

Table 2 Estimated effects of race, the TBQ scales, and their interaction on the PANAS-C scales

	Race coded as AA = 0 & EA = 1 Parameter estimate	SE	Race coded as EA = 0 & AA = 1 Parameter estimate	SE
Positive affect				
Inst (γ_{10})	0.134	0.989	3.202***	0.897
Neg (γ_{20})	-1.209	0.825	-1.633*	0.684
Org (γ_{30})	1.188	0.876	0.916	0.784
Socio (γ_{40})	3.209***	0.887	2.001**	0.753
Race (γ_{50})	0.150	1.068	0.150	1.068
Race by Inst (γ_{60})	3.069*	1.335	-3.069*	1.335
Race by Neg (γ_{70})	-0.424	1.072	0.424	1.072
Race by Org (γ_{80})	-0.273	1.173	0.273	1.173
Race by Socio (γ_{90})	-1.207	1.163	1.207	1.163
Negative affect				
Inst (γ_{10})	-1.218	0.882	-1.411	0.794
Neg (γ_{20})	2.316***	0.652	0.798	0.559
Org (γ_{30})	-1.106	0.706	-0.127	0.668
Socio (γ_{40})	0.768	0.828	1.479*	0.665
Race (γ_{50})	0.013	0.884	-0.013	0.884
Race by Inst (γ_{60})	-0.193	1.186	0.193	1.186
Race by Neg (γ_{70})	-1.519	0.859	1.519	0.859
Race by Org (γ_{80})	0.979	0.970	-0.979	0.970
Ethnicity by Socio (γ_{90})	0.711	1.062	-0.711	1.062

Inst instructional teaching behavior, Neg negative teaching behavior, Socio socio-emotional teaching behavior, Org organizational teaching behavior

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

different between these racial groups. Given that students spend a majority of their day at school (Bureau of Labor Statistics, 2014), it is crucial to investigate if and how teaching behaviors are associated with PA and NA in students. The mixed findings on rates of depressive symptoms between AA and EA high school students (Gore & Aseltine, 2003; Miller & Taylor, 2012; Saluja et al., 2004) and the lack of research specific to the associations between teaching behaviors and affect in AA high school students demonstrates the necessity of this study.

Many, but not all, findings were consistent with previous research, which did not consider students' race (Pössel et al., 2013a), and our hypotheses. For example, contrary to our expectations, we found that most of the associations between teaching behavior and affect were significant in EA students (instructional, socio-emotional, and negative teaching behavior and PA; socio-emotional teaching behavior and NA) but only a few were significant in AA students (socio-emotional teaching behavior and PA; negative teaching behavior and NA). Bandura's (1986) social cognitive theory, which discusses the importance of observational learning, might be the mechanism underlying this pattern of findings. This theory explains that perceiving similarities between oneself and a social model can positively influence the observer's ability to learn from the social model. In other words, students are better able to learn from teachers they perceive as similar to themselves. This hypothesis is supported by a study examining associations between teaching behavior of "most similar" and "least similar" teachers and depressive symptoms in college freshmen (Pössel & Smith, submitted). The participants in the present study were from a school district in which 84% of teachers identify as EA (Kentucky Department of Education, 2015). Although the current study did not collect data on teacher race, it is possible that many of the students in this study had an EA teacher, and consistent with Bandura's (1986) social cognitive theory and Pössel and Smith's (submitted) findings, EA students are more likely to benefit and learn from a teacher who is also EA as opposed to any other race/ethnicity. Additional support for this pattern of findings comes from Coleman, Jussim, and Isaac (1991), who examined AA students' responses to evaluative feedback from AA and EA teachers. The researchers found that AA students perceived their EA teachers as being less positive than their AA teachers, even when AA and EA teachers provided the same feedback (Coleman et al., 1991). Thus, it may be that AA and EA students respond differently to their EA teachers' teaching behaviors. Conversely, it could be that some EA teachers engage in behaviors that are less culturally responsive to AA students as compared to EA students.

Further, based on previous studies that did not provide results separated by race (Pittard et al., 2015; Pössel et al.,

2013a), we predicted that there would be no association between instructional teaching behavior and PA for either subgroup; however, we found a positive association for EA students and this association was stronger in EA students compared to AA students. Besides Bandura's (1986) social cognitive theory, these findings can also be understood by examining which characteristics AA and EA students prefer in a teacher. In general, for EA students it is important that a teacher is well organized and explains classroom material while AA middle and high school students prefer and perceive as important a teacher's warmth and niceness (Coleman, 2007; Sizemore, 1981). Therefore, EA students may be more responsive to teachers' instructional teaching behaviors. It may be that in previous studies analyses were not conducted separately based on race and the inclusion of AA students masked this association and made it appear not significant (e.g., Pössel et al., 2013b; Study 1 = 31.6% AA, 50.8% EA; Study 2 = 32.5% AA, 44.6% EA).

Based on literature delineating the racial disparities in student outcomes (NAEP, 2009; NAEP, 2013; Saluja et al., 2004; Sen, 2004) and teacher characteristics AA and EA middle and high school students prefer (Coleman, 2007; Sizemore, 1981), we expected the strength of the associations for instructional teaching behavior and affect to be stronger in EA students. Our results found partial support for these hypotheses, in that the strengths of the associations for instructional teaching behavior and PA were significantly different; however, there was no difference in the strengths of the associations for NA. Given that the relationship between instructional teaching behavior and NA was not significant for either student subgroup, it is unlikely to find differences in the strengths of these associations.

Further, we predicted significant associations between socio-emotional teaching behavior and PA and NA for both student subgroups, and that the strengths of these relationships would be stronger for AA students. We found a positive association with PA in both AA and EA students, a positive association with NA in EA students only, and no differences in the strengths of any associations. Therefore, with one exception, the overall pattern of the findings indicates that there are no differences in socio-emotional teaching behavior and affect between AA and EA students. It may be that even though AA and EA students prefer certain teacher *characteristics* (Coleman, 2007; Sizemore, 1981), with AA students preferring socio-emotional characteristics such as warmth and niceness, both AA and EA students appreciate socio-emotional teaching *behaviors*. This would explain our findings. To test this explanation, future research should measure socio-emotional teacher *characteristics* and teaching *behavior* and their relationships with students' affect in AA and EA students.

Finally, our findings related to the link between negative teaching behavior and affect were, in part, consistent with our hypothesis that negative teaching behavior would be negatively associated with PA and positively associated with NA. Although we found partial support for this hypothesis, we also observed differential effects based on the study's two racial groups. For example, we found the association of negative teaching behavior with PA is negative in EA students while the association of negative teaching behavior with NA is positive in AA students. Thus, while the details are different, these findings demonstrate negative teaching behavior is relevant for both racial groups but in different ways. Two different explanations may account for these observed differences.

First and as mentioned above, in the present study, it is possible that many of the teachers identified as EA (Kentucky Department of Education, 2015), and thus, it could be the combined effects of the teachers' race and teaching behavior explain the differential findings on the significant relationship between negative teaching behavior and *type* of affect (i.e., PA or NA) among the students. In other words, AA students may have interpreted the negative teaching behavior (possibly from an EA teacher) as mean, frightening, or demeaning. Conversely, the same negative teaching behavior could have been interpreted by EA students as benign. These different interpretations of the same negative teaching behavior might explain why AA and EA students respond with NA and PA, respectively.

Second, the literature suggests that an important element that informs outcomes associated with teaching behavior is the extent to which students perceive they are supported by their teachers (Guess & McCane-Bowling, 2016; Suldo et al., 2009). Similarly, the extent to which students feel connected with their teachers may be different based on race and ethnicity (Amatea, Cholewa, & Mixon, 2012; Dee, 2004). Given that it is possible that many of the teachers in the present study identified as EA (Kentucky Department of Education, 2015), it is not surprising that negative teaching behavior would be correlated with PA among race concordant students (i.e., EA students) and correlated with NA among race discordant students (i.e., AA students; Goldenberg, 2014). It could be that in our study the EA students felt a greater level of support from their teachers than the AA students and thus the negative teaching behavior did not result in the same positive association with NA (Suldo et al., 2009; Tenenbaum & Ruck, 2007). Rather the association between teaching behavior and affect, while still present, was related to PA.

The present study used the tripartite model (Clark & Watson, 1991) to conceptualize depressive symptoms as a combination of low PA and high NA. Based on this model and as proposed by Pittard et al. (2015), we would expect that if a teaching behavior has significant and inverse

associations with both PA and NA, it is also significantly associated with depressive symptoms and therefore particularly important for students' mental health. Based on previous research (Pittard et al., 2015; Pössel et al., 2013a), we expected to find such inverse associations with PA and NA solely for negative teaching behavior but not for the other three teaching behaviors. However, in our study we observed these inverse relationships in *none* of the four teaching behaviors when AA and EA students were studied separately. Which raises the question: what might have caused the differences in our findings using PA and NA and previous research measuring depressive symptoms (Pittard et al., 2015)? One explanation could be that the tripartite model (Clark & Watson, 1991) does not hold up for AA and/or EA adolescents. However, this explanation seems unlikely as several studies found the tripartite model, and therefore the combination of low PA and high NA, to be a valid and useful conceptualization of depression in AA (Gaylord-Harden et al., 2011; Lambert et al., 2004) and EA adolescents (Joiner et al., 1996; Phillips et al., 2002; Turner & Barrett, 2003). Further, it is possible that the fact that PANAS-C is a subjective, non-clinical instrument to measure PA and NA and not clinical depression is responsible for the differences in findings. Additionally, adolescents sometimes give inaccurate, invalid, or intentionally false responses (Fan et al., 2006). However, research has also shown that adolescents are a reliable source for information about internal processes like affect and depressive symptoms (Inderbitzen, 1994). Toward this end, student-reports have been shown to have strong predictive validity of actual diagnostic interviews (Gotlib, Lewinsohn, & Seeley, 1995). Therefore, this explanation is unlikely as well. Summarized, it is not clear why our findings on the relationship between teaching behavior and affect do not match up with previous findings using depressive symptoms in high school students as an outcome variable (Pittard et al., 2015). As no previous studies on teaching behaviors have provided separate findings based on race/ethnicity and to further examine these unexpected findings, future studies should consider examining the associations of teaching behavior on both students' affect and depressive symptoms.

It is important to note that no students was excluded from participating in this study. While we see this as a strength of the study, as it increases the generalizability of the findings, one might see this as a limitation as the present sample may include students in unique school programs. This may impact the generalizability of the findings in that the sample may contain a diverse group of students.

The results of the present study should be evaluated in context of the study's limitations. First and as discussed above, PA and NA were measured using a self-report instrument. Similarly, teaching behavior data were

collected using a student-report instrument as well. Researchers have noted that common method variance may occur when one individual provides self-report information on all variables in the study (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Thus, in order to avoid common method variance, it may be helpful to consider the use of multiple methods such as a combination of teacher- and student-reports as well as reports from external observers. Nevertheless, due to impression management or lack of insight, teachers might not be the most reliable source for information about their own behavior (Douglas, 2009). Regarding external observers, one might want to consider that while observations of teaching behaviors is seen as the gold standard, the usage of external observers requires significant time and financial resources (Douglas, 2009). In addition, events that seldom occur, such as some negative teaching behaviors, might not be easily observable as external observers usually have limited observation time (Pössel et al., 2013a). Finally, multiple studies found that student-reports of teaching behavior seem to be more valuable than reports from other sources (Eccles et al., 1993; Pössel et al., 2013a; Wubbels & Levy, 1991).

Next, the setting in which the data were collected may be seen as another limitation, given the self-report nature of the data. It is possible that completing the questionnaires in the presence of peers and a teacher may have influenced a student's responses. Thus, different settings in which students complete the questionnaires should be considered. Additionally, the cross-sectional design of the present study is another limitation, as it does not allow us to draw conclusions about the directionality of the associations between teaching behaviors and students' affect. Thus, future research should apply longitudinal designs.

In this study, students reported on only one of their teachers' behaviors, which might be an additional limitation. Given that most high school students attend classes with several teachers throughout the school day, future studies should consider the use of analyses that allow for the consideration of the associations between the teaching behavior of all of a student's teachers and an individual students' affect. However, it should be considered that it could put significant strain on a student to ask them to report on five or more teachers, which might reduce the willingness of students to participate and/or reduce the reliability of the data as students might become fatigued.

Further, the present study only included AA and EA students from one urban, Southern high school, and thus, findings cannot be generalized to elementary or middle school students, or students of other racial/ethnic groups or geographical locations. In addition, the generalizability of these findings to other high schools is unclear. Therefore, authors of future studies may wish to build on the results of this study and include elementary and middle school

students to determine whether the pattern of findings is similar. In addition, future studies should investigate whether differences exist in the associations between teaching behaviors and students' mental health outcomes for other racial/ethnic groups. Considering the current demographics of the USA (United States Census Bureau, 2016), the inclusion of EA, AA, and Hispanic or Latino students seems particularly informative. Further, authors of future studies should consider examining whether differences exist in these associations based on variables such as gender and socioeconomic status, as no studies to date have considered these variables.

Unfortunately, in the present study we were not able to account for teacher characteristics, such as teacher's race, that may have affected the results. Although this study did not include demographic data on the participating teachers, the data were collected in a school district in which 84% of teachers identify as EA (Kentucky Department of Education, 2015). Therefore, it is possible that many of the participating teachers identified as EA. Thus, we suggest to collect data on teacher characteristics and examine the effects of teacher's race on students' perceptions of teaching behavior in future studies.

Summarized, the findings from this study suggest that the relationship between teaching behaviors and students' affect may differ for AA and EA high school students. Specifically, instructional teaching behavior was more strongly related to PA in EA students indicating that EA students may benefit more from instructional teaching behavior. The findings from this study have several implications for teachers, administrators, school psychologists, and other school personnel. First, school psychologists and administrators may use these findings to help teachers adapt the way they interact with students, organize their classrooms, and give instruction. Further, teachers should be aware of how their behavior may influence students' affect differently based on students' race. Thus, teacher training could include information on how AA and EA high school students experience PA and NA differently based on each specific teaching behavior and help teachers identify specific teaching behaviors that promote PA and reduce NA in AA and EA students. In other words, such trainings could focus on how teachers can incorporate these findings into their teaching behavior to create positive, culturally responsive classroom environments (Gay, 2002; Ladson-Billings, 2006) and by doing so potentially improve mental health outcomes in their AA and EA students. Specifically, Gay (2002) notes that culture is embedded in one's teaching and teaching style, and therefore, teaching racially or ethnically diverse students must be *multiculturalized*. Following Gay (2002), one way of doing this is to match one's teaching and instructional techniques to the learning styles of diverse students. Based

on our findings, teachers may wish to consider how they can modify their instructional teaching behavior so that all students benefit. Further, educators and school administrators can use our findings to build on their efforts to provide culturally competent teaching, which in turn, may result in increased PA and decreased NA among all students.

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Compliance with Ethical Standards

Conflict of interest The authors have no conflicts of interest to disclose.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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