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## Psychophysiological Stress Responses to Bicultural and Biracial Identity Denial

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*Bicultural and biracial individuals (those who identify either with two cultures or two races) are often denied membership in the groups with which they identify, an experience referred to as identity denial. The present studies used an experimental design to test the effects of identity denial on physiological and self-reported stress, and naturalistic behavioral responses in a controlled laboratory setting for both bicultural (Study 1; N = 126) and biracial (Study 2; N = 119) individuals. The results suggest that compared to an identity-irrelevant denial, bicultural participants who were denied their American identity and Minority/White biracial individuals who were denied their White identity reported greater stress and were more likely to verbally reassert their identity. Bicultural participants also demonstrated slower cortisol recovery compared to those in the identity-irrelevant denial condition. The results are the first to highlight the negative physical health*

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*consequences of identity denial using an experimental design for both bicultural and biracial populations, underscoring the necessity to promote belongingness and acceptance.*

Compared to monocultural or monoracial individuals, both bicultural and biracial populations (those who identify with either two cultures or two races) experience an elevated risk of poor health outcomes, including lower levels of psychological adjustment and higher substance abuse (e.g., Bratter & Gorman, 2011; Hovey, 2000; Torres, 2010). These poor outcomes may be due in part to experiences of identity denial, wherein an important social group membership is denied (Albuja, Sanchez, & Gaither, 2019; Cheryan & Monin, 2005). Identity denial experiences are common for people who identify with two groups within one identity domain. Bicultural and biracial individuals share the experience of having intermediary or “border identities” because they fall in between standard monocultural or monoracial groups. For example, ubiquitous implicit associations equating “American” and “White” exclude bicultural Latino or Asian Americans who may identify as American but are often perceived as foreigners (Devos, Gavin, & Quintana, 2010; Huynh, Devos, & Smalarz, 2011; Zou & Cheryan, 2017). Similarly, widely held beliefs that race is a biological construct create norms of single racial identification, undermining biracial people’s simultaneous membership in multiple racial groups (Ho, Roberts, & Gelman, 2015; Sanchez, Shih, & Wilton, 2014; Williams & Eberhardt, 2008). Therefore, having a nonprototypical cultural or racial identity may lead to increased experiences of identity denial (Cheryan & Monin, 2005; Sanchez, 2010). For example, bicultural individuals such as Asian Americans are often denied their American identity with questions like, “Where are you really from?” or “Do you speak English?” (Albuja et al., 2019; Cheryan & Monin, 2005; Wang, Minervino, & Cheryan, 2012). Likewise, biracial people are often told they should identify differently, or forced to select one race on a demographic form (Sanchez, 2010; Townsend, Markus, & Bergsieker, 2009).

Like racism or other identity related threats (David & Fernandez, 2019), identity denial evokes negative affect and behavioral compensation (Wang et al., 2012). For example, bicultural and biracial Americans who report more frequent experiences of identity denial also report greater stress and depressive symptoms (Albuja et al., 2019), lower life satisfaction (Huynh et al., 2011), and lower motivation and self-esteem (Townsend et al., 2009). Further, because of these experiences, bicultural Americans may reassert their denied American identity, which could serve as an identity protective factor by reaffirming one’s sense of self. For example, one study showed that bicultural Asian Americans who were denied their American identity tried to counteract that perception by then self-reporting that they engage in more American practices and naming more American movies as a marker of group belonging than participants who were not denied (Cheryan & Monin, 2005).

Further, traditional research on health disparities has largely employed single cultural or racial categorizations, resulting in a lack of knowledge of the social determinants of bicultural and biracial people's health (Bratter & Gorman, 2011; Clegg et al., 2007; Tabb, 2016). Given that some metrics project bicultural Americans will account for the majority (88%) of the U.S. population growth through 2065 (López, Bialik, & Radford, 2018), and that the biracial population is expected to triple by 2060 (Colby & Ortman, 2015), it is imperative to better understand the discrimination experiences that affect the health of these populations. Moreover, despite evidence that identity denial occurs frequently (Cheryan & Monin, 2005; Townsend et al., 2009; Tran, Miyake, Martinez-Morales, & Csizmadia, 2016), and is associated with poor psychological well-being, the existing literature is limited in four ways. Specifically, the existing literature (1) lacks experimental tests of the effects of identity denial on psychological and physical health with rigorous control conditions, (2) relies on self-reported data to the exclusion of physiological measures, (3) does not explore the role of identity reassertion in ameliorating the negative effects of identity denial, and (4) has only begun to thoroughly compare bicultural and biracial participants. To address these limitations, the present studies experimentally tested the effects of identity denial on self-reported psychological well-being, physiological stress, and naturalistic behavioral responses for both bicultural (Study 1) and biracial (Study 2) individuals. We review each of the existing limitations below.

### *Relevance of Identity Denial*

The existing literature is largely correlational, and experimental work has yet to distinguish between self-relevant identity denials (e.g., being denied an identity you possess) and irrelevant denials (e.g., being denied in general and not based on a specific identity one may have). According to social identity theory, belonging to social groups such as cultural or racial groups helps people create their self-definition (Tajfel & Turner, 1986). Therefore, being denied membership in a cultural or racial group that is relevant to how people identify themselves may be especially impactful as it could threaten additional aspects of the self-concept. Indeed, one previous experimental identity denial study suggests that participants reported being more offended and angrier in response to being denied their American identity compared to a control condition that received no denial (Cheryan & Monin, 2005). Additionally, correlational research indicates that bicultural and biracial people's frequent identity denial experiences are associated with a lower sense of freedom in choosing their own identity and with increased perceived conflict between their two identities (Albuja et al., 2019). Despite this initial work, it is unclear whether an identity-relevant denial would evoke a more negative reaction compared to an identity-irrelevant denial. Because only social groups people identify with are relevant to their self-concept (Tajfel & Turner, 1986),

we predict that being denied membership in a personally self-relevant identity group should be more aversive than being denied membership in a group that one does not identify with. Including a rigorous comparison group will provide insight into how identity denial, a unique experience for bicultural and biracial people given their identification that breaks social norms of singular cultural and racial categorization, differs from general denial that is not specific to one's identity.

### *Physiological Measures of Health*

Identity denial research has focused primarily on self-reports of distress (e.g., Cheryan & Monin, 2005; Huynh et al., 2011; Sanchez, 2010), so it is unclear whether identity denial experiences also result in physiological manifestations of stress. Past work has described discrimination experiences among other cultural and racial minority groups as stressors that are often uncontrollable and unpredictable and therefore affect people's health and well-being (Major, Quinton, & McCoy, 2002). These stressors also manifest physiologically, such as through increased secretion of the stress hormone cortisol in the hypothalamic–pituitary–adrenal cortical (HPA) axis (Pascoe & Smart Richman, 2009). In accordance with social self-preservation theory, people experience physiological stress responses to social threats (Dickerson & Kemeny, 2004; Dickerson, Gruenewald, & Kemeny, 2004). Specifically, threats to one's status, esteem, or acceptance elicit HPA activation, resulting in increased cortisol activity. For example, perceived discrimination has been associated with greater cortisol output and greater cortisol dysregulation among African Americans and Latino Americans (Fuller-Rowell, Doan, & Eccles, 2012; Zeiders, Doane, & Roosa, 2012). Given that identity denial experiences challenge bicultural and biracial people's status as group members and undermine their social belonging (AhnAllen, Suyemoto, & Carter, 2006; Albuja et al., 2019), they may be experienced as stressors that activate the HPA axis, leading to downstream physiological effects. Though HPA axis activation is adaptive in response to acute situations of stress by preparing the body to physically react quickly, chronic cortisol reactivity can result in allostatic load that suppresses immune system functioning, increases the risk of diabetes and cardiovascular disease, and worsens cognitive functioning (Dickerson & Kemeny, 2004; Lee et al., 2007; McEwen, 2008). Despite these potential dire outcomes, no research to date has examined the effects of identity denial on physiological variables.

### *Identity Reassertion*

Because confronting discrimination can restore feelings of autonomy and promote well-being (Sanchez, Himmelstein, Young, Albuja, & Garcia, 2016), it is important to examine the role of identity reassertion in response to identity denial as a potential pathway of resilience for bicultural and biracial individuals.

Though few studies have examined the physiological outcomes of confronting discrimination, the existing work suggests that confrontation may be associated with lower blood pressure (Krieger & Sidney, 1996), lower rates of psychiatric disorders (McLaughlin, Hatzenbuehler, & Keyes, 2010), and fewer depressive symptoms (Noh & Kaspar, 2003). Past research suggests these outcomes may occur because confronting prejudice promotes feelings of autonomy and reduces rumination, though research on these mechanisms remains scarce (but see Sanchez et al., 2016; Shelton, Richeson, Salvatore, & Hill, 2006, as examples). Other work has also identified some psychological benefits stemming from confronting discrimination (see Chaney, Young, & Sanchez, 2015 for a review). For example, participants who assertively confronted prejudice have reported feeling more personal empowerment and comfort compared to participants who did not confront or confronted nonassertively (Hyers, 2007). However, confronting discrimination can also come at a cost. Even when discrimination was blatant, African Americans who attributed a rejection to discrimination were seen as complainers or were generally disliked compared to those who attributed a rejection to other factors (Kaiser & Miller, 2001; Shelton & Stewart, 2004). Fear of these social consequences may reduce people's willingness to confront prejudice for themselves or on another's behalf (Good, Moss-Racusin, & Sanchez, 2012), which may increase negative self-directed affect such as rumination (Shelton et al., 2006).

Despite the potential costs of confronting (e.g., Good et al., 2012), past research has reported high rates of identity reassertion in response to identity denial among bicultural participants. For example, Cheryan and Monin (2005) reported that all bicultural participants whose American identity was challenged informed the experimenter that they were American. Whether biracial people reassert after identity denial remains an open question, yet the similar rates of identity denial experiences among both populations highlights the importance of measuring reassertion among biracial people as well. Townsend et al. (2009) found that biracial participants who were forced to select only one identity (vs. multiple identities) on a demographic form reported lower feelings of agency. Biracial people may therefore also reassert their identity in order to restore their autonomy (Sanchez et al., 2016). Despite the high likelihood of reassertion (Cheryan & Monin, 2005), no work to date has examined the psychological or physiological effects of identity reassertion among bicultural and biracial people. Given past work indicating that confronting prejudice may restore agency, we predicted that participants who confronted identity denial would report more positive affect, more autonomy, and less stress, as well as demonstrate more positive verbal and nonverbal behavior. Thus, experimental tests of the physiological and confrontational responses to identity denial can reveal the types of mental and physical health risks that identity denial poses for bicultural and biracial individuals (Dickerson & Kemeny, 2004).

### *Bicultural and Biracial Similarities*

Both bicultural and biracial people are members of two different social groups within one identity category (i.e., belonging to two cultural groups or two racial groups), and are therefore less prototypical group members. Yet, the existing literature rarely compares bicultural and biracial identity denial despite several overlapping characteristics between the two populations. However, one recent study demonstrated that American identity denial for bicultural participants and White identity denial for biracial participants is experienced similarly, as it is associated with lower feelings of belonging and increased perceptions of conflict between the two identities (Albuja et al., 2019). Despite this initial work, comparisons between bicultural and biracial populations remain underexplored and are subject to similar limitations characterizing the identity denial literature as a whole.

### **The Present Research**

The present studies tested the effects of identity denial on psychological well-being, cortisol reactivity, and naturalistic behavioral responses in a controlled laboratory setting for both bicultural (Study 1) and biracial (Study 2) individuals. We expected bicultural and biracial participants to demonstrate more negative naturalistic behaviors, report greater stress, and show a heightened cortisol response when experiencing a self-relevant identity denial rather than an identity-irrelevant control denial. We also expected negative naturalistic, physiological, and self-report responses to be attenuated among participants who reasserted their identity when experiencing denial. All data and materials may be found at <https://osf.io/baxq2/>

### **Study 1**

#### *Participants and Procedure*

Bicultural ( $N = 141$ ) undergraduate students were recruited to participate in a health study. Students were invited to participate based on their responses to a prescreen survey but did not know the study was related to bicultural identity. Bicultural people are typically defined as people who have significant experience with more than one cultural group (Nguyen & Benet-Martínez, 2007). Thus, participants were eligible if they identified as bicultural, selected a single racial identity, and either had at least one parent born outside of the United States or were born outside of the United States themselves. Participant nationality was used to operationalize biculturalism, consistent with a large body of work examining the identity of bicultural participants (e.g., Benet-Martínez, Lee, & Leu, 2006; Chen, Benet-Martínez, & Bond, 2008; Wang et al., 2012). Additionally, students were

only invited to participate if they were not currently pregnant, not taking any medications that affect the cardiovascular system, not actively using illegal drugs or unprescribed prescription drugs, and did not smoke cigarettes, as these factors can distort measurements of cortisol levels (Kirschbaum & Hellhammer, 1994; Lovallo & Thomas, 2000).

An *a priori* power analysis conducted using G\*Power (Faul, Erdfelder, Buchner, & Lang, 2009) recommended 120 participants to achieve 80% power based on effect sizes achieved in similar past research (Albuja et al., 2019). After participants who did not identify as bicultural ( $n = 13$ ) or selected multiple racial options ( $n = 2$ ) were removed, the final sample consisted of 126 bicultural participants. Although biracial people may also identify as bicultural, the inclusion criteria created separate bicultural and biracial samples for Study 1 and Study 2, respectively. Indeed, participants demonstrated a bicultural identity: On a scale of 1 (*very weakly*) to 7 (*very strongly*), participants responded above the midpoint to the item, "How strongly do you identify as bicultural?" ( $M = 4.49$ ,  $SD = 1.94$ ,  $t(125) = 2.84$ ,  $p = .005$ ). Moreover, participants also identified above the midpoint with their minority culture ( $M = 5.38$ ,  $SD = 1.51$ ,  $t(123) = 10.16$ ,  $p < .001$ ) and as American ( $M = 5.90$ ,  $SD = 1.33$ ,  $t(125) = 16.09$ ,  $p < .001$ ). Sensitivity analyses suggest that this sample provided 80% power to detect a minimum effect size of  $d = .50$  for condition effects and  $\eta_p^2 = .01$  for mixed ANOVAs. The average age was 18.55 years ( $SD = 1.09$ ) and the sample was 56% ( $n = 70$ ) female and 100% Asian to control for bicultural background. Most participants were born in the United States (99.2%), were second-generation immigrants (73%; meaning at least one parent was born outside of the United States), and all participants were U.S. citizens.

For accurate cortisol measurement, participants first confirmed that they did not exercise, eat, or consume a caffeinated beverage one hour before their appointment (Page-Gould, Mendes, & Major, 2010). After consenting to being video or audio recorded, they completed baseline measures of affect and stress among other filler scales and then completed the first saliva sample for cortisol assessment. When participants finished this portion (approximately 7 minutes after beginning the study), a second experimenter entered the room. In the experimental self-relevant denial condition, the experimenter looked at the participant and said, "Actually, you have to be an American for this particular health study." If after approximately 20 seconds the participant did not respond, the experimenter continued, "Well, because you have already started the study, I think it's okay if you continue but I will make a note about it in my records that you're not actually American." If the participant responded, the experimenter said, "I think it's okay if you continue." In the control identity-irrelevant condition, the experimenter instead said, "Actually, you have to be African American for this particular health study" and followed up with "Well, because you have already started the study, I think it's okay if you continue but I will make a note about it in my records

that you're not actually African American." Thus, participants in the control condition were also denied a specific identity, but one that they did not possess. We used this same denial in the control condition across both studies because African American was an irrelevant identity for both samples and we wanted to be able to compare the results across studies. Next, participants rated their own stress and affect (Watson, Clark, & Tellegen, 1988), and completed a second saliva sample 30 minutes later when changes in cortisol would have developed in the saliva (Dickerson & Kemeny, 2004). Participants completed neutral filler tasks for another 30 minutes and completed the third saliva sample to measure recovery. Behavior following denial was video recorded and coded for reassertion of identity by trained coders.

### Measures<sup>1</sup>

#### *Cortisol Reactivity*

Saliva samples were collected using Sarstedt Salivettes<sup>®</sup>, which require participants to chew on a cotton swab for one minute. This collects approximately 1.1 ( $\pm 0.3$ ) mL of saliva, which is stored in a plastic tube. Saliva samples were immediately stored at  $-20^{\circ}\text{C}$  until they were shipped overnight to Dresden, Germany for analysis (Kirschbaum, Dresden University of Technology, Germany). The samples were assayed for salivary free cortisol, reported in nmol/L.

#### *Stress*

Participants completed four items indicating their state level of stress. Using a scale of 1 (*strongly disagree*) to 7 (*strongly agree*), participants indicated the extent to which they felt stressed, annoyed, offended, and angry. The items were averaged to form a single scale ( $\alpha = .85$ ).

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<sup>1</sup>Participants in both samples also completed measures of identity integration (Benet-Martínez & Hariatos, 2005; Cheng & Lee, 2009), perceived social support (Zimet, Dahlem, Zimet, & Farley, 1988), and bicultural (Study 1) or biracial (Study 2) group identity (modified from Luhtanen & Crocker, 1992) as exploratory moderators. In Study 1, there was no significant moderation by identity integration conflict,  $F_s < 3.61, p_s > .059$ , identity integration distance,  $F_s < 1.39, p_s > .243$ , or social support,  $F_s < 0.91, p_s > .345$ . Bicultural group identity significantly moderated the effect of condition on how sad participants sounded and how comfortable they looked (see Supplemental Materials for results). There were no other significant moderation results,  $F_s < 3.20, p_s > .075$ . In Study 2, there was no significant moderation by identity integration conflict,  $F_s < 2.34, p_s > .128$ , identity integration distance,  $F_s < 1.86, p_s > .175$ , social support,  $F_s < 3.33, p_s > .071$ , or biracial group identity,  $F_s < 3.49, p_s > .063$ .



### *Affect*

Participants completed the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) to measure affect. The PANAS includes 10 items that measure positive affect (e.g., excited and enthusiastic) and 10 items that measure negative affect (e.g., upset and irritable). Using a scale of 1 (*not at all*) to 5 (*extremely*), participants indicated the extent to which each of the items described how they felt. They completed half of the items before the manipulation ( $\alpha_{\text{positive}} = .83$ ;  $\alpha_{\text{negative}} = .80$ ) and half after the manipulation ( $\alpha_{\text{positive}} = .89$ ;  $\alpha_{\text{negative}} = .81$ ).

### *Identity Autonomy*

Participants completed a five-item measure of identity autonomy that measured how free participants felt to culturally identify as they wish (Albuja et al., 2019). An example item is “I feel that I can culturally identify as I want.” Participants indicated their agreement on a scale of 1 (*strongly disagree*) to 7 (*strongly agree*) and the items were averaged ( $\alpha = .87$ ).

### *Verbal and Nonverbal Behavior*

Four female research assistants (2 White, 2 South Asian) who were blind to study hypotheses were trained to code the video recordings of participants. Research assistants viewed participants' behavior from the moment of receiving the experimental or control manipulation until the experimenter began the next section of the study. The research assistants viewed each video first without sound and coded for nonverbal behaviors. Next, they watched the video again with sound to code for reassertion and verbal behaviors. Thus, coders were blind to condition for their first coding, but knew which condition participants were in when coding the verbal behaviors because they listened to the interaction. Using a scale of 1 (*not at all*) to 7 (*very much*), research assistants coded how confident, sad, and upset the participant sounded, as well as how anxious, comfortable, stressed, tense, and upset the participant looked. Research assistants also coded how frequently the participant smiled, made eye contact, and the physical engagement of the participant. Lastly, research assistants coded whether participants verbally reasserted their identity or not. Examples of reassertions included participant responses such as, “I am American,” “I was born here,” or “I am a citizen.” Aside from two variables that were removed because they failed to reach adequate intercoder reliability, intercoder reliability was generally good (see Table 1; Hallgren, 2012). Each variable was analyzed separately.

**Table 1.** Interrater Reliability for Verbal and Nonverbal Behavior in Studies 1 and 2

Variable	Study 1 ICC	Study 2 ICC
Verbal		
Affirmation	.98	.94
Confident sounding	.78	.79
Sad sounding	.49	.72
Upset sounding	.56	.73
Anxious looking	.61	.69
Nonverbal		
Comfortable looking	.65	.82
Stressed looking	.59	.69
Tense looking	.68	.76
Upset looking	.60	.70
Smiling frequency	.93	.86
Eye contact	.78	.88
Physically engaged	.77	.78

## Results

### *Analysis Plan*

The full analytic sample was included in analyses of the effects of condition on self-reported measures. Analyses of the hormonal responses included all male participants and a subset of the female participants who were in the follicular stage of their menstrual cycle (5–13 days after the onset of menstruation; Blascovich, Vanman, Mendes, & Dickerson, 2011). Women who were not in the follicular phase of their menstrual cycle ( $n = 47$ ) were excluded from analyses of cortisol to minimize the impact of natural hormone fluctuations of women outside of the follicular phase (Mendes, Gray, Mendoza-Denton, Major, & Epel, 2007; Symonds, Gallagher, Thompson, & Young, 2004). Five of the women included in the cortisol analyses reported using hormonal birth control.<sup>2</sup>

### *Cortisol Reactivity*

To examine whether changes in cortisol across phases of the experiment varied by condition, we conducted a linear mixed model with fixed effects of

<sup>2</sup>The results remained the same when participants using hormonal birth control were excluded from the cortisol analysis.

time, condition (coded as control = -1, denial = 1), and their interaction, and a random intercept. There was a significant interaction between time and condition,  $b = 0.65$ ,  $SE = 0.30$ ,  $t(76) = 2.16$ ,  $p = .034$ , 95% CI = [0.05, 1.26]. Although participants' cortisol response reduced over time in both conditions, it decreased more slowly in the self-relevant identity denial condition,  $b = -1.50$ ,  $t(41) = -5.12$ ,  $p < .001$ , 95% CI = [-2.10, -0.91], compared to the control condition,  $b = -2.81$ ,  $t(35) = -5.02$ ,  $p < .001$ , 95% CI = [-3.95, -1.68]. These results suggest that cortisol levels were elevated for a longer period of time when experiencing identity-relevant denial compared to identity-irrelevant denial.

### *Stress*

A mixed ANOVA with Time 1 and Time 2 stress as a within-subjects variable and condition as a between subjects variable indicated a significant effect of stress,  $F(1, 124) = 44.20$ ,  $p < .001$ ,  $\eta_p^2 = .26$ . Participants reported greater stress at Time 2 ( $M = 3.61$ ,  $SD = 1.51$ ) compared to Time 1 ( $M = 2.96$ ,  $SD = 1.09$ ). This was qualified by a significant interaction between stress and condition,  $F(1, 124) = 13.44$ ,  $p < .001$ ,  $\eta_p^2 = .10$ . Though there was a significant increase in reported stress in both conditions, the effect was stronger in the denial condition,  $F(1, 64) = 38.65$ ,  $p < .001$ ,  $\eta_p^2 = .38$ , compared to control,  $F(1, 64) = 7.83$ ,  $p = .007$ ,  $\eta_p^2 = .12$ .

### *Affect*

A mixed ANOVA with Time 1 and Time 2 positive affect as a within-subjects variable and condition as a between-subjects variable yielded a main effect of positive affect,  $F(1, 124) = 41.44$ ,  $p < .001$ ,  $\eta_p^2 = .25$ . Across conditions, participants reported lower positive affect at Time 2 ( $M = 2.40$ ,  $SD = 1.00$ ) compared to Time 1 ( $M = 2.86$ ,  $SD = 0.76$ ). The interaction with condition was not significant,  $F(1, 124) = 0.06$ ,  $p = .805$ . A mixed ANOVA with Time 1 and Time 2 negative affect indicated no significant effects of negative affect,  $F(1, 124) = 0.50$ ,  $p = .483$ , or interaction with condition,  $F(1, 124) = 1.09$ ,  $p = .299$ .

### *Autonomy*

There was no significant difference in identity autonomy between the identity-relevant denial condition ( $M = 5.42$ ,  $SD = 1.03$ ) and the identity-irrelevant control condition ( $M = 5.09$ ,  $SD = 1.21$ ),  $t(124) = 1.63$ ,  $p = .105$ .

### *Verbal and Nonverbal Behavior*

There were significant effects of condition on identity reassertion,  $\chi^2(1, N = 116) = 56.76$ ,  $p < .001$ , such that participants reasserted their identity more in the

identity-relevant denial condition (66.1%) than in the identity-irrelevant condition (0%). However, there were no significant differences between conditions on the coded verbal and nonverbal behaviors,  $t_s < 1.68$   $p_s > .099$ .

### *Identity Reassertion*

Because no participants in the identity-irrelevant denial condition reasserted their identity, we can only include participants from the identity-relevant denial condition in identity reassertion analyses. Thus, we conducted mixed ANOVAs with reassertion status as a between-subjects variable among participants in the identity-relevant denial condition to test for differences between those who reasserted their identity and those who did not on cortisol reactivity and the self-reported variables. Although there was a significant decrease in cortisol over time,  $F(2, 70) = 17.90$ ,  $p < .001$ ,  $\eta_p^2 = .34$ , there was no significant interaction with reassertion status,  $F(2, 70) = 1.22$ ,  $p = .302$ . There were also no significant differences between participants who reasserted on stress,  $F(1, 57) = 1.34$ ,  $p = .252$ , positive affect,  $F(1, 57) = 1.30$ ,  $p = .260$ , or self-reported autonomy,  $t(57) = -0.07$ ,  $p = .946$ . For negative affect there was a significant interaction between negative affect and reassertion status,  $F(1, 57) = 5.04$ ,  $p = .029$ ,  $\eta_p^2 = .08$ . However, there was no change between Time 1 and Time 2 negative affect in either condition,  $F_s < 2.53$ ,  $p_s > .127$ .

Next, we tested whether there were differences in participants' verbal and nonverbal behaviors based on whether they reasserted their identity (see Table 2).<sup>3</sup> Participants who reasserted their American identity after experiencing an identity-relevant denial were rated as sounding less sad, sounding more confident, appearing less tense, appearing more comfortable, and appearing marginally less anxious, and marginally less stressed, than participants who did not reassert their identity. There were no significant differences on how upset participants sounded, how upset participants looked, the amount of eye contact or smiling, or how physically engaged participants were,  $t_s < 1.57$ ,  $p_s > .123$ .

### **Summary**

Bicultural participants in Study 1 reported greater stress when their American identity was denied compared to when they received an identity-irrelevant denial. Further, there was some evidence of a physiological effect, as participants in the identity-relevant condition demonstrated a slower cortisol reduction compared to

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<sup>3</sup>Seven videos were missing, and 62 participants only consented to being audio recorded rather than video recorded. This results in a lower sample size for analyses of nonverbal behavior compared to verbal behavior.

**Table 2.** Independent Samples *t*-Tests by Reassertion Status on Verbal and Nonverbal Responses for Study 1

	Reassertion <i>M</i> ( <i>SD</i> )	No Reassertion <i>M</i> ( <i>SD</i> )	<i>t</i>	<i>d</i> [95% CI]
Verbal				
Confident sounding	5.46 (1.24)	3.00 (0.91)	7.81***	2.15 [1.48, 2.81]
Sad sounding	1.48 (0.66)	1.91 (0.75)	2.26*	0.62 [0.07, 1.17]
Upset sounding	2.10 (0.91)	2.39 (1.00)	1.12	0.47 [-0.25, 1.18]
Nonverbal				
Anxious appearance	2.64 (1.03)	3.38 (1.08)	2.02†	0.70 [-.003, 1.40]
Comfortable appearance	4.08 (1.01)	3.05 (1.31)	2.58*	0.92 [0.18, 1.66]
Stressed appearance	1.95 (0.85)	2.54 (0.91)	1.83†	0.68 [-0.07, 1.42]
Tense appearance	2.55 (0.97)	3.28 (0.85)	2.09*	0.78 [0.02, 1.52]
Upset appearance	2.08 (1.01)	2.58 (0.93)	1.40	0.50 [-0.22, 1.21]
Smiling frequency	3.53 (2.15)	2.85 (1.94)	0.96	0.32 [-0.37, 1.01]
Eye contact frequency	5.58 (0.97)	5.90 (0.73)	1.01	0.35 [-0.34, 1.04]
Physical engagement	5.10 (0.96)	5.35 (1.09)	-0.74	0.26 [-0.43, 0.94]

*Note.* For verbal responses,  $N_{\text{Reassertion}} = 39$ , and  $N_{\text{No Reassertion}} = 20$ . For nonverbal responses,  $N_{\text{Reassertion}} = 26$  and  $N_{\text{No Reassertion}} = 11$ .

† $p < .10$ .  
 \* $p < .05$ .  
 \*\* $p < .01$ .  
 \*\*\* $p < .001$ .

control. There were no differences between conditions in affect or autonomy. While no reassertions were made when an irrelevant identity was denied, more than half of the participants (66.1%) reasserted their American identity when it was denied. Importantly, those who reasserted their American identity reported more positive nonverbal and verbal responses, though there were no differences by reassertion status on self-reported stress, affect, or autonomy. Though identity reassertion may have some benefits, disclosing an identity that may be stigmatized is often difficult and may therefore not reduce stress (Sanchez & Bonam, 2009). The purpose of Study 2 was to test the same hypotheses from Study 1 among a biracial sample.

## Study 2

### *Participants and Procedure*

Biracial ( $N = 171$ ) undergraduate students from two universities ( $n = 66$  and  $n = 53$ , respectively) were recruited to participate in a health study.<sup>4</sup> As in Study 1, students were invited to participate based on prescreen survey responses but did not know the study was related to biracial identity. Participants were invited to participate if they selected “biracial” or multiple racial identities for themselves or selected different racial options for their biological parents. Using the same power analysis reported in Study 1, we sought to recruit 120 participants to achieve 80% power. Participants who did not identify as biracial ( $n = 18$ ), selected one racial option for themselves and both parents ( $n = 17$ ), did not report any White ancestry ( $n = 5$ ), failed both attention check questions ( $n = 2$ ), were subject to experimenter error ( $n = 9$ ), or were younger than 18 years old ( $n = 1$ ) were removed, leaving a final sample of 119 participants.

Similarly to Study 1, participants responded above the midpoint ( $M = 5.85$ ,  $SD = 1.60$ ),  $t(118) = 12.62$ ,  $p < .001$ , to the item, “How strongly do you identify as biracial?” using a scale of 1 (*very weakly*) to 7 (*very strongly*). Participants also identified above the midpoint with their minority race ( $M = 5.12$ ,  $SD = 1.39$ ),  $t(110) = 8.49$ ,  $p < .001$ , and as White ( $M = 4.55$ ,  $SD = 1.79$ ),  $t(117) = 3.31$ ,  $p = .001$ . Sensitivity analyses suggested that this sample provided 80% power to detect a minimum effect size of  $d = .52$  for condition effects and  $\eta_p^2 = .01$  for mixed ANOVAs. The average age was 21.47 years ( $SD = 3.92$ ), and the sample was 74% ( $n = 88$ ) female and 43% White/Asian, 30% White/Latino, 15% White/Black, and 12% White/other racial backgrounds.

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<sup>4</sup>There were no significant interactions between condition and university location on any of the variables,  $F_s < 1.51$ ,  $p_s > .224$

Study 2 followed the same procedure as Study 1, with a few changes. In Study 2, the second experimenter said, “Actually, you have to be White for this particular health study” in the experimental self-relevant denial condition. After approximately 20 seconds, the experimenter continued, “Well, because you have already started the study, I think it’s okay if you continue but I will make a note about it in my records that you’re not actually White.” In the control identity-irrelevant condition, the experimenter instead said, “Actually, you have to be African American (Asian for White/Black biracial participants) for this particular health study” and followed up with “Well, because you have already started the study, I think it’s okay if you continue but I will make a note about it in my records that you’re not actually African American/Asian.” Participants completed the second saliva and third saliva samples at 30 and 60 minutes after the manipulation, respectively. They also completed the same measures of stress ( $\alpha_{\text{pre-manipulation}} = .75$ ;  $\alpha_{\text{post-manipulation}} = .79$ ), positive ( $\alpha_{\text{pre-manipulation}} = .78$ ;  $\alpha_{\text{post-manipulation}} = .82$ ) and negative affect ( $\alpha_{\text{pre-manipulation}} = .74$ ;  $\alpha_{\text{post-manipulation}} = .74$ ; Watson et al., 1988), and identity autonomy (reworded to be specific to racial identity rather than cultural identity;  $\alpha = .88$ ) from Study 1. Participant behavior was again video recorded and coded by six female trained research assistants (2 White, 2 South Asian, 1 African American, 1 Middle Eastern) for the same verbal and nonverbal behaviors from Study 1, demonstrating high reliability (see Table 1).

## Results

### *Cortisol Reactivity*

As in Study 1, we excluded women who were not in the follicular phase of their menstrual cycle ( $n = 56$ ) from analyses of cortisol reactivity. We conducted a linear mixed model analysis of cortisol with fixed effects of time, condition (coded as control = -1, denial = 1), and their interaction, and a random intercept. There was a significant effect of time,  $b = -3.55$ ,  $SE = 0.59$ ,  $t(63.10) = -6.00$ ,  $p < .001$ , 95% CI = [-4.73, -2.37], but no significant interaction between time and condition,  $b = 0.67$ ,  $SE = 0.59$ ,  $t(63.10) = 1.14$ ,  $p = .261$ , 95% CI = [-0.51, 1.85]. Participants’ cortisol response reduced over time and did not vary by condition. There were 12 women included in the analysis who reported currently using hormonal birth control.<sup>5</sup>

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<sup>5</sup>When participants using hormonal birth control were excluded, there was a marginal interaction between time and condition,  $b = 1.19$ ,  $SE = 0.86$ ,  $t(51.22) = 1.75$ ,  $p = .085$ , 95% CI = [-0.17, 2.56]. Although participants’ cortisol response reduced over time in both conditions, it decreased slower in the self-relevant identity denial condition ( $b = -2.24$ ) compared to the control condition ( $b = -4.63$ ).

### *Stress*

A mixed ANOVA with Time 1 and Time 2 stress as a within-subjects variable and condition as a between subjects variable indicated a significant effect of stress,  $F(1, 117) = 32.84, p < .001, \eta_p^2 = .22$ . Participants reported higher stress at Time 2 ( $M = 3.13, SD = 1.32$ ) compared to Time 1 ( $M = 2.56, SD = 1.01$ ). This was qualified by a significant interaction between stress and condition,  $F(1, 117) = 10.70, p = .001, \eta_p^2 = .08$ . Participants reported increased stress in the self-relevant identity denial condition,  $F(1, 61) = 40.34, p < .001, \eta_p^2 = .40$ , while this effect was marginal in the control condition,  $F(1, 56) = 3.07, p = .085, \eta_p^2 = .05$ .

### *Affect*

A mixed ANOVA with Time 1 and Time 2 positive affect as a within-subjects variable and condition as a between subjects variable indicated a significant effect of positive affect,  $F(1, 117) = 105.09, p < .001, \eta_p^2 = .47$ . Across conditions, participants reported less positive affect at Time 2 ( $M = 2.42, SD = 0.82$ ) compared to Time 1 ( $M = 3.05, SD = 0.68$ ). There was no significant interaction between positive affect and condition,  $F(1, 117) = 1.08, p = .300$ . For negative affect, there was no significant effect of affect,  $F(1, 117) = 0.001, p = .981$ , or interaction with condition,  $F(1, 119) = 0.11, p = .736$ .

### *Autonomy*

There was no significant difference between the identity-relevant denial ( $M = 4.54, SD = 1.37$ ) and identity-irrelevant denial ( $M = 4.74, SD = 1.40$ ) conditions on racial identity autonomy,  $t(117) = 0.80, p = .425$ . Identity denial did not influence how autonomous participants felt in selecting their own identity compared to control.

### *Verbal and Nonverbal Behavior*

There were significant effects of condition on reassertion,  $\chi^2(1, N = 93) = 28.31, p < .001$ , such that participants reasserted their identity more frequently in the identity-relevant denial condition (54.3%) than the identity-irrelevant condition (4%). There was a marginal effect of condition on how upset participants sounded,  $t(96) = 1.67, p = .098$ . Participants in the identity-relevant denial condition appeared more upset ( $M = 2.54, SD = 1.21$ ) than participants in the identity-irrelevant condition ( $M = 2.15, SD = 1.07$ ). There were no other significant differences between conditions on the coded verbal and nonverbal behaviors,  $ts < 1.43, ps > .157$ .



**Table 3.** Independent Samples *t*-Tests by Reassertion Status on Verbal and Nonverbal Responses for Study 2

	Reassertion <i>M</i> ( <i>SD</i> )	No Reassertion <i>M</i> ( <i>SD</i> )	<i>t</i>	<i>d</i> [95% CI]
Verbal				
Confident sounding	5.12 (1.19)	4.32 (1.06)	2.40*	0.71 [0.11, 1.31]
Sad sounding	2.06 (0.82)	2.27 (1.09)	-0.74	0.22 [-0.36, 0.80]
Upset sounding	2.75 (1.13)	2.60 (1.09)	0.44	0.13 [-0.45, 0.71]
Nonverbal				
Anxious appearance	2.7 (1.05)	2.62 (0.70)	0.30	0.09 [-0.49, 0.67]
Comfortable appearance	3.99 (1.40)	3.91 (0.92)	0.21	0.06 [-0.52, 0.64]
Stressed appearance	2.37 (1.06)	2.49 (0.87)	-0.43	0.13 [-0.45, 0.71]
Tense appearance	2.79 (1.14)	3.27 (0.93)	-1.53	0.45 [-0.14, 1.04]
Upset appearance	2.48 (1.05)	2.62 (1.22)	-0.41	0.12 [-0.46, 0.70]
Smiling frequency	3.62 (1.48)	3.38 (1.45)	0.55	0.16 [-0.42, 0.74]
Eye contact frequency	5.04 (1.26)	4.79 (-0.79)	0.78	0.23 [-0.35, 0.81]
Physical engagement	4.33 (1.49)	3.92 (1.04)	1.07	0.32 [-0.27, 0.90]

Note. For both verbal and nonresponses,  $N_{\text{Reassertion}} = 25$ , and  $N_{\text{No Reassertion}} = 21$ .

\* $p < .05$ .

### Identity Reassertion

Because only two participants in the identity-irrelevant denial condition reasserted their identity, we have excluded them from the identity reassertion analyses to avoid uneven cell sizes and underpowered analyses. We conducted mixed ANOVAs with reassertion status as a between-subjects variable among participants in the identity-relevant denial condition to test for differences between those who reasserted their identity and those who did not on cortisol reactivity and the self-reported variables. Although there was a significant decrease in cortisol over time,  $F(2, 40) = 8.82$ ,  $p = .001$ , there was no significant interaction with reassertion status,  $F(2, 40) = 1.94$ ,  $p = .157$ . There were also no significant differences between participants who reasserted on stress,  $F(1, 57) = 1.34$ ,  $p = .252$ , positive affect,  $F(1, 44) = 0.01$ ,  $p = .920$ , or negative affect,  $F(1, 44) = 0.33$ ,  $p = .567$ . For autonomy, there was a significant effect,  $t(44) = 2.06$ ,  $p = .045$ , such that participants reported greater identity autonomy if they reasserted their identity ( $M = 5.13$ ,  $SD = 1.26$ ) compared to those who did not ( $M = 4.36$ ,  $SD = 1.26$ ).

Lastly, we tested whether there were differences in participants' verbal and nonverbal behaviors based on whether they reasserted their identity (see Table 3). Participants who reasserted their White identity after experiencing an identity-relevant denial were rated as sounding more confident than those who did not reassert. There were no significant differences on any other verbal or nonverbal behaviors,  $ps > .132$ .

## Summary

Biracial participants in Study 2 who were denied their White identity reported more subjective stress compared to participants who received an identity irrelevant denial. However, there was no significant effect on physiological stress responses. About half of the participants (54.3%) reasserted their identity. Those who reasserted were rated as sounding more confident and reported greater autonomy, though there were no other consistent differences between participants who reasserted versus those who did not.

## Discussion

Bicultural and biracial individuals are often denied membership in groups with which they identify. The present studies directly compared identity-relevant to identity-irrelevant denial experiences for both populations in order to examine the psychological and physiological effects of identity denial. The results suggest that both bicultural and biracial participants who were denied their American or White identity (self-relevant identities) reported greater stress than participants who were denied an irrelevant identity (identities that these two populations did not hold). These studies are among the first to experimentally demonstrate that being denied membership in an important cultural or racial group leads to greater self-reported stress than being denied membership in an identity-irrelevant group. Additionally, bicultural participants demonstrated a slower reduction of cortisol reactivity after denial. Bicultural Americans experience identity denial frequently (Cheryan & Monin, 2005), indicating that a slower reduction of cortisol reactivity after identity denial experiences over time may have wider health implications. Given that some health disparities persist among Asian Americans compared to other racial and cultural groups (Kim, Keefe, & Linn, 2014), future research focused on specific identity experiences that lead to physiological stress responses may help pinpoint stressors that contribute to overall poor health (Williams & Mohammed, 2009). Very few programs are in place to attend to the needs of those with "border" identities such as bicultural and biracial individuals. These populations could be affirmed through inclusive demographic forms that allow for multiple identifications (Sanchez, 2010), or support for dual identity development in school and mental health institutions (Renn, 2008). For example, although parents often avoid discussing race with their children, White parents who were more aware of their own racial bias were more likely to engage in color conscious discussions that acknowledge racism (Perry, Skinner, & Abaied, 2019). This suggests that increasing discussions of the specific identity threats experienced by bicultural and biracial people may similarly improve people's awareness of identity denial and reduce its occurrence.

There were no significant differences between conditions on self-reported affect and autonomy. Past work has found that identity denial experiences lead to negative affect compared to a control condition where participants did not experience identity denial (Cheryan & Monin, 2005). Therefore, it is possible that there were no significant differences in affect between identity-relevant and identity-irrelevant denial experiences because both were experienced negatively. Additionally, though past work has found a correlational association between reported frequency of identity denial and autonomy felt in selecting an identity (Albuja et al., 2019), it is possible one identity denial experience is not sufficient to thwart identity autonomy, especially given that people were willing to reassert their identities in the face of this experience. Future research should examine whether denial influences autonomy when a better assessment of state level autonomy is crafted, or when the denial manipulation more directly restricts identity choice such as through a forced-choice demographic form (Sanchez, 2010).

In both samples, more than half of the participants who received an identity-relevant denial reasserted their identity through responses such as, "I am American" or "I am White." This reassertion rate is lower than that reported in past work with bicultural Americans (Cheryan & Monin, 2005). However, in the present studies, participants' identity was denied after the study had already begun, so it is possible some participants did not feel a need to reassert their identity in order to be able to complete the study. Among bicultural participants, identity reassertion was associated with positive verbal and nonverbal outcomes, including sounding less sad and looking more comfortable. These effects were not consistently found among the biracial participants. However, the analyses must be interpreted with caution because including only participants in the identity-relevant denial condition in the analysis severely reduced statistical power. Nonetheless, such initial results provide an avenue for future research to further explore the effects of identity reassertion on well-being among bicultural and biracial people.

The present study found similar effects between the bicultural and biracial samples, suggesting that identity denials may be similarly stressful experiences among various populations with dual-identities. This is consistent with past work, which suggests that the association between identity denial experiences and mental well-being is similar among both populations (Albuja et al., 2019). However, the physiological effects were only significant for bicultural participants who had their American identity denied. Past work has found that biracial people report more frequent identity denial experiences than bicultural populations (Albuja et al., 2019), and may therefore be less impacted or may be more resilient when encountering one. Biracial people may also expect identity denial more frequently, given their often ambiguous phenotype and ambiguous group membership (Gaither, Babbitt, & Sommers, 2018). Additionally, this discrepancy may also be due to current public policies that increasingly limit the definition of American by restricting

immigration and casting foreign born citizens as outsiders (Krogstad & Gonzalez-Barrera, 2018). Given this climate, it is possible that being denied an American identity was an especially potent identity denial eliciting greater physical threat responses. Thus, it is important to create policies that are inclusive of bicultural Americans as full members of the American cultural group in order to prevent downstream adverse health effects. For example, maintaining birthright citizenship policies, expanding grants available to green card holders, and acknowledging minority cultural groups in school curriculums would promote inclusion of bicultural people with a recent immigration history in the opportunities and culture of the United States.

Although biracial people in the present study did not show evidence of being similarly impacted physiologically, denial was similarly subjectively stressful for both groups. Thus, it is important for policy to also support biracial people in their dual identity. Despite the U.S. Census Bureau allowing citizens to select more than one racial option on the census form since 2000 (Parker, Horowitz, Morin, & Lopez, 2015), many demographic forms used by hospitals, schools, and other institutions continue to allow for only single racial selections. These restrictive demographic forms are often a source of stress and identity denial for biracial individuals as they are forced to “choose” between their racial identities (Townsend et al., 2009). Furthermore, the lack of inclusive racial options on these forms can contribute to issues in providing proper health care for patients as well as exacerbating minority health disparities (Hasnain-Wynia & Baker, 2006; Woo, Austin, Williams, & Bennett, 2011). Allowing biracial people to select multiple options on demographic forms would improve demographic data quality of this understudied group and affirm biracial people’s identity.

The present studies improve upon limitations of past work in several ways. By using a rigorous control condition that also included a negative but irrelevant denial, the present studies provide a more stringent test of the effects of identity denial specific to bicultural and biracial people. Further, using physiological measures complements the self-reported stress results to better understand for whom identity denial might pose a social threat that activates the physiological stress response. The analyses comparing reassertion provide initial insight into how confronting identity denial might help bicultural and biracial people buffer themselves from the effects of denial. The present studies provide a nascent understanding of reassertion processes that with additional testing may prove to be a tangible coping tool to reduce the negative effects of identity denial on stress and promote resiliency. The results also contribute to a novel literature comparing the identity experiences of bicultural and biracial people, highlighting some differences between populations that lend themselves to further study.

*Limitations and Future Directions*

The present studies leave open several questions for future research. Though subtle racial discrimination may have cognitive consequences (Ozier, Taylor, & Murphy, 2019), for biracial participants identity denial threat may not be strong enough on its own to elicit cortisol effects. Dickerson and Kemeny's (2004) meta-analysis suggests that public speaking and cognitive tasks such as the Trier Social Stress Task (Kirschbaum, Pirke, & Hellhammer, 1993) reliably evoke a cortisol response. Adding an identity denial threat to a standardized social stress task may be more effective in inducing a significant cortisol reaction in order to elucidate differences between experiencing identity relevant denial versus identity irrelevant denial. Moreover, cardiovascular responses indicative of challenge or threat should also be examined within future research (Blascovich & Mendes, 2000). An examination of physiological appraisals of challenge or threat would provide additional insight into the physiological resources individuals with multiple identities have during identity denial experiences.

Additionally, the present study only included Asian American bicultural participants, consistent with much of the existing identity denial literature (e.g., Guendelman, Cheryan, & Monin, 2011). However, other bicultural populations such as Latino Americans are similarly viewed as foreign and subjected to identity denial (Zou & Cheryan, 2017). Future research may extend this work by experimentally examining the mental and physical consequences of identity denial among Latino Americans, whose status as American may feel especially precarious given current policy debates surrounding citizenship status. A current proposal to ask about citizenship status on the 2020 Census threatens the inclusion and visibility of a significant portion of this population. Critics argue that this question was designed to discriminate against many Latinos and deter them from completing the Census (Entin, 2018; Wines, 2018), and that the effects of this could be substantial. A meaningful proportion of the Latino population is potentially denied inclusion in the U.S. population by this question. Therefore, the addition of this question could have a radical impact on the demographic counts of the population as Mexican and other Latin American immigrants make up the largest proportion of the foreign-born population in the United States (Zong & Batalova, 2018). Furthermore, the underrepresentation of this group brought on by this this question could be detrimental in informing future policy decisions.

Lastly, the present study did not systematically examine how responses to identity denial may differ by group membership of the perpetrator. Based on a history of hypodescent and ingroup overexclusion in the United States (Castano, Yzerbyt, Bourguignon, & Seron, 2002; Ho, Sidanius, Levin, & Banaji, 2011; Leyens & Yzerbyt, 1992), bicultural and part-White biracial people may expect to be denied their high status American or White identities more often than their minority identities. However, given that minority cultural groups often provide

solidarity and safety from societal discrimination, being denied membership in the minority cultural or racial group may have different consequences (Gomez, 2017). Though one past study among Black/White biracial people suggests that denial from Black people is more hurtful than denial from others (Franco & Franco, 2015), no research to date has examined this experimentally. In the present studies, the experimenters were racially diverse, though the majority (61%) were White, and experimenters did not share participants' cultural or racial minority identity (Does et al., 2018). Future research may systematically vary experimenter race to examine how responses to denial differ when the perpetrator is an outgroup member who does not share either cultural or racial identity with the bicultural or biracial person.

### *Conclusion*

In sum, we all have multiple identities (i.e., sex, age, occupation, socioeconomic status, etc.; Boston & Cimpian, 2019; Castillo & Destin, 2019) and with the number of immigrants and interracial marriages on the rise, the United States will only continue to become more diverse. The important role that group identification plays in promoting stigmatized people's well-being (Schmitt & Branscombe, 2002) underscores the necessity to better understand the identity denial experiences of bicultural and biracial people and to promote belongingness and acceptance. Therefore, this research highlights the need to investigate the nature of diverse individuals' social identifications with multiple groups, and how society can learn from these experiences to help improve intergroup relations more broadly through policies that are inclusive and supportive of dual identities.

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### **Supporting information**

Additional supporting information may be found online in the Supporting Information section at the end of the article.

**Figure 1.** Moderation of the effect of condition on participants' sad sound by bicultural group identification.

**Figure 2.** Moderation of the effect of condition on participants' comfortable appearance by bicultural group identification.

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