**Temporal Fluctuations in Context Ethnic Diversity Over Three Decades Predict Implicit
National Inclusion of Asian Americans**

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Study materials and full dataset (<https://osf.io/cpmfk/>) as well as analysis scripts and data files necessary to reproduce findings reported (<https://osf.io/6haq5/>) are publicly available. We thank Project Implicit for ongoing efforts to collect and make public IAT data across tasks and time.

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Abstract

The present research examined whether temporal fluctuations in context ethnic diversity account for current levels of implicit ethnic-American associations. Temporal fluctuations in ethnic diversity at the metropolitan level were assessed using data from four decennial U.S. censuses (1980-2010) and distinguishing three dimensions of context ethnic diversity (minority representation, variety, and integration). Project Implicit data (2011-2017) indexed the extent to which American identity was implicitly associated with European Americans over Asian Americans (i.e., American = White associations). Data were analyzed using multilevel modeling ($N = 152,011$, nested within 226 metropolitan areas). Steeper increases in the proportion of Asian Americans were related to weaker implicit (but stronger explicit) American = White associations. Increases in ethnic integration accounted for stronger implicit American = White associations when integration fluctuations reflected accelerating rather than decelerating trends. These results suggest that current levels of implicit ethnic-national associations are linked to complex patterns of ethnic diversity fluctuations.

The U.S. population is more ethnically and racially diverse today than at any point in its history (Lee & Bean, 2010; Lee, Iceland, & Farrell, 2014). By 2044, this increasing ethnic diversity is projected to yield a majority-minority nation (Colby & Ortman, 2015). Do these types of demographic shifts have implications for lay people's definitions of what it means to be American? As diversity increases, are members of ethnic minorities more likely to be included in the national identity? Capitalizing on variability in the expansion of ethnic diversity across U.S. metropolitan areas over the last three decades, the present research tested whether temporal fluctuations in context ethnic diversity predict the extent to which American identity is implicitly associated with Asian and European Americans. Asian Americans represent one of the fastest growing ethnic groups in the U.S. (Hoeffel, Rastogi, Kim, & Shalid, 2012), yet they continue to be perceived as perpetual foreigners (Lee, Wong, & Alvarez, 2009; Zou & Cheryan, 2017).

Implicit Ethnic-American Associations

Various conceptions of national identity coexist within the U.S. (Citrin, Wong, & Duff, 2001; Huynh, Devos, & Altman, 2015; Schildkraut, 2011; Theiss-Morse, 2009). Civic notions of national identity tend to be inclusive as they are based on commitment to shared values and civic participation, whereas ethnic¹ definitions of national identity tend to be exclusive, considering people of only certain ethnic backgrounds as authentic co-nationals (Mukherjee, Molina, & Adams, 2012; Pehrson & Green, 2010; Schildkraut, 2007). The pervasiveness of exclusive conceptions of the American identity is especially highlighted by research relying on implicit measures: when individuals have limited conscious control over their responses, American identity is more strongly associated with European Americans than Asian Americans, Latinx Americans, African Americans, or even Native Americans (for reviews, see Devos & Mohamed, 2014; Yogeeswaran & Dasgupta, 2014). This implicit *American = White* effect reflects a deeply

entrenched conflation between Americanness and whiteness that conscious knowledge cannot eradicate (Devos & Banaji, 2005; Devos & Ma, 2008). This effect has been shown to predict discriminatory behaviors and voting intentions (Devos & Ma, 2013; Ma & Devos, 2014; Yogeeswaran & Dasgupta, 2010). Meaningful sources of variation in implicit ethnic-American associations include respondents' ethnicity and political orientation (Crawford & Bhatia, 2012; Devos, Gavin, & Quintana, 2010; Nosek et al., 2007). Short-term experimental manipulations have also been shown to affect the implicit inclusion of ethnic minorities in the national identity (Rydell, Hamilton, & Devos, 2010; Yogeeswaran, Dasgupta, Adelman, Eccleston, & Parker, 2011; Yogeeswaran, Dasgupta, & Gomez, 2012).

In line with recent calls to consider the interplay between implicit biases and socio-structural factors (Payne, Vuletich, & Lundberg, 2017; Yogeeswaran, Devos, & Nash, 2016), the focus of the present research was to examine the relationship between temporal fluctuations in ethnic diversity and the extent to which the American identity is implicitly associated with Asian vs. European Americans. Implicit associations tap the socio-structural knowledge accessible in a specific context (Devos, 2008; Olson, Fazio, & Han, 2009; Payne et al., 2017; Rudman, 2004). In the present case, the notion of socio-structural knowledge refers to knowledge associated with systemic relations between ethnic groups in a specific historical place and time. Immersion in a specific environment is linked to recurring experiences (e.g., interactions with others, exposure to symbols, ideas, practices, or cultural products) that produce, strengthen, or weaken implicit associations. Most relevant here are experiences that bear the mark of the historical relations between ethnic groups in a given setting. Socio-structural factors often point to the stability of contexts over time and thus implicit associations may reflect this inertia. However, socio-structural characteristics of contexts are not immutable; they do change over time, even if at a slow pace. Context ethnic diversity is a prime illustration of both the constancy and fluidity of

socio-structural factors. The socio-demographic make-up of states, counties, or cities can be relatively stable or show temporal fluctuations. Even if a person is not present in a context as changes unfold over decades, context diversity effects on implicit associations may emerge because fluctuations in diversity over time can influence socio-structural knowledge currently accessible in the environment.

The idea that contextual changes occurring over a relatively long period would affect the implicit associations of individuals who did not live in the context when these changes occurred might be hard to grasp. However, it is important to stress that the knowledge currently accessible in a given context is not just a reflection of the present state of affairs in this context, but also bears the mark of the temporal fluctuations (e.g., historical events or demographic shifts). This proposition is consistent with research on cultural inertia documenting that demographic shifts elicit various forms of resistance, unless the context or culture is already changing (Zárate, & Shaw, 2010; Zárate, Shaw, Marquez, & Biagas, 2012). From this perspective, contexts with *currently* identical levels of context diversity might be experienced differently depending on the direction, magnitude, or implications of *changes* in context diversity. The recurring experiences that individuals have in a given context partially reflect what has been happening in this context even if they were not around when changes unfolded. To put it simply, the knowledge accessible to individuals living in distinct contexts (e.g., states, counties, or cities) characterized by similar levels of ethnic diversity are not the same if the level of ethnic diversity has been steady in one case (no temporal fluctuation), increased drastically three decades ago, or increased drastically over the last decade. Interethnic interactions, symbols, practices, norms, and institutions may differ across these contexts. These differences might relate to current implicit associations and be linked to variables mapping changes over time in these contexts. In that sense, what individuals personally experience and the knowledge accessible to them is shaped in important

ways by the socio-structural characteristics of the context they are immersed in, including how this context changed over a period of time that goes well beyond their presence in this context (for a similar argument, see Payne, Vuletic, & Brown-Iannuzzi, 2019).

Context Diversity as Minority Representation, Variety, and Integration

Given the paucity of research on the socio-structural correlates of implicit associations (c.f. Hehman, Flake, & Calanchini, 2017; Marini et al., 2013; Nosek et al., 2009; Zerhouni, Rougier, & Muller, 2016), the present work built on a broader literature on context diversity effects. The links between context ethnic diversity and important aspects of ethnic relations are complex (Craig, Rucker, & Richeson, 2018; Hewstone, 2015). Some findings support the idea that ethnic diversity fosters inter-ethnic contact, more complex and inclusive ingroup representations, prosocial behaviors, and reduced prejudice (Christ et al., 2014; Nai, Narayanan, Hernandez, & Savani, 2018; Schmid, Hewstone, & Al Ramiah, 2013). Other findings are more consistent with the notion that ethnic diversity is threatening, erodes social trust, and increases prejudice (Craig & Richeson, 2014a, 2014b; Danbold & Huo, 2015; Dixon, 2006; Putnam, 2007). The complexities of the role of context ethnic diversity sometimes come to the fore in the same study with pathways operating in opposite directions, and effects moderated by third variables (Cohen-Marks & Faught, 2010; Piekut & Valentine, 2016; Schmid, Al Ramiah, & Hewstone, 2014; Stolle, Soroka, & Johnston, 2008).

However, one major issue with prior research on this topic is that it has typically relied on a single, fairly simple, indicator of context diversity – the proportion of ethnic minorities living in a specific context. In the present work, we build on influential contributions to the conceptualization and measurement of context diversity (Biemann & Kearney, 2010; Budescu & Budescu, 2012; Harrison & Klein, 2007; Koopmans & Schaeffer, 2015; Reardon & Firebaugh,

2002; Schaeffer, 2013) by examining three distinct, yet complementary, dimensions of context diversity at the metropolitan level (Devos & Sadler, 2019; Sadler & Devos, 2018).

First, context diversity can be conceptualized by the proportion of the population represented by specific ethnic minority groups (similar to the work described above). Metropolitan areas may differ in the extent to which a specific ethnic minority group is represented within the population, and even by the degree to which a specific ethnic minority group represents a growing segment of the total population. For example, over the course of several decades, the proportion of Asian American residents may increase from 2% to 10%. This shift would correspond to an *increase in minority representation*.

However, context diversity can also be conceptualized by the presence of multiple ethnic groups living in a given context (i.e., *variety*). According to this second dimension of context diversity, metropolitan areas may become more diverse because their populations are increasingly composed of multiple ethnic groups. Over time, for instance, the representation of distinct ethnic groups could become more proportionally even or more than two groups might begin to account for significantly larger shares of the total population. These instances would correspond to an *increase in variety* and would be conceptually distinct from minority representation. For example, consider a case where the proportion of Asian American residents remained stable over time (e.g., 10%). Increasing proportions of Latinx (from 2% to 8%) and African American (from 12 to 15%) residents in that same area would correspond to an increase in variety. In other words, such a change would reflect an increase in *variety*, with no changes in *minority representation* of Asian Americans.

Finally, context diversity can be conceptualized by the relative distribution of ethnic groups across smaller environments within an area (i.e., *integration*). For this third dimension of context diversity, metropolitan temporal fluctuations may be characterized by a shift in the

extent to which various ethnic groups become less concentrated such that their distributions across neighborhoods reflect that of the metropolitan area as a whole. This form of fluctuation would correspond to an *increase in integration*. Integration is conceptually distinct from the other two dimensions and captures changes in the relationship between variety at a lower level (neighborhoods making up the metropolitan area) and a higher level (metropolitan area as a whole). To illustrate the specificity of this dimension, consider a metropolitan area where minority representation and variety remained steady over time (e.g., 10% Asian, 8% Latinx, 15% African, and 67% European American residents). Initially, some neighborhoods might have been characterized by the over-representation of some groups and the under-representation of other groups (e.g., ethnically homogeneous neighborhoods). Over time, the distributions of various ethnic groups in most neighborhoods may shift such that they are now isomorphic to that of the metropolitan area as a whole. This would be indicative of a move from relative segregation towards greater integration.

The distinction between minority representation, variety, and integration was recently used to examine the relations between metropolitan context diversity and the extent to which the American identity was implicitly and explicitly associated with Asian Americans and European Americans (Devos & Sadler, 2019). Across 304 metropolitan areas, implicit American = White effects were less pronounced in areas characterized by higher proportions of Asian Americans (minority representation) or the presence of multiple ethnic groups (variety). Greater dispersion of ethnic groups at the neighborhood level (integration) was not a source of reliable variation in implicit ethnic-American associations. However, the effects of these context diversity indicators differ quite drastically depending on the nature or type of intergroup biases examined. Implicit Black-weapon associations were weaker as metropolitan areas were characterized by higher levels of variety or integration, but minority representation (in this case, defined as the

proportion of Blacks in the context) was unrelated to implicit Black-weapon associations (Sadler & Devos, 2018). Another study showed that the ratio of Black to White residents at the state or county level (a measure closely related to minority representation) was associated with stronger implicit ingroup favoritism among both White and Black respondents (Rae, Newheiser, & Olson, 2015). These studies collectively shed light on the relationship between contemporaneous levels of context diversity and implicit associations. However, a common limitation of such past work was to test these relationships using a cross-sectional design. For example, Devos and Sadler (2019) tested whether context diversity indicators based on 2010 U.S. census data predicted implicit ethnic-American associations collapsed across 14 years (2004-2017). The present research builds on this recent work, but introduces a temporal dimension. Here, we examined how *temporal fluctuations* in context diversity over a three-decade period predict current levels of implicit ethnic-American associations. Moreover, by distinguishing between three distinct forms of context diversity (minority representation, variety, and integration), we can examine the unique contributions of temporal fluctuations in each of these distinct forms of context diversity on implicit ethnic-American associations.

Increases in Context Diversity and Implicit Ethnic-American Associations

While demographic analyses point to an increasingly diverse U.S. population (Colby & Ortman, 2015; Lee & Bean, 2010; Lee, Iceland, & Farrell, 2014), variability in the pace and pattern of diversity increases at the metropolitan level offers a unique opportunity to test whether traces of these contextual changes can be detected in implicit associations displayed by individuals currently living in those settings. While our study design will not allow us to establish a causal link between increases in context diversity and ethnic-American associations, it will map the magnitude and pattern of diversity increases onto current levels of ethnic-American associations. The assumption is that temporal diversity fluctuations may influence the

socio-structural knowledge currently accessible in these environments. Thus, even individuals who did not experience firsthand the temporal fluctuations in the ethnic make-up of a metropolitan area (e.g., they were not born yet or did not live in this area for an extended period), might be affected by the socio-cognitive implications of diversity increases (for a similar argument, see Payne et al., 2019).

We theorized that minority representation is likely to have an impact on the knowledge accessible in social environments. Implicit assumptions about who is American may be a function of exposure to prevalent cultural symbols, people in positions of power, and everyday social interactions. As minority representation increases over time, the socio-structural knowledge accessible may evolve and affect who is seen as typical vs. atypical, familiar vs. unfamiliar, or valued vs. devalued. In line with the notion that implicit stereotypes operate as automatic accessibility biases (Devos & Heng, 2009; Payne, Jacoby, & Lambert, 2005), we predicted that increases in minority representation would be associated with a greater implicit inclusion of Asian Americans in the national identity (Hypothesis 1). Variety is more likely to influence the complexity of the socio-structural knowledge about American identity. As variety increases over time, the context might be appraised as multiethnic. Contrasts between the White majority and ethnic minority groups may become less pronounced as these groups represent more significant segments of the population. In line with research on the complexity of mental representations (Er-rafiy & Brauer, 2012; Miller, Brewer, & Arbuckle, 2009; Waldzus, Mummendey, Wenzel, & Weber, 2003), we expected that variety might bring to mind finer and more complex distinctions, making it progressively easier to implicitly associate American identity with the various ethnic groups (Hypothesis 2). Finally, as integration increases, diversity is more likely to be experienced repeatedly and directly: firsthand exposure to members of different ethnic backgrounds and to cultural symbols or practices associated with these ethnic

groups are likely to become more frequent. In line with research on intergroup contact and immersion in multicultural environments (Crisp & Turner, 2011; Hewstone, 2015; Tadmor, Hong, Chao, Wiruchnipawan, & Wang, 2012), we predicted that increases in integration would be associated with more inclusive implicit ethnic-American associations (Hypothesis 3). Given that these three dimensions are conceptually (and empirically, see Method section) distinct and *a priori* operate through distinct mechanisms, we expected that they would each uniquely account for implicit ethnic-American associations: weaker American = White effects should be observed in metropolitan areas characterized by steeper increases in minority representation (Hypothesis 1), variety (Hypothesis 2), or integration (Hypothesis 3).

Besides considering the magnitude of diversity increases, we also explored effects that could be attributed to the curvilinearity of the temporal fluctuations. Increases in diversity are not necessarily linear or uniform. Some metropolitan areas may be characterized by decelerating patterns, meaning that a steep initial increase in diversity was followed by a more modest increment. Other metropolitan areas may have followed accelerating trajectories defined by a tenuous initial increase in diversity followed by a steeper boost. Decelerating and accelerating trajectories may have contrasting effects on implicit ethnic-American associations that may indirectly shed light on the dynamics through which socio-structural factors operate. Two opposite potential patterns are worth considering. If weaker American = White effects were to be found for decelerating trends compared to accelerating trends, it would be consistent with the notion that these biases change at a relatively slow pace. In other words, more distal diversity increases would be associated with a weakening of American = White associations compared to more proximal diversity increases. At a minimum, traces of the recent surge in diversity (accelerating trend) would not yet be detectable in ethnic-American associations. Also consistent with this pattern would be the notion that drastic increases in diversity first elicit some resistance

(maintaining or reinforcing the American = White effect), but in the long-term, when increases in diversity plateau, these translate into a weakening of the effect. In contrast, if weaker American = White effects were to be found for accelerating trends compared to decelerating trends, it would be aligned with the idea that implicit ethnic-American associations reflect recent socio-structural changes, but that their impact tends to fade over time when diversity increases are not sustained. To put it simply, this pattern would be more consistent with the notion that current levels of implicit ethnic-American associations reflect proximal, rather than distal, increases in diversity. To be clear, the design of the present study will not allow us to identify if, when, or how changes in implicit associations occurred (c.f. Charlesworth & Banaji, 2019; Sawyer & Gampa, 2018; Westgate, Riskind, & Nosek, 2015), but effects attributed to the curvilinearity of diversity trajectories would, at a minimum, highlight the complexities of the interconnections between contextual changes and implicit ethnic-American associations. Given the paucity of prior research on the effects of curvilinear pattern of temporal fluctuations in context diversity and the fact that opposite effects are likely to be documented, these analyses were more exploratory.

Research Overview

The aim of the present study was to examine whether temporal fluctuations in ethnic diversity accounted for current levels of implicit ethnic-American associations. Temporal fluctuations in ethnic diversity at the metropolitan level were assessed using data from four decennial U.S. censuses (1980, 1990, 2000, and 2010). We distinguished between three dimensions of ethnic diversity (minority representation, variety, and integration). For each dimension, we examined the effects of both linear and curvilinear increases in diversity. The linear component captured how steep increases in diversity were over the course of three decades. The curvilinear component distinguished accelerating vs. decelerating increases in

diversity. The outcome variable was based on data collected through Project Implicit for 2011-2017 (7 years) indexing the extent to which the American identity was implicitly associated with European Americans over Asian Americans (implicit American = White effect).

Although it would be interesting to examine similar research questions for multiple interethnic comparisons, we focused on a comparison between Asian and European Americans because Project Implicit does not host a similar task for Latinx or African Americans (Xu, Lofaro, Nosek, & Greenwald, 2018). In addition to this being the only suitable dataset to examine the specific research questions, the issue of perceived Americanness-foreignness is particularly relevant to Asian Americans (Zou & Cheryan, 2017). It is also worth stressing that the present research took into account other important segments of the U.S. population given that the proportions of Latinx and African Americans come into play in the computation of two out of three indicators of context diversity (variety and integration).

In line with our theoretical framework, we relied on multilevel modeling techniques to estimate the effects of context-level variables on implicit associations displayed by individuals. Individual differences were not ignored in that we always controlled for the effects of socio-demographic variables including age, gender, ethnicity/race, education level, and political orientation. In addition, we tested whether the effects of temporal fluctuations in ethnic diversity were moderated by two important socio-demographic variables: participants' ethnicity and political orientation. Based on previous research (Devos & Banaji, 2005; Devos & Anderson, 2019; Nosek et al., 2007), we know that Asian participants display a weaker implicit American = White effect than White participants. Unknown from previous work is whether changes in context diversity differentially predict Asian vs. White participants' implicit ethnic-American associations. For Asian participants, the increased representation of their own ethnic group within their immediate surroundings might be a particularly potent indicator of their group's

strong ties to the national identity. Implicit ethnic-American associations have also been found to vary as a function of participants' political orientation (Crawford & Bhatia, 2012; Devos & Ma, 2013, Ma & Devos, 2014; Nosek et al., 2007). Based on prior research demonstrating that political conservatives are more resistant to change and more sensitive to threat than political liberals (Hibbing, Smith, & Alford, 2014; Jost, Glaser, Kruglanski, & Sulloway, 2003), one might predict that increases in context diversity would be associated with stronger implicit American = White effect among political conservatives. Thus, we examined the potential moderating effect of participants' ethnicity and political orientation.

The primary focus of the present work was on implicit associations. For comparison purposes, the effects of temporal fluctuations in context diversity were also examined on an explicit measure of ethnic-American associations. The dataset we relied on includes a single-item measure of ethnic-American associations that is weakly correlated with implicit associations (Nosek et al., 2007). Previous research has shown that the link between context diversity at one point in time and this measure are quite distinct from those documented at the implicit level (Devos & Sadler, 2019). These findings are consistent with the notion that implicit and explicit responses are conceptually and empirically distinct, but it is important to stress that a single-item measure does not provide an optimal basis to reach firm conclusions. Thus, we report the results of analyses performed on the self-report measure of ethnic-American associations to satisfy the curiosity of readers interested in comparisons between implicit and explicit measures. The goal was not to test specific predictions regarding similarities or differences between implicit and explicit measures, but to provide a more complete picture that enriches our understanding of the effects of temporal fluctuations in context diversity.

Method

Participants

Participants who completed the Asian-European American IAT on Project Implicit (<https://implicit.harvard.edu>) between 2011 and 2017 were included. Using data collected over this period ensures that assessments of ethnic-American associations postdated the most recent context diversity indicators (2010 U.S. Census). IATD scores were available for 303,054 participants. Following standard practices (Greenwald, Nosek, & Banaji, 2003), 9,730 participants (3.2%) were dropped for having 10% or more trial responses faster than 300 milliseconds. In addition, only participants who reported their age, ethnicity/race, gender, education attainment, and political orientation were included because these demographic variables were controlled in the analyses. Finally, participants must have reported a current zip code located in a Metropolitan Statistical Area (hereafter “metropolitan area”) with 50 or more participants. The final sample included 152,011 participants across 226 metropolitan areas, covering widely distinct U.S. regions. The median number of participants in a metropolitan area was 231 (25th percentile = 103, 75th percentile = 514, and maximum = 11,607). The number of metropolitan areas included and the minimum number of participants per metropolitan area were more than sufficient to allow requisite statistical power (Hox, 1998).

Participants were 26.36 years old on average ($SD = 11.33$). The sample had more women than men (61.6% female) and was composed of 41.7% Whites, 34.2% Asians, 3.7% Blacks, 3.8% Latinx, and 16.5% who chose other ethno-racial categories. Among participants who were at least 25 years old, 76.4% had obtained a bachelor’s degree or higher. Overall, the sample leaned slightly toward the liberal end of the political spectrum ($M = 4.76$ on a 1 to 7-point scale). This large dataset is not representative of the general population, but it is relatively heterogeneous on several important socio-demographic variables.

Procedure

Participants completed the IAT, a short questionnaire, and series of demographic questions. A description of all measures in this dataset is available at <https://osf.io/cpmfk/>. Only measures of interest to our specific research questions are described here.

Implicit ethnic-American associations. The IAT relevant to the present research assessed the direction and strength of the associations between two ethnic groups (European American vs. Asian American) and the concepts American vs. foreign. Following the basic steps of the IAT (Nosek, Greenwald, & Banaji, 2007), participants were asked to categorize images of European American vs. Asian American faces and American vs. foreign landmarks under different configurations (see Devos & Banaji, 2005). In one configuration, European American faces and American landmarks were sorted on one side and Asian American faces and foreign landmarks were sorted on the opposite side. Before or after this portion of the task, the configuration was switched such that Asian American faces and American landmarks were now sorted on the same side and contrasted to European American faces and foreign landmarks. Participants were asked to assign each stimulus (face or landmark) to its correct category, as fast as possible, by pressing the appropriate key. When they made an error, they were required to provide the correct answer to move on to the next trial. Each critical block included a total of 60 trials with a brief message appearing after the first 20 trials reminding participants to respond as quickly as possible.

Explicit ethnic-American associations. In a self-report measure paralleling the IAT, participants were asked to indicate which statement best described their belief among options ranging from “I consider Americans of European descent to be much more American than Americans of Asian descent” (coded +3) to “I consider Americans of Asian descent to be much

more American than Americans of European descent” (coded -3). The mid-point of the response scale indicated the belief that both groups were equally American (coded 0).

Demographic questionnaire. Participants were asked to provide demographic information including age, gender, ethnicity/race, level of education, political orientation, and current zip code. Current zip code was used to determine the metropolitan area participants were living in.

Context diversity indicators. Data from four decennial U.S. censuses (1980, 1990, 2000, and 2010) were utilized to obtain information about context ethnic diversity of metropolitan areas. Metropolitan areas have populations greater than 100,000 people, include an urban center, but also proximal areas that are socially or economically connected. The computations of minority representation and variety are based on information available at the metropolitan area level. The computation of integration also factors in information based on census tracts. Census tracts are smaller geographic divisions that have resident populations of only a few thousand people. Geographic boundaries of metropolitan areas and census tracts are not perfectly stable over time which may undermine the comparability of context diversity indicators over time. To ensure that context diversity indicators were calculated based on the same geographic locations from decade to decade, we relied on the Longitudinal Tract Database (LTDB; Logan, Xu, & Stults, 2014). The LTDB uses 2010 census tract boundaries to retroactively redraw analogous geographic locations and provides comparable population estimates for prior censuses.

For each metropolitan area, three context diversity indicators (minority representation, variety, and integration) were computed following steps described in prior research (Devos & Sadler, 2019; Sadler & Devos, 2018). The important addition was that these indicators were computed at four time points (1980, 1990, 2000, and 2010) by aggregating the census tracts

corresponding to the most recent delineation of geographical boundaries. Minority representation was calculated as the proportion of Asians in the metropolitan area. Given that minority representation is highly skewed, a natural log transformation was applied to minority representation or variables based on minority representation in all analyses. Variety was calculated as an entropy score (Iceland, 2004) per metropolitan area. Higher scores on variety represent more evenly proportional representations of the four major U.S. ethnic groups (African, Asian, European, and Latinx Americans). Integration was calculated using the multigroup Theil's H or multigroup information theory index (Iceland, 2004). This index captures whether variety scores at the level of census tracts tend to be aligned with or to deviate from the variety score of the metropolitan area. Higher scores indicate that variety at the census tract and metropolitan area levels are isomorphic, reflecting an integrated metropolitan area. Lower scores indicate that distributions of the four major ethnic groups are less even in some census tracts than in the metropolitan area as a whole, reflecting a form of segregation.

For the four decennial U.S. censuses, descriptive statistics are reported for each context diversity indicator (see Table 1). This information is provided for all the metropolitan areas available across three decades ($N = 328$) and for the subset of metropolitan areas included in the analyses ($N = 226$). In both cases, the descriptive statistics point to the fact that metropolitan areas, on average, became increasingly diverse over time in terms of minority representation, variety, and integration. Whether we consider the full set of metropolitan areas or the subset of metropolitan areas included in the analyses, two important observations can be made based on correlations among diversity indicators. First, variations across metropolitan areas for minority representation ($r_s > .85$), variety ($r_s > .86$), and integration ($r_s > .87$) were extremely stable over time. Second, correlations among diversity indicators were similar within each time point. Minority representation was moderately positively correlated with variety ($.40 < r_s < .55$ for full

set, $.35 < r_s < .59$ for subset). Minority representation was weakly positively correlated with integration ($.01 < r_s < .17$ for full set, $.06 < r_s < .22$ for subset). Variety and integration were moderately negatively correlated ($-.31 > r_s > -.42$ for full set, $-.32 > r_s > -.43$ for subset). The subset of metropolitan areas included in the analyses is not representative of all metropolitan areas, but it is comparable to the full set of metropolitan areas in terms of overall levels of context diversity, fluctuations in context diversity over time, and intercorrelations among context diversity indicators.

Results

Implicit Ethnic-American Associations

IAT data were analyzed following the algorithm recommended by Greenwald et al. (2003). An IATD score was calculated by examining the difference between the mean response latency for the two critical configurations, divided by its associated standard deviation. Positive IATD scores reflect that the concept American (relative to foreign) was more strongly associated with European Americans than Asian Americans (i.e., implicit American = White effect). Negative scores would be indicative of an effect in the opposite direction. IATD scores were analyzed using multilevel models with participant as the Level 1 unit and metropolitan area as the Level 2 unit (see Table 2). The Intraclass Correlation Coefficient value ($ICC = .019$) was very small, but a multilevel analytic approach is most fitting to test the effects of context properties on individuals immersed within them (Luke, 2004). Level 1 fixed effects were group mean-centered and Level 2 fixed effects were grand mean-centered (Enders & Tofighi, 2007). Effect size estimates (R^2) were calculated according to Snijders and Bosker (2012). Given the unusually large sample size, an alpha level of .005 was used to determine significance as recommended by Benjamin et al. (2018).

Model 1 included individual-level socio-demographic predictors and the three context diversity predictors for 1980. Although our predictions regarded fluctuations in context diversity over time, it was necessary to control for initial context diversity in case the trajectory of context diversity over a period of time is correlated with the initial level of diversity. For example, contexts that were low on integration in 1980 had more room to increase over time than did contexts that were high on integration in 1980 (i.e., a potential ceiling effect). To address this issue statistically, the existing levels of minority representation, variety, and integration in 1980 were controlled in the analyses. Thus, Model 1 can be thought of as a baseline model in the sense that it controlled not only for the effects of Level 1 predictors, but also for the effects of context diversity indicators at the initial time point. This model was significantly better than a model including only the individual-level predictors, $\chi^2(3) = 137.308, p < .001$. On average, European Americans were implicitly perceived as more American than Asian Americans (as reflected in the intercept test). The set of individual difference predictors accounted for 9.2% of the Level 1 variation in implicit ethnic-American associations. All the socio-demographic variables were significant, but effect sizes were negligible except in the case of participant ethnicity. Specifically, the implicit American = White effect was stronger among White than Asian participants ($r^2 = .076$), among conservative than liberal participants ($r^2 = .0007$), among older than younger participants ($r^2 = .0005$), among less educated than more educated participants ($r^2 = .0003$), and among men than women ($r^2 = .000004$).

Context diversity measures for 1980 accounted for 45.6% of the Level 2 variation in implicit ethnic-American associations. Both minority representation and variety in 1980 accounted for the magnitude of the implicit American = White effect for the 2011-2017 period. More precisely, metropolitan areas characterized by higher proportions of Asian Americans ($r^2 = .207$) and more even representation of the four major ethnic groups ($r^2 = .048$) in 1980 were

characterized currently by a greater implicit inclusion of Asian Americans in the national identity. The level of integration in 1980 was not a source of meaningful variation in implicit ethnic-American associations. Importantly, 1980 context diversity levels were not predictive of implicit associations once fluctuations in context diversity over time were included (see Model 2).

Next, polynomial contrasts were computed to capture temporal fluctuations in ethnic diversity at the metropolitan area level in order to test if larger increases in context diversity over time were associated with weakening implicit American = White associations or if instead a backlash was prompted, exacerbating associations. For each context diversity (CD) indicator (minority representation, variety, and integration), three orthogonal polynomial contrasts necessary to fully represent the four context diversity periods were created. The linear contrast (coded: $CD_{1980} = -3$, $CD_{1990} = -1$, $CD_{2000} = +1$, $CD_{2010} = +3$) represented a steady increase in context diversity over time. Thus, metropolitan areas with higher scores would be characterized by steeper linear increases in context diversity. The quadratic contrast (coded: $CD_{1980} = -1$, $CD_{1990} = +1$, $CD_{2000} = +1$, $CD_{2010} = -1$) captured the extent to which temporal fluctuations in context diversity were curvilinear. Equivalently, the quadratic effect assesses if the effect of the increase in context diversity from decade to decade becomes larger or smaller over the course of the three-decade period. Given the coding scheme, metropolitan areas with positive scores would reflect decelerating increases over time: the increase in context diversity would be relatively strong initially, but it would then plateau. In contrast, metropolitan areas with negative scores would be characterized by accelerating increases in context diversity over time: the increase in context diversity would be relatively minimal initially, but it would then steepen. Cubic contrasts were not of theoretical interest, but they were computed (coded: $CD_{1980} = -1$, $CD_{1990} = +3$, $CD_{2000} = -3$, $CD_{2010} = +1$) and introduced in the model to ensure more precise

estimates of the effect of linear and quadratic increases. For all metropolitan areas (see Table 3), there was a positive linear trend in minority representation indicating the proportion of Asian Americans increased over time. On average, the quadratic trends across the three diversity indicators reflected that increases in context diversity accelerated over time. However, at least twenty-five percent of metropolitan areas showed the opposite pattern such that increases in context diversity decelerated over time.

In Model 2, we tested whether temporal fluctuations in context diversity accounted for current levels of implicit ethnic-American associations. The nine polynomial contrasts were added to the model, which proved to be a significantly better fit to the data than Model 1, $\chi^2(9) = 80.552, p < .001$, explaining 59.6% of the remaining variation. For minority representation, only the effect of linear increases was significant ($r^2 = .148$), indicating that contexts in which there was a greater linear increase in the proportion of Asian Americans over time also showed weaker implicit American = White associations in the span of 2011 to 2017 (Figure 1). This effect of a linear increase in minority representation was consistent with Hypothesis 1. For variety, the effects of linear and quadratic increases were not significant. Thus, we did not find support for Hypothesis 2 in this model.

For integration, the effect of the linear ($r^2 = .032$) increases were significant. In contrast to what we predicted (Hypothesis 3), contexts that had the largest linear increases in integration over decades also had stronger implicit American = White associations. In other words, greater increases in integrated living conditions in a context were associated with a possible backlash and greater link between “White” and “American”. While this finding is at odds with the linear effect of minority representation, it highlights the importance of distinguishing diversity experienced on a broader vs. more local level. However, the significant quadratic effect of

integration ($r^2 = .024$) highlights that the recency of the linear increases in integration is important to understand current levels of implicit ethnic-American associations. American = White effects were more pronounced when increases in integration occurred relatively recently in time (i.e., decade to decade increases were accelerating over time), but weaker when such increases occurred more distally (i.e., decade to decade increases were decelerating over time) (Figure 2). Thus, it may be that although recent increases in integration are met with elevated implicit American = White associations, as integration changes slow over the longer term, implicit American=White associations weaken.

One might wonder if the results of Model 2 are not simply reflecting the metropolitan levels of context diversity in 2010, which result from context diversity in 1980 plus changes in context diversity over the three intervening decades. To address this concern, we re-estimated Model 2 controlling for 2010 levels of context diversity instead of 1980 levels. If temporal fluctuations in diversity continue to account for implicit ethnic-American associations beyond 2010 context diversity levels, the importance of the trajectory of diversity over time would be further supported. The pattern, direction, and significance of all context diversity results reported in Model 2 held when current (2010) levels of diversity were controlled: minority representation linear effect, $B = -.051$, $t = -2.929$, $p = .004$, $r^2 = .024$, integration linear effect, $B = .118$, $t = 3.367$, $p = .001$, $r^2 = .037$, and integration quadratic effect, $B = -.701$, $t = -3.140$, $p = .002$, $r^2 = .024$. The only noteworthy difference, compared to the initial iteration of Model 2, was that now the linear effect of variety was significant, $B = .092$, $t = -3.983$, $p < .001$, $r^2 = .048$. In contrast to Hypothesis 2, contexts in which there was a greater linear increase in variety over time showed stronger implicit American = White associations.

To explore the moderating role of participants' ethnicity and political orientation, we ran two additional models. In both cases, cross-level interactions between the socio-demographic variable and each of the polynomial contrasts were introduced in the model. The significance, direction, and magnitude of the effects in these models mirrored those of Model 2. No cross-level interaction was significant at $p < .005$. Thus, we found no evidence for the notion that effects of increases in context diversity were moderated by participants' ethnicity or political orientation.

Explicit Ethnic-American Associations

The explicit measure of ethnic-American associations was analyzed using similar steps as those described for the IAT (see Table 4). Since not all participants provided a response to this measure, the sample for these analyses included 5.7% fewer participants ($N = 143,378$). Including effects for minority representation, variety, and integration in 1980 (Model 1) did not provide a better fit to the data than a model with socio-demographic variables alone, $\chi^2(3) = 2.416, p = .491$. On average, European Americans were explicitly perceived as more American than Asian Americans (as reflected in the intercept test). The set of individual difference predictors accounted for 5.6% of the Level 1 variation in explicit beliefs. With the exception of level of education, all the socio-demographic variables were significant predictors of explicit ethnic-American associations. The explicit American = White effect was stronger among Asian than White participants ($r^2 = .005$), among conservative than liberal participants ($r^2 = .004$), among younger than older participants ($r^2 = .0007$), among less educated than more educated participants ($r^2 = .000003$), and among women than men ($r^2 = .000005$). The set of context diversity measures for 1980 accounted for only 1.5% of the variation in explicit beliefs and none of the diversity indicators was source of a significant effect.

Polynomial contrasts were introduced in the model to determine whether temporal fluctuations in context diversity accounted for explicit ethnic-American associations (Model 2). Adding the nine polynomial contrasts significantly improved model fit over Model 1, $\chi^2(9) = 49.348$, $p < .001$, explaining 17.5% of the remaining variation. Among the polynomial contrasts, only the effect of linear increases in minority representation was significant ($r^2 = .063$): steeper linear increases in the proportion of Asian Americans over time were associated with stronger explicit American = White effects. In this model, the initial level of minority representation was also source of a reliable effect ($r^2 = .044$): higher proportions of Asian Americans in 1980 were linked to weaker explicit American = White effects.

Discussion

The present research examines how temporal fluctuations in context ethnic diversity across three decades predict implicit ethnic-American associations. Specifically, we tested how changes to the ethnic diversity (represented in three distinct forms: minority representation, variety, and integration) of 226 metropolitan areas between 1980 and 2010 account for the implicit inclusion of Asian Americans within the national identity in 2011-2017. Steeper linear increases in the proportion of Asian Americans living within a metropolitan area between 1980 and 2010 are associated with greater implicit inclusion of Asian Americans within the national identity (Hypothesis 1). However, contrary to our predictions (Hypothesis 3), steeper linear increases in integration across three decades are related to greater implicit national *exclusion* of Asian Americans. Interestingly, the curvilinearity of changes in integration in metropolitan areas also accounts for implicit national exclusion: the implicit national exclusion of Asian Americans is stronger when the level of integration accelerated over time compared to when integration decelerated and plateaued over time. Temporal fluctuations in the extent to which various ethnic groups are evenly represented at the metropolitan level (variety; Hypothesis 2) are sources of

more inconsistent and tenuous effects. That is not to say that variety is an unimportant facet of context diversity: integration is based on the extent to which the variety of neighborhoods differ or are similar to that of the metropolitan area they constitute.

These findings contribute to the emerging literature on the socio-structural foundations of implicit biases (see Payne et al., 2017, 2019) by highlighting how changes in context ethnic diversity across several decades can be meaningfully related to people's implicit beliefs about the national belongingness of ethnic minorities. While the data do not establish causal links between temporal fluctuations in context diversity and implicit ethnic-American associations, increases in minority representation are particularly predictive of greater implicit national inclusion of Asian Americans. As minority representation increases over time, the socio-structural knowledge accessible to people living within that context may evolve and affect who is spontaneously seen as typical vs. atypical, familiar vs. unfamiliar, or valued vs. devalued. Effects associated with increases in integration are less straightforward. Overall, linear increases in integration are related to greater implicit exclusion of Asian Americans from the national identity. This was particularly the case in areas that saw a relatively recent surge in integration. When integration increases occurred less recently and since stabilized, there is more evidence for implicit inclusion of Asian Americans in the national identity. One possible explanation for this complex pattern is that accelerating levels of integration may lead people to protect an ethnocultural American prototype due to perceived threats associated with rapid changes. This would be consistent with research documenting defensive reactions to the numerical decline of Whites in the U.S. (Craig & Richeson, 2014a, 2014b; Danbold & Huo, 2015), but it is important to point out that the present findings are not restricted to White respondents. When increases in integration plateau, people may gradually expand their representations of the national group without perceiving the same level of threat. These findings are also aligned with recent research

showing that increases in religious diversity are associated with negative responses (e.g., lower self-reported quality of life or decline in trust in others) in the short term, but that these effects are alleviated by the benefits of intergroup contact in the long term (Ramos, Bennett, Massey, & Hewstone, 2019). It is worth noting that the distinction between proximal vs. distal fluctuation did not nuance the effect associated with minority representation (i.e., there was no quadratic effect). The fact that the effect is specific to increases in integration may point to effects emerging when various ethnic groups are more likely to co-exist within the same location, and as such lead to firsthand recurring experiences of diversity, that may initially be sources of threats, but over time translate into more inclusive responses. As such, this finding may be consistent with the mechanisms identified by Ramos et al. (2019): the negative initial responses to increasing integration would be counteracted, in the long term, by the benefits of intergroup contact. However, future work is needed to directly examine this complex relationship between context diversity in the form of integration, intergroup contact, and implicit ethnic-American associations. For now, these specific findings suggest that distal vs. proximal increases in integration are sources of distinct effects on implicit ethnic-American associations. Thus, it is important to consider not only the magnitude of changes in diversity, but also the trajectory (e.g., accelerating vs. decelerating) of the fluctuations.

It is also worth comparing the present findings to work based on an earlier cross-sectional study examining the links between context diversity and implicit ethnic-American associations (Devos & Sadler, 2019). First, it is important to stress that levels of minority representation and variety at a given point in time (1980 in the present case or 2010 in the prior study) are sources of similar and reliable effects, but this is not too surprising given that both studies relied on overlapping datasets and that context diversity is relatively stable over time. More interesting is to highlight similarities and differences of the effects of context diversity at a specific point in

time and the effects of temporal fluctuations in context diversity. For minority representation, the effects point in the same direction: a large proportion of Asian Americans or a large increase in the proportion of Asian Americans in the context is associated with weaker American = White effects. The important contribution of the present analyses (because we control for minority representation at a specific point in time) is to show that these effects are distinct in that they each uniquely account for current levels of implicit ethnic-American associations. The picture for variety and integration is more complex. Variety yields more inconsistent and tenuous effects when the temporal dimension is considered than when looking at cross-sectional effects. By contrast, changes in integration seem to be more crucial than static levels of integration at a specific time point. At this stage, it is hard to fully explain these nuances. However, it is clear that characteristics of contexts need to be considered both in terms of their absolute levels of diversity and in terms of the trajectory of diversity over time. In a nutshell, the effects of temporal fluctuations in diversity documented in the present study show that two contexts with similar levels of diversity are not the same if they substantially differed in terms of the demographic changes that they went through. Implicit associations within contexts with equivalent levels of diversity can differ depending on the previous patterns of demographic change. This highlights the importance and heuristic value of examining the effects of context diversity at a specific time point and examining the effect of temporal fluctuations in context diversity over time as well as considering simultaneously multiple dimensions of context diversity (minority representation, variety, and integration).

The present findings also add to the large nuanced literature on the role of context ethnic diversity in intergroup relations (for reviews, see Craig et al., 2018; Hewstone, 2015) in important ways. For example, we switched the focus from examining cross-sectional relations to incorporating a temporal dimension. Specifically, we documented how fluctuations in context

ethnic diversity over several decades are linked to current levels of implicit inclusion of Asian Americans within the national identity. Similarly, we add to existing literature on context diversity by examining the unique effects of temporal fluctuations in three distinct forms of context diversity (i.e., minority representation, variety, and integration). As our work shows, distinguishing between different dimensions of context diversity can yield differing results on the same intergroup outcome. Therefore, future work would benefit from disentangling the unique role these different dimensions of context diversity play on intergroup relations.

Given that the dataset did not include information about length of residence in the metropolitan area and was largely composed of relatively young adults,² one might be skeptical that changes in the ethnic diversity of metropolitan areas over three decades account for current levels of implicit ethnic-American associations. This skepticism is grounded in the assumption that individuals need to experience firsthand contextual changes for these changes to be picked up in their implicit associations. While this perspective is consistent with the idea that implicit associations are learned slowly through repeated and extensive experiences, an alternative perspective is that implicit associations reflect knowledge embedded in socio-structural contexts. From this theoretical vantage point, contextual changes (e.g., an increase in diversity over time) may influence implicit associations because they affect the content or accessibility of specific knowledge. For example, contributions made by individuals belonging to an ethnic minority group might not impact contextually accessible knowledge overnight; their influence may evolve over time. The processes through which context diversity shapes artifacts and institutions in the area probably unfold over a period of time. Thus, temporal contextual variations may transpire from assessments of implicit associations even among individuals who have not been immersed in the changing contexts for an extended period of time. Not having information about length of residence in a context and not finding variations as a function of respondent's age do not

undermine the present findings. In sum, current recurring personal experiences differ depending on what happened in the context over time. Thus implicit associations may reflect temporal fluctuations even among individuals who did not experience the changes firsthand (see Payne et al., 2019 for a similar argument).

Although our primary focus was on responses operating outside of conscious control (implicit level), the explicit findings are worth acknowledging. Most striking is the fact that steeper linear increases in minority representations are associated with stronger explicit (but weaker implicit) American = White effects. Thus, the same factor is a source of effects that diverge at the implicit and explicit levels. In addition, temporal fluctuations in integration are sources of reliable effects at the implicit level, but not at the explicit level. However, the use of a single-item explicit measure in the present study is far from ideal in getting a reliable estimate. Nevertheless, these findings highlight the benefits of examining intergroup outcomes using both implicit and explicit measures, as contextual changes in diversity may differentially relate to people's automatic perceptions of social groups and their more deliberative judgments. Finding that an increase in the proportion of Asian Americans over time is associated with a stronger exclusion of this group from the American identity can be explained through at least two distinct conceptual lenses. As mentioned before, the increasingly diverse make-up of a metropolitan area can be construed as diminished status for White Americans (Craig & Richeson, 2014a, 2014b; Danbold & Huo, 2015), resulting in defensive reactions or resistance (Ramos et al., 2019; Zárate, & Shaw, 2010; Zárate et al., 2012), in the present case, a reassertion of an ethnocentric definition of Americanness. Another possibility is that the increasing representation of Asian Americans may increase the visibility of this group. Even in metropolitan areas that witnessed a growing proportion of Asian Americans over time, this ethnic group remains (in most cases) a relatively small fraction of the overall population. Under these circumstances, increased visibility may

further highlight minority status and, as a result, undermine inclusion in the American identity (see Devos & Sadler, 2019 [supplemental material] for a similar point).

The present work demonstrates how temporal fluctuations in context ethnic diversity have nuanced relationships with implicit ethnic-American associations. An important limitation of the present work is that we only examined implicit associations between the American identity and Asian vs. European Americans. In light of research showing that other ethnic minority groups are seen as less American than European Americans (e.g., Devos & Mohamed, 2014; Yogeeswaran & Dasgupta, 2014), it would be worthwhile to examine whether similar findings emerge for other interethnic comparisons. It also remains to be seen whether temporal fluctuations in context diversity yield convergent or divergent effects on more evaluative interethnic biases (i.e., ethnic prejudice). Finally, future research would greatly benefit from examining the psychological processes underlying such effects. Limitations inherent to relying on existing datasets preclude us from shedding light on the underlying processes through which temporal fluctuations of context diversity operate. The present work, however, provides a starting point for future exploration by demonstrating the unique relationship between distinct facets of context ethnic diversity and the implicit inclusion of ethnic minorities within the national identity.

Declaration of Conflicting Interests

The authors declare that there is no conflict of interest.

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Footnotes

¹ We use the terms “ethnic” or “ethnicity” to refer to distinctions commonly made among ethnic and racial groups in the U.S. such as Asian, Latinx/Hispanic, African/Black, or European/White Americans. Although not without interest, the distinction between ethnicity and race is not central to the present work because we focus on how lay people categorically represent their social environments and how context diversity accounts for implicit associations about social categories.

² Compared to older adults, young adults are less likely to have spent an extensive period of time in the metropolitan areas they reported living in; they are more likely to have relocated for college and to visit Project Implicit as part of an instructional activity. We tested whether the effects of temporal fluctuations in context diversity differed between young adults (below 25 years; 60.5% of participants) and older participants (25 years and older; 39.5% of participants). Only one cross-level interaction was significant. Age interacted with the effect of linear increases in integration, $B = -.012$, $t = -3.863$, $p < .001$, $r^2 = .026$, such that the effect of increasing integration was significant for both groups, but stronger among participants 25 years and older, $B = -.081$, $t = -7.169$, $p < .001$, than participants younger than 25, $B = -.049$, $t = -5.350$, $p < .001$. The fact that this effect is significant for both age groups and also that no other effects of temporal fluctuations are moderated by this age distinction is consistent with the notion that individuals do not need to experience firsthand contextual changes for these changes to leave traces in their implicit associations.

Table 1

Means and Standard Deviations for Minority Representation, Variety, and Integration Across Four Decennial U.S. Censuses.

Census	1980	1990	2000	2010
All metropolitan areas ($N = 328$)				
Minority Representation (MR)	.011 (.035)	.018 (.038)	.027 (.046)	.036 (.050)
Variety (V)	.458 (.240)	.519 (.248)	.624 (.251)	.721 (.243)
Integration (I)	.764 (.140)	.786 (.119)	.810 (.101)	.836 (.083)
Metropolitan areas included ($N = 226$)				
Minority Representation (MR)	.013 (.042)	.023 (.045)	.034 (.054)	.045 (.058)
Variety (V)	.460 (.247)	.531 (.257)	.647 (.259)	.751 (.248)
Integration (I)	.758 (.147)	.781 (.125)	.804 (.105)	.830 (.086)

Table 2

*Current Levels of Implicit Ethnic-American Associations as a Function of Context Ethnic**Diversity Fluctuations of Metropolitan Areas.*

	Model 1			Model 2		
	<i>B</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>t</i>	<i>p</i>
Level 1						
Intercept	.319	93.030	<.001	.320	110.467	<.001
Age	.003	24.072	<.001	.003	24.072	<.001
Gender	.011	8.955	<.001	.011	8.955	<.001
Education	-.013	-18.210	<.001	-.013	-18.210	<.001
Political Orientation	-.021	-27.525	<.001	-.021	-27.525	<.001
WvA	.156	112.736	<.001	.156	112.737	<.001
WAvO	-.002	-2.491	.013	-.002	-2.491	.013
Level 2						
MR ₁₉₈₀	-.041	-7.837	<.001	-.004	-0.608	.544
V ₁₉₈₀	-.072	-3.518	.001	-.034	-1.464	.145
I ₁₉₈₀	-.050	-1.701	.090	.090	1.666	.097
MR Linear				-.061	-7.264	<.001
MR Quadratic				.007	0.408	.684
MR Cubic				-.004	-0.249	.804
V Linear				.073	2.650	.009
V Quadratic				-.315	-2.296	.023
V Cubic				.029	0.531	.596
I Linear				.173	2.927	.004
I Quadratic				-.699	-3.128	.002
I Cubic				-.035	-0.224	.823

Note. MR = Minority Representation, V = Variety, I = Integration. Level 1 fixed effects were group mean centered and Level 2 fixed effects were grand mean centered. Level 1 Political Orientation was set as a random effect. Gender was contrast-coded (+1 if Male, -1 if Female). Participant ethnicity was coded in orthogonal codes: WvA (+1 if White, -1 if Asian, 0 if Other) and WAvO (+1 if White or Asian, -2 if Other).

Table 3

Means, Standard Deviations, Minimums, Maximums and Percentiles for Contrasts Assessing Context Ethnic Diversity Fluctuations of Metropolitan Areas.

	<i>M (SD)</i>	Min	Max	Percentiles		
				25	50	75
MR Linear	0.053 (0.047)	0.006	0.455	0.026	0.039	0.067
MR Quadratic	-0.001 (0.004)	-0.015	0.028	-0.002	-0.001	0.001
MR Cubic	0.001 (0.009)	-0.032	0.092	-0.001	0.001	0.003
V Linear	0.494 (0.213)	-0.439	1.036	0.364	0.506	0.651
V Quadratic	-0.016 (0.033)	-0.104	0.108	-0.039	-0.023	0.002
V Cubic	-0.055 (0.077)	-0.374	0.195	-0.089	-0.043	-0.012
I Linear	0.119 (0.134)	-0.167	0.480	0.008	0.106	0.226
I Quadratic	-0.002 (0.018)	-0.104	0.058	-0.010	-0.001	0.008
I Cubic	-0.001 (0.025)	-0.121	0.077	-0.013	0.002	0.017

Table 4

*Current Levels of Explicit Ethnic-American Associations as a Function of Context Ethnic**Diversity Fluctuations of Metropolitan Areas.*

	Model 1			Model 2		
	<i>B</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>t</i>	<i>p</i>
Level 1						
Intercept	.598	81.795	<.001	.595	90.449	<.001
Age	-.007	-22.098	<.001	-.007	-22.098	<.001
Gender	-.013	-4.860	<.001	-.013	-4.860	<.001
Education	-.002	-0.992	.321	-.002	-0.992	.321
Political Orientation	-.090	-50.957	<.001	-.090	-50.956	<.001
WvA	-.187	-57.953	<.001	-.187	-57.953	<.001
WAvO	.052	24.619	<.001	.052	24.618	<.001
Level 2						
MR ₁₉₈₀	.007	0.639	.524	-.052	-3.607	<.001
V ₁₉₈₀	.004	0.085	.932	.009	0.173	.863
I ₁₉₈₀	-.065	-1.043	.298	-.184	-1.512	.132
MR Linear				.088	4.662	<.001
MR Quadratic				.012	0.297	.767
MR Cubic				-.059	-1.834	.068
V Linear				-.041	-0.657	.512
V Quadratic				.371	1.196	.233
V Cubic				.156	1.282	.201
I Linear				-.169	-1.258	.210
I Quadratic				-.017	-0.034	.973
I Cubic				-.267	-0.761	.447

Note. MR = Minority Representation, V = Variety, I = Integration. Level 1 fixed effects were group mean centered and Level 2 fixed effects were grand mean centered. Level 1 Political Orientation was set as a random effect. Gender was contrast-coded (+1 if Male, -1 if Female). Participant ethnicity was coded in orthogonal codes: WvA (+1 if White, -1 if Asian, 0 if Other) and WAvO (+1 if White or Asian, -2 if Other).

Figure 1. Effect of Linear Increases in Minority Representation (Left Y-Axis indicating the average percentage of Asian American residents in the metropolitan area) on the Implicit American = White Effect (Right Y-Axis with black bars representing the average IATD effect). The linear increase in minority representation (black line connecting four time points) was divided into categories (Small = 0 to 33%, Medium = 34% to 75%, and Large = 76% to 100%). The average minority representation (average percentage of Asian American residents) at each time point (1980, 1990, 2000, and 2010 reported using the last two digits of the U.S. census year), within category, is plotted.

Figure 2. Effect of Quadratic Increases in Integration (Left Y-Axis indicating the extent to which variety at the census tract was isomorphic to variety for the metropolitan area as a whole) on the Implicit American = White Effect (Right Y-Axis with black bars representing the average IATD effect). The quadratic increase in integration (black line connecting four time points) was divided into categories (Accelerating = 0 to 33%, Steady = 34% to 75%, and Decelerating = 76% to 100%). The average integration at each time point (1980, 1990, 2000, and 2010 reported using the last two digits of the U.S. census year), within category, is plotted.