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**A two-component framework captures cross-cultural similarities and differences in essentialist thinking about social categories**

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**Abstract**

Social essentialism is the intuitive assumption that members of social categories share underlying properties that determine category membership and cause observable regularities. We investigate cultural differences in social essentialism in the USA, Northern Ireland, and China. In Study 1, 106 undergraduates from the US and Northern Ireland rated 44 social categories on 9 scales representing distinct aspects of social essentialism. In Study 2, 157 undergraduates from the US and China rated 31 social categories on 6 scales. Results showed that a single two-component framework—describing variability in social categories with respect to perceived naturalness (objectivity, immutability) and cohesiveness (homogeneity, informativeness)—explained representations of social categories in all three cultures. Differences emerged as well; on average, American participants rated social categories as more natural and less cohesive than Northern Irish or Chinese participants. Moreover, specific social dimensions were seen as more natural in cultures where those dimensions had particular cultural salience (religion in Northern Ireland, home region in China). Together, these findings demonstrate cross-cultural similarities (a common two-component framework for representing social kinds, a common way to essentialize historically salient social dimensions) and differences (in the general extent to which social categories were perceived to be natural and cohesive) across disparate cultural groups.

### **Significance**

Social essentialism is the intuitive belief that members of social categories share underlying properties that determine category membership and cause observable regularities. We investigated social essentialism in the USA, Northern Ireland, and China, and found that a single two-component framework—describing variability in perceived naturalness (objectivity, immutability) and cohesiveness (homogeneity, informativeness)—explained beliefs about social categories in all three cultures. The framework also revealed cultural differences: Americans rated social categories as more natural and less cohesive than Northern Irish or Chinese, and social categories were seen as more natural in cultures where they had specific historical importance than in cultures where they did not. Thus, a single framework captures cross-culture similarities as well as differences in thinking about social categories.

Categories allow us to organize knowledge and generalize from limited experience, thus simplifying the bewildering array of information available to us. *Psychological essentialism* has been proposed as a pervasive conceptual bias resulting in a default assumption that members of a category share an underlying, invisible principle, property or nature that determines category membership and causes category members to exhibit a range of both observable and nonobvious shared properties. Although initially discussed by Sherif (1) and Allport (2), ideas about essentialism were largely neglected by psychologists until the 1980s and 1990s when researchers began to consider whether essentialism might provide a good account of people's beliefs about the ontology of categories (3, 4, 5, 6). Since then, essentialist thinking has been investigated in diverse domains such as conceptual development (7, 8) science education (9, 10) and genetics (11).

Here we focus on essentialist thinking about social categories (5, 12, 13) which can be a source of bias and prejudice towards members of those categories (14, 15, 16, 17, 18, 19, 20). This can be especially true for social categories associated with salient cultural historical conflict in specific contexts such as *Catholic* and *Protestant* in Northern Ireland, or *Arab* and *Jew* in Israel. In this paper we investigate cultural differences in essentialist thinking about social categories. Specifically, although social essentialism is often described in the literature as a unidimensional construct (21, 13), we explore whether a two-component model (12, 5) captures general cross-cultural differences in beliefs about social categories and identifies culture-specific beliefs associated with culturally and historically salient social dimensions. In so doing, we hope to provide a common framework for understanding cultural similarities and differences in the representation of social kinds.

Although essentialist beliefs about social categories have been demonstrated in a variety of cultures (22, 23, 24, 12, 25, 26, 27), there has been almost no comparative work on cultural differences in social category essentialism. One exception is a small number of studies on cross cultural differences in the development of essentialist beliefs (28, 29, 24). This work suggests that essentialist beliefs about specific, culturally important social categories have different developmental trajectories in different cultures. However, with the exception of (29) which examines urban/rural differences in the US, there have been no cross-cultural comparisons of essentialist thinking about social categories in adults. In other words, we know next to nothing about the existence or nature of cultural differences in adults' essentialist beliefs about social categories.

There are a variety of ways in which such differences, should they exist, might be manifested (fig. 1). Most simply, as illustrated in Figure 1a, social categories may be essentialized more strongly in some cultures than in others. This possibility has been suggested by Haslam (30, see also 31) who pointed to the potential for culturally specific beliefs to influence the ways in which essentialism is manifested within a culture. For example, genetic essentialism, the tendency to treat membership in social groups as genetically determined, appears to be widespread in societies where acceptance of science is high (11). Such beliefs might lead to relatively high levels of social essentialism. Another possibility is that culture may influence essentialist thinking about social categories via broad dimensions of cultural variation, or "cultural syndromes," which may in turn structure representations of social categories in individuals. One such dimension is

individualism-collectivism (32, 33, 34, 35). Collectivist cultures in which social category membership is of primary importance may also be more likely to construe social categories in essentialist terms. Thus, for a variety of reasons, people from one culture might be more essentialist in general than people from another culture.

Another, slightly more complex, possibility is that the way in which culture impacts on beliefs about category essences relates to the way in which particular societies are organized (30). Specifically, social categories or dimensions that are salient for cultural and/or historic reasons may be especially apt targets for essentialist thinking. In line with this, developmental evidence suggests that children growing up in societies which are segregated on the basis of membership in particular social categories tend to essentialize those categories more than other social categories. For example, children in Israel essentialize ethnicity categories (36, 37), children in the US essentialize race categories (38, 39, 40), and (many) children in Northern Ireland essentialize religion categories (24, 41). Likewise, a few studies have compared essentialist thinking about specific social categories across cultures where those categories vary in historical salience. For example, unlike their counterparts in Belfast, children from Boston did not essentialize religion category membership more than other social categories (24). Likewise, older children in the US essentialized race more than younger children, whereas Israeli children showed the reverse developmental pattern (28). Although there is almost no direct cross-cultural comparative work on adults' essentialist beliefs about social categories, the developmental work we have just described might be interpreted as suggesting the possibility depicted in Figure 1b where different social dimension are essentialized to a greater or lesser extent in different cultures, depending perhaps on socio-historical salience.

Thus far, we have considered possibilities in which essentialist beliefs are considered to be a single factor. However, there is quite a lot of evidence that essentialist beliefs are multifactorial. A variety of elements of essentialism have been proposed (38, 5, 6). For example, essentialized categories have been theorized to be natural, discrete, and homogeneous; membership in essentialized categories has been theorized to be immutable, exclusive, based on the possession of necessary features and to support inductive inferences between category members. Haslam and colleagues (12, 15, 16) found that these elements could be reduced to two components. The *naturalness* component captures the degree to which social categories are natural and discrete and category membership is immutable and stable depending on possession of necessary features. The *entitativity* component on the other hand summarizes people's beliefs about the degree to which category members are homogeneous, that category membership is exclusive, depending on an underlying reality, and that category membership supports generalizations. Because of overlap between the concept of entitativity in Haslam's model and ideas about social category entitativity more generally (42), we will use the term *cohesiveness* here. Whilst more general ideas about entitativity often encompass elements of social category cohesiveness captured by Haslam's model (43), notions of entitativity also include claims about common fate (42) and common agency (44). Thus, according to Haslam's model, social categories may be essentialized because they are believed to be like natural kinds (25, 45, 11, 13), and/or because they are seen as being cohesive and homogeneous.

Accordingly, a third possibility (see Figure 1c) is that cultural differences in essentialist thinking about social categories in general might pattern differently for the naturalness versus cohesiveness components. For example, consider the cultural dimension of individualism-collectivism. Briefly, members of individualist cultures tend to value autonomy and independence from in-groups, prioritize personal goals, and behave primarily on the basis of individual attitudes and preferences. In contrast, members of collectivist societies tend to value cohesiveness and interdependence within groups, prioritize group goals, and behave primarily on the basis of group norms (35). Given the emphasis on social group membership and cohesiveness, one might expect members of collectivist cultures to essentialize social categories along the lines of cohesiveness to a greater degree than members of individualist cultures. However, members of individualistic cultures also tend to use analytic cognition, in the sense of attributing causality to stable internal properties, whereas members of collectivist cultures tend to use holistic cognition, attributing causality to fluid external context (33). Given this emphasis on stable internal causality, one might expect members of individualist cultures to essentialize social categories along naturalness lines more than members of collectivist cultures. Indeed, there is evidence of suggestive cross-cultural differences. For example, Americans regard personality traits (46) and academic performance (47) as less mutable than Japanese participants do. Relatedly, Americans anticipate less change than Chinese participants (48). As mutability is an important element of beliefs about naturalness, these results might suggest that there will be cross-cultural differences in how people essentialize social categories along the lines of naturalness. However, as none of this work concerns social categories, the interaction of broad cultural dimensions with the different components of essentialist thinking about social categories is an open question.

The final way in which cultural differences in social essentialism might be manifested is depicted in Figure 1d. In this possibility, there is a three-way interaction between culture, essentialism component, and social category such that cultural differences in essentialist thinking about specific social categories might pattern differently for the naturalness or cohesiveness components. One reason for taking this possibility seriously is that Haslam and colleagues (12) have shown that naturalness and cohesiveness components are weighted differently for different social categories. For instance, gender, race and ethnicity categories were perceived as highly natural component but only moderately cohesive, whereas religious and political categories were thought to be highly cohesiveness but only moderately natural. It is possible that these weightings might differ cross-culturally, leading to differences in the perceived naturalness or cohesiveness of particular social categories or dimensions. The most likely candidates for such differences, we hypothesize, are social dimensions with special historical salience within a particular culture. For example, a category may be seen as highly cohesive by in a cultural context where that category is socially significant, but not in a different cultural context. Similarly, given claims about the centrality of genetic and biological essentialism (45, 11), cross cultural differences might best be captured by the naturalness component. That is, social categories may come to seem more like natural kinds in cultures in which they are historically salient than in cultures in which they are of less importance (25, 30). Given the lack of evidence, it is impossible to make specific predictions about how culture, essentialism component and category might interact. However, any finding that they do will suggest that cross-cultural

differences in social essentialism are more complex than would be suggested by the possibilities represented in Figures 1a-1c. One of our aims in this paper is to examine which of these possibilities best capture cross-cultural differences in social essentialism, noting that more than one possibility may apply.

The studies to be described below enable us to tease apart the possibilities that we have just described. Because several of these possibilities involve interactive effects of socially salient categories, it is important that we choose cultures where different social categories are salient. On the other hand, several possibilities make predictions about more general effects of culture so, independent of socially salient categories, it is important to select cultures for comparison which are known to differ along broad dimensions of cultural variation. Given what is known about such cultural differences (49, 34, 35), we compared samples from the USA with samples from Europe (Study 1) and East Asia (Study 2). Our primary aim in Study 1 was to test for the existence of interactions between culture and category as suggested by Figures 1b and 1d. Although Study 2 was also designed to test for these interactions, we chose the cultures we did in order to allow us to test for more global effects of culture on essentialist reasoning, as suggested by Figures 1a and 1c.

## Results

### Study 1

In Study 1 we compared essentialist beliefs about social categories in the United States (Boston) and the United Kingdom (Belfast). Although the United States and the United Kingdom are highly similar on a number of overarching cultural characteristics (50), differences in the historical salience of specific social categories make this comparison an interesting test case. Northern Ireland, unlike the U.S., is segregated along religious lines. Catholics and Protestants live in different neighborhoods (51), attend different schools (52) and rarely intermarry (53). Religion category membership is a source of prolonged conflict which has cost thousands of lives in the thirty years prior to the ending of the Troubles in 1998 by the Good Friday agreement (54). Thus, religion categories are an important aspect of social organization in Northern Ireland. Likewise, race categories are an important aspect of social organization in the U.S. Many U.S. cities are segregated on the basis of race and race is frequently cited as a source of bias and discrimination in public life. Although Northern Irish children are aware of race categories, race is not a salient source of social conflict in Northern Ireland like it is in the U.S. And although there has been some history of discrimination against Catholics in the U.S. (55), religious categories like *Protestant* and *Catholic* are familiar in the US, but not as a culturally and historically salient source of social conflict, like they are in Northern Ireland. If historical salience increases essentialist thinking about specific social categories, we might expect religion categories to be more strongly essentialized in Northern Ireland and race categories to be more strongly essentialized in the U.S. Of interest is whether we observe such context-specific differences, and whether they are captured by differences in beliefs about naturalness and/or cohesiveness.

**The Two-Dimension Model in the US and Northern Ireland.** We computed mean scores on each of the nine essentialism items for each of the 44 social categories (separately for

participants in the US and NI) and conducted principal components analyses with Varimax rotation for each data set (12). Results replicated components reported in (12) with remarkable fidelity. The analyses yielded the same 2-factor solution separately in the US and NI, with the same five items loading onto a naturalness factor and the same four items loading onto a cohesiveness factor as reported by Haslam et al. (see Table 1). To depict where different social dimensions fall relative to each other for participants in the US and NI, we computed standardized scores for each category on both essentialism components, averaged those by social dimension (e.g., *race*, *religion*), and graphed these on a naturalness x cohesiveness scatterplot (see Fig. 2).

< Table 1>

< Figure 2>

**National Differences in Essentialist Thinking about Social Categories in General.** We computed *naturalness* and *cohesiveness* component scores for each category by averaging ratings across participants on the appropriate essentialism items (discreteness, naturalness, immutability, stability, and necessity for *naturalness*; uniformity, informativeness, inherence, and exclusivity for *cohesiveness*). We then compared these using an item-wise 2 (Country: US, NI) x 2 (Essentialism component: Naturalness, Cohesiveness) repeated measures ANOVA. Results revealed that naturalness ratings were markedly higher than cohesiveness ratings,  $F(1,43)= 95.02, p<0.001, \eta^2=0.67$ . Importantly, although there was no main effect of country ( $F(1,43)= 1.98, p=0.17$ ), there was a significant interaction between country and essentialism component,  $F(1,43)= 32.87, p<0.001, \eta^2=0.43$ . Simple effects analysis showed that social categories were seen as more natural in the US than NI ( $p=0.012$ ), but as more cohesive in NI than in the US ( $p<0.001$ ). See fig 3.

< Figure 3>

**National Differences in Essentialist Thinking about Specific Social Dimensions.** In order to compare essentialist thinking about social dimensions in the US and NI, we computed each participant's *naturalness* and *cohesiveness* scores for each social dimension on which participants rated at least two categories (*Race, Gender, Religion, Nationality, Political Affiliation, Age, Class, Occupation, Personality, Physical Appearance, Hobbies*) by averaging the respective scores across all individual categories within the dimension. We then used a 2 (Country: US, NI) x 11 (Social Dimension) x 2 (Essentialism component: Naturalness, Cohesiveness) mixed ANOVA. This analysis revealed a significant country x social dimension x essentialism component interaction ( $F(10,1030)= 4.75, p<0.001, \eta^2=0.02$ ). This indicates that national differences in essentialist thinking about social dimensions differed for naturalness versus cohesiveness. To explore this interaction, we conducted separate 2 (Country) x 11 (Social Dimension) mixed ANOVAs on naturalness ratings and cohesiveness ratings.

**Naturalness.** Social dimensions varied in the degree to which they were seen as natural,  $F(10,1030)=143.21, p<0.001, \eta^2=0.57$ . *Race, gender, nationality*, and *age* categories were seen as relatively natural, whereas *political affiliation, class, occupation, personality* and



*hobby* categories were seen as less natural (fig. 2). Importantly, there was a country x social dimension interaction ( $F(10,1030)=5.04, p<0.001, \eta^2=0.02$ ), suggesting that social dimensions were perceived as natural to different degrees in the US and Northern Ireland (fig. 2). To further explore the interaction, we compared mean naturalness ratings for US and NI participants on each dimension via independent samples t-tests. Results indicated that naturalness ratings were higher for US participants than NI participants for most social dimensions, and that these differences were strongest for *age* categories ( $t(103)=2.38, p=0.019$ , Cohen's  $d=0.46$ ) and *physical appearance* categories ( $t(103)=3.66, p<0.001, d=0.72$ ). In contrast, NI participants rated only one social dimension as significantly more natural than US participants, and that was *religion* ( $t(103)=2.43, p=0.017, d=0.47$ ). Naturalness ratings for *race* categories did not differ reliably.

**Cohesiveness.** Social dimensions varied in the degree to which they were seen as cohesive,  $F(10,1030)=37.30, p<0.001, \eta^2=0.26$ . *Religion, political affiliation, gender, and age* categories were seen as relatively cohesive, whereas *race, physical appearance, and hobby* categories were seen as less cohesive (fig. 2). However, there was no interaction between country and social dimension for cohesiveness ratings ( $F(10,1030)=1.36, p=0.193$ ).

**Summary.** Results of Study 1 show that the two-component model is sensitive to cultural differences in essentialist thinking about social categories. Although social categories in general are essentialized to the same gross degree in both the U.S. and N.I., they are essentialized in different ways. Specifically, social categories were seen as more *cohesive* in general in NI than in the US, and more *natural* in the US than in NI. Against this general trend, historically salient religion categories were seen as more natural in NI than in the US, suggesting that culture-specific essentialist thinking about historically salient categories may center around heightened perceptions of naturalness for those categories. It is important to note, however, that we did not find the predicted cross-cultural difference in essentialist beliefs about race categories, which were highly naturalized in both countries. Given that we were more interested in interactions between culture and category in Study 1, and did not select the U.S. and N.I. with a view to examining global differences in essentialist beliefs, we were somewhat surprised to find such differences in our data. Accordingly, we attempted to replicate these differences in Study 2 using a more extreme cultural comparison.

## Study 2

Results of Study 1 support the importance of examining cultural variability in terms of differences in the perceived naturalness and cohesiveness of social categories. To test the generality of these findings, we turn to a very different cultural comparison in Study 2: the US and China. This is an important extension for several reasons. First, the past literature on social essentialism is largely concentrated on western samples, the majority of which come from European, American and Australian populations. Given the limited evidence from eastern societies (27), the current study contributes to our understanding of social essentialist thinking more broadly by examining the phenomenon comparatively in China and the US. This allows us to examine essentialist thinking about social categories in two cultures that differ more than those examined in Study 1.

Moreover, the results of Study 1 also suggest an interesting hypothesis: that cultural differences in essentialist thinking about historically salient social dimensions may involve the degree to which such categories are seen as being like natural kinds, rather than the degree to which they are seen as cohesive. In Study 2, we examined a different social dimension that is highly salient in China. Specifically, we asked participants in both places to rate the degree to which *home region* categories are essentialized. Traditional Chinese culture puts much emphasis on the critical importance of environmental influences on determining individual traits. For example, according to a proverb in *The Spring and Autumn Annals of Master Yan* (橘生淮南则为橘, 生于淮北则为枳), which dates to 500 BC (56), the kind of environment that one grows up in ultimately determines one's identity and category membership. Consistent with the spirit of this proverb, Chinese administrative and economic systems have tended to discourage cross-regional migration. The segregational nature of such policies can increase the distance and hostility between regions. China's household registration (*Hukou*, 户口) system, for example, registers the resident location of each citizen, which is mainly inherited from parents thus determined by birth (57). Importantly, individual access to educational, medical, social security, housing, and other social welfare resources are directly related to one's *Hukou* status (57). Although the *Hukou* system has undergone great changes in the last few decades, it has nevertheless been argued to have created a spatial hierarchy with differential opportunities unequally distributed among the regions (57, 58, 59). Given the cultural and economic salience of this social dimension in China, we predict that home region categories will be more strongly essentialized among Chinese participants than U.S. participants. Whether any cross cultural difference in the degree to which regional categories are essentialized is due to beliefs amongst Chinese participants that such categories are more natural, will be of particular interest, given the results of Study 1.

**The Two-Dimension Model in the US and China.** We computed mean scores on each of the six essentialism items for each of the 31 social categories (separately for participants in the US and China) and conducted principal components analyses with Varimax rotation for each data set (12). Results are presented in Table 2, and closely replicated results from (12), as well as those from Study 1. The analyses yielded the same 2-factor solution separately in the US and China, with the three naturalness items loading onto one factor and the three cohesiveness items loading onto the other factor (see Table 2). This is especially notable since we used a truncated version of the measure, employing six of the original nine scales (27). To illustrate where different social dimensions fall relative to each other for participants in the US and China, we again computed standardized scores for all categories on both essentialism components, averaged those by social dimension (e.g., *race*, *religion*), and graphed these on a naturalness x cohesiveness scatterplot (see Fig. 3)

< Table 2>

< Figure 3>

**National Differences in Essentialist Thinking about Social Categories in General.** We again computed *naturalness* and *cohesiveness* scores for each category by averaging ratings across participants on the appropriate essentialism items (naturalness, immutability and

discreteness for *naturalness*; uniformity, inherence and informativeness for *cohesiveness*), and comparing these using an item-wise 2 (Country: US, China) x 2 (component: Naturalness, Cohesiveness) repeated measures ANOVA. Results again revealed that naturalness ratings were higher than cohesiveness ratings,  $F(1,28) = 13.25, p = 0.001, \eta^2 = 0.32$ . As in Study 1, there was no main effect of country ( $F(1,28) = 0.45, p = 0.51$ ), but there was a significant interaction between country and essentialism component,  $F(1,28) = 61.50, p < 0.001, \eta^2 = 0.69$ . Simple effects analysis revealed precisely the same pattern as in Study 1; social categories were seen as more natural in the US than China ( $p = 0.003$ ), but as more cohesive in China than in the US ( $p < 0.001$ ), see Fig. 4

#### < Figure 4 >

**National Differences in Essentialist Thinking about Specific Social Dimensions.** We computed each participant's *naturalness* and *cohesiveness* scores for each social dimension on which participants rated at least two categories (*Race, Gender, Religion, Hometown, Sexuality, Age, Class, Occupation, Physical Appearance*) by averaging the respective scores across all individual categories within the dimension. We then used a 2 (Country: US, China) x 9 (Social Dimension) x 2 (Essentialism component: Naturalness, Cohesiveness) mixed ANOVA, which revealed a significant country x social dimension x essentialism component interaction ( $F(8,1240) = 9.77, p < 0.001, \eta^2 = 0.03$ ). This indicates that patterns of national differences in essentialist thinking about social dimensions differed for naturalness versus cohesiveness. To explore this interaction, we again conducted separate 2 (Country) x 9 (Social Dimension) mixed ANOVAs for naturalness rating and cohesiveness ratings.

**Naturalness.** Social dimensions varied in the degree to which they were seen as natural,  $F(8,1240) = 146.17, p < 0.001, \eta^2 = 0.46$ . *Race, gender, and age* categories were seen as more natural, whereas *religion, class, and occupation* categories were seen as less natural (fig. 4). Importantly, as in Study 1, there was a country x social dimension interaction ( $F(8,1240) = 16.96, p < 0.001, \eta^2 = 0.05$ ), suggesting that social dimensions were perceived as natural to different degrees in the US and China (fig. 4). To further explore the interaction, we compared mean naturalness ratings for US and Chinese participants on each dimension via independent samples t-tests. Results indicated that although naturalness ratings were higher for US participants than Chinese participants on most dimensions, these differences varied in size; differences were strongest for *class* ( $t(155) = 8.99, p < 0.001, d = 1.44$ ), *occupation* ( $t(155) = 6.48, p < 0.001, d = 1.04$ ), and *physical appearance* ( $t(155) = 4.25, p < 0.001, d = 0.68$ ). In contrast, Chinese participants rated only one social dimension as significantly more natural than US participants, and that was *home region*,  $t(155) = 2.98, p = 0.003, d = 0.48$ . Again, naturalness ratings for *race* categories did not differ reliably.

**Cohesiveness.** As in Study 1, results for cohesiveness ratings showed a very different pattern. Social dimensions varied in the degree to which they were seen as cohesive,  $F(8,1240) = 92.00, p < 0.001, \eta^2 = 0.37$ . *Religion* categories were seen as especially cohesive, whereas *physical appearance* categories were perceived as having little cohesiveness (fig. 4). Unlike Study 1, there was also a country x social dimension interaction ( $F(8,1240) = 2.34, p = 0.017, \eta^2 < 0.01$ ), suggesting that social dimensions were perceived as cohesive to different degrees in the US and China (see fig. 4). To further explore the interaction, we

compared mean cohesiveness ratings for US and Chinese participants on each dimension via independent samples t-tests. Although means for all social dimensions were higher in China than in the US, the significant interaction likely stems from variation in the size of the differences, varying from smallest for race categories ( $t(155) = 0.31, p = 0.726, d = 0.05$ ) to largest for religion categories ( $t(155) = 4.89, p < 0.001, d = 0.79$ ).

**Summary.** As in Study 1, the two-component model was necessary to reveal cultural differences in essentialist thinking about social categories. Overall ratings of social categories did not differ across cultures; however, U.S participants in general rated social categories as more natural than Chinese participants, whereas Chinese participants, rated social categories as more cohesive than U.S participants. Given that the social and cultural differences between the USA and China would seem to greatly outweigh those between the USA and Northern Ireland (50, 60, 33), this nearly perfect replication of the pattern of cultural differences seen in Study 1 is particularly striking. Results of Study 2 also provide support for our hypothesis—derived from Study 1—that culture-specific essentialist thinking about historically salient categories (*home region* in China, *race* in the US) may center around heightened perceptions of naturalness. Our results showed that home region categories were seen as more natural in China than in the US, against the backdrop of higher naturalness ratings in the US more generally. In contrast, cohesiveness ratings for *home region* showed the same pattern as other social dimensions. Notably, once again race categories were seen as the most natural categories we queried among participants in both countries, and did not differ.

### **Supplementary Analyses Comparing US-Northern Ireland and US-China Differences in Social Essentialism**

The picture of cultural differences in essentialist thinking about social categories that emerges from these two studies is remarkably consistent. In comparing participants in the USA and Northern Ireland, we found that a two-component characterization of social essentialist thinking (12) applied equally well to both populations. Overall, social categories were seen as more natural in the US, and more cohesive in Northern Ireland. Based on historical and cultural salience, we predicted that *race* categories would be more highly essentialized in the US, and that *religion* categories would be more highly essentialized in Northern Ireland. However, our findings were more complex. Race categories were seen as highly natural in both the US and NI. And although most social categories were seen as more natural among US participants than NI participants, *religion* violated this trend; religion categories were seen as more like natural kinds among participants from NI than among participants from the US. No such differences were evident in terms of cohesiveness; NI participants perceived social categories in general to be more cohesive than participants from the US.

In comparing participants in the USA and China, we again found a two-component characterization of social essentialist thinking (12) applied equally well to both populations. Overall, social categories were seen as more natural in the US, and more cohesive in China. Based on historical and cultural salience, we again predicted—with some hesitation given our findings in Northern Ireland—that race categories would be more highly essentialized in the US, and that home region categories would be more highly

essentialized in China. Findings were again more complex, in precisely the same way we observed in Study 1. Specifically, race categories were seen as highly natural in both the US and China. And although most social categories were seen as more natural among US participants than Chinese participants, home region categories violated this trend; these categories were seen as more like natural kinds among participants from China than among participants from the US. No such differences were evident in terms of cohesiveness; Chinese participants perceived social categories in general to be more cohesive than participants from the US.

To verify this common pattern that emerged from Studies 1 and 2, we conducted parallel supplementary analyses. For both data sets, we computed mean naturalness and cohesiveness scores for target social dimensions (*religion* for the US-NI comparison, *home region* for the US-China comparison) and non-target dimensions (all other social dimensions for which participants rated multiple categories in each study). We then performed separate 2 (Country) x 2 (Social Dimension: Target, Non-Target) x 2 (Essentialism component: Naturalness, Cohesiveness) mixed ANOVAs on mean essentialism ratings, with repeated measures on Social Dimension and Essentialism component. If our characterization of the cultural differences holds across both comparisons, we would expect to observe three-way interactions for both samples. Follow-up two-way ANOVAs should show a country x social dimension interaction for naturalness but not cohesiveness. Results are depicted in Figure 6

### < Figure 6 >

**USA-Northern Ireland.** Consistent with our characterization of the cultural differences in essentialist thinking about social categories, we observed a significant three-way interaction,  $F(1,103)=15.14$ ,  $p<0.001$ ,  $\eta^2=0.09$  (see fig. 5A). Follow-up 2 (Country) x 2 (Social Dimension) ANOVAs showed a country x social dimension interaction for the naturalness component ( $F(1,103)=16.07$ ,  $p<0.001$ ,  $\eta^2=0.13$ ) but not the cohesiveness component ( $F(1,103)=0.08$ ,  $p=0.774$ ,  $\eta^2<0.001$ .)

**USA-China.** Once again, consistent with our characterization of the cultural differences in essentialist thinking about social categories, we observed a significant three-way interaction,  $F(1,155)=25.53$ ,  $p<0.001$ ,  $\eta^2=0.14$  (see fig. 5B). Follow-up 2 (Country) x 2 (Social Dimension) ANOVAs showed a country x social dimension interaction for the naturalness scale ( $F(1,155)=32.44$ ,  $p<0.001$ ,  $\eta^2=0.14$ ) but not for the cohesiveness scale ( $F(1,155)=0.18$ ,  $p=0.675$ ,  $\eta^2=0.001$ .)

These admittedly post-hoc exploratory analyses support the idea that social categories may be seen as more natural, immutable, and objective in cultural settings where they have been implicated in conflict or other historically or socially salient events.

### Discussion

Most generally, our results demonstrate clear and consistent cross-cultural differences in essentialist thinking about social categories. At the outset, we outlined four possible ways in which cross cultural differences in social essentialism might be manifested (fig. 1). Our findings rule out all of the possibilities in which essentialism is treated as a unitary

component (figs 1a and 1b), and validate a two-component model of social essentialism in which conceptions of social categories vary with respect to their perceived naturalness and cohesiveness (figs 1c and 1d). Moreover, our results also show that cultures differ in terms of how particular social dimensions are perceived to be natural and cohesive. Specifically, social dimensions are differentially essentialized as a function of cultural salience, and this manifests primarily in heightened perceptions of naturalness. Finally, our results demonstrate that Americans' beliefs about social categories may be atypical when compared to other cultures, in that Americans perceive social categories in general as more natural and less cohesive than people in China or Northern Ireland. We discuss these findings below.

### **Cultures Differ in the Degree to which Social Categories are seen as Natural and Cohesive**

Our results consistently show that the two-component structure of social essentialism (12) is not only replicated across cultures, but that it is critical for characterizing the nature of cultural differences in essentialist thinking about social categories. Indeed, we observed few, if any, differences in overall "social essentialism" between participants in the US, Northern Ireland and China. When viewed in terms of naturalness and cohesiveness, however, consistent differences were evident. Social categories were consistently rated as more *natural* by participants in the US relative to participants in Northern Ireland and China. Conversely, social categories were consistently rated as more *cohesive* by participants in Northern Ireland and China relative to participants in the US. Language differences cannot explain this pattern of results; participants in Study 1 were tested in the same language, whereas those in Study 2 were tested in different languages, yet both yielded the same patterns. Likewise, results are not an artifact of national differences in the use of rating scales; Americans were systematically lower on one component, and higher on the other. Rather, the finding that naturalness and cohesiveness show distinct patterns of cultural variation provides additional evidence that this two-component model represents a valid and important perspective from which to examine cultural differences in essentialist thinking about social categories.

Our results are also consistent with other comparative findings. For example, Japanese adults viewed personality traits as more mutable than did American adults (46, see also 61). Rather than taking this as evidence of general cross-cultural differences in essentialist beliefs about personality traits (31), our results suggest an alternative explanation. Perhaps personality traits, like social categories, are viewed as more natural—and therefore less mutable—in some cultures than in others.

### **Culturally Salient Social Dimensions are Perceived as More Natural**

The pattern we have just described, where naturalness and cohesiveness show distinctive patterns of cultural variation, is consistent with figure 1c, in which cross-cultural differences in social essentialism are captured by an interaction between culture and essentialism component. However, our data suggest that to fully capture the complexity of cultural differences in social essentialism, we need to consider how naturalness and cohesiveness beliefs vary with respect to specific social dimensions (figure 1d) as a

function of the culture-specific socio-historical salience of those dimensions. We focused on *race* and *religion* categories in the US and Northern Ireland in Study 1, and *race* and *home region* categories in the US and China in Study 2. The picture that emerges from these two studies is remarkably consistent. Differential cultural salience of specific social dimensions seems to be manifested most clearly in cultural differences in the degree to which categories within that dimension are seen as natural kinds. Specifically, the only social dimension that was seen as significantly more natural in Northern Ireland than the US was *religion*, and the only social dimension that was seen as significantly more natural in China than the US was *home region*. It is important to point out that these were not the most highly naturalized social dimensions in either case—figures 2 and 4 reveal that both were about average. Rather, these dimensions were perceived as markedly more natural in cultures where they had salient socio-historical implications than in cultures where they had no such significance.

This pattern was somewhat asymmetric, however; contrary to our expectation, *race* categories were not differentially naturalized in the US compared to Northern Ireland and China. This might be due at least in part to a ceiling effect; race categories were seen as highly natural across all three nationalities, a finding consistent with a large body of literature (62, 63, 13, 5, 25).

At the outset, we sought to distinguish between different possible manifestations of cultural effects on social essentialism. We did not make predictions about the form which interactions of particular complexity might take as we knew of no grounds for such predictions. As such, it is particularly striking that in two different cross-cultural comparisons, social dimensions which had socio-historical significance for members of one culture only were seen as more natural by members of that culture. These results show that such culture-specific essentialism has its basis in beliefs about category naturalness, which include beliefs about the discreteness of category boundaries and the necessity of certain features for category membership, as well as beliefs about category naturalness, mutability and stability. Notably, this finding only emerged because we measured beliefs about both naturalness and cohesiveness, demonstrating that taking two components into account is necessary not only to understand broad cultural differences but also to understand specific cultural differences in essentialist thinking about historically salient social dimensions.

### **Americans are Atypical**

Across two studies, we demonstrated general cultural differences in the extent to which social categories are perceived to be *cohesive*. Specifically, participants from the USA consistently rated social categories in general as less cohesive than participants from China or Northern Ireland. This suggests that US participants see social categories in general as less homogeneous and informative, and see category membership as less exclusive and less likely to be based on an underlying reality, than participants from China or the UK. This finding—although novel in the study of essentialist thinking about social categories—is consistent with a number of other findings with respect to cultural dimensions of individualism-collectivism (64, 34, 35). Indeed, Americans have been shown to be highly individualistic relative not only to non-western cultures like China, but also relative to

people in other western european countries (60, 50), prompting Henrich et al. to conclude that “Americans are, on average, the most individualistic people in world” (60, p. 74). Hallmarks of individualism include the tendency to value autonomy and independence from in-groups, prioritize personal goals, and behave primarily on the basis of individual attitudes and preferences (35). These could well be linked to Americans’ systematic beliefs about the lack of cohesiveness in social categories.

In contrast, social categories in general were seen as more *natural* by American participants than by participants in Northern Ireland and China. Paradoxically, this suggests that contrary to explicitly expressed–albeit unrealistic–beliefs about social mobility in the US (65, 66, 67, 68), Americans were particularly likely to see social categories as stable, sharply bounded, and immutable. One possible explanation for this difference, as we mentioned in the Introduction, could be a preference for analytic cognition among members of individualistic cultures (33). However, this would not explain the differences between participants in the US and Northern Ireland, both relatively individualistic cultures whose members presumably tend to favor analytic cognition. Another possible explanation could be an over-attribution of causal centrality to genetic underpinnings of social categories (11), although we know of no evidence that Americans would be particularly susceptible to such beliefs.

Although we can only speculate as to the source of the national differences in perceived cohesiveness and naturalness, it is important to point out that Northern Ireland and China are vastly different cultures in many respects. The fact that Americans differ from participants in both locales in precisely the same ways suggests that Americans are the outliers. In other words, these findings suggest that, no matter what the explanation is, US participants may systematically differ from participants in other cultures with respect to beliefs about both the naturalness and cohesiveness (or lack thereof) of social categories (60).

## Conclusions and Implications

We have shown that participants in the USA, Northern Ireland, and China differ with respect to beliefs about the naturalness and cohesiveness of social categories: Americans rate social categories in general as more natural and less cohesive than Northern Irish or Chinese. Moreover, specific social dimensions are rated as more natural in cultures where those dimensions are associated with salient historical conflict. Thus, understanding cultural differences in social essentialism, and indeed any investigation into essentialist thinking about social categories, requires consideration of both naturalness and cohesiveness. More generally, these results demonstrate the need for increased specificity and precision in both empirical and theoretical work on psychological essentialism and its development.

## Materials & Methods

### Participants

For Study 1, 54 American undergraduates enrolled in an introductory Psychology course at Northeastern University in Boston, USA, and 52 undergraduates enrolled in a degree



course in psychology from Queen's University in Belfast, Northern Ireland, participated for course credit or payment. Both samples were collected in 2012, and demographic information is unavailable. For Study 2, 70 American undergraduates from Northeastern University in Boston, USA (24% male, 74% female) and 87 Chinese undergraduate students from Central China Normal University in Wuhan, PRC (30% male, 70% female) participated for partial course credit. The U.S sample was collected in fall 2017, and the Chinese sample was collected in spring 2017.

## Materials

For both studies, we chose a broad range of social categories intended to be familiar to both populations of participants and to vary in their potential for being seen as natural and cohesive. For Study 1, participants rated a total of 44 social categories on nine different essentialism items adapted from (12); categories were identical for participants in both locations. For Study 2, participants rated a total of 31 social categories on the six different essentialism items (including the three that loaded highest on each factor); categories were identical except for home region dimension, for which, US and Chinese participants rated culturally meaningful categories (East-coaster and West-coaster for U.S participants; Northerner and Southerner for Chinese participants). The original survey materials were translated into Chinese by a native Chinese speaker fluent in English with formal training in translation, and were then back-translated by another Chinese-English bilingual speaker to double check translation fidelity. (See Supplementary Materials Tables S1 and S2 for wording of the items.) For both studies, categories were drawn from a large range of social dimensions (e.g., *race, gender, religion, nationality, personality, height, hair color*) and were chosen to be familiar to students in both research sites (e.g., *doctors, women, Catholics, blond people*) and to represent a broad range of social categories, including historically salient race and religion (Study 1) or race and home region (Study 2) categories. For a complete list of categories used, see Tables S3 and S4.

## Design

To increase the range of categories examined, the survey was presented in two versions. Both versions contained the same race, gender, religion, nationality, and political affiliation categories (Study 1) or race, gender, religion, class, and sexuality categories (Study 2) which were rated by all participants in both locations. The two versions differed on specific category exemplars of other dimensions (Tables S3 and S4). As a result, participants in Study 1 rated 30 social categories on nine essentialism items, and participants in Study 2 rated 21 social categories on six essentialism items. All categories were rated on a single essentialism item (e.g., *uniformity*) before moving to the next item. The order of item blocks, as well as the order of social categories presented within each block was randomized.

## Procedure

The study was programmed and administered using Qualtrics software (Qualtrics, Provo, UT). In the U.S., participants were tested individually in lab rooms; in Northern Ireland, participants were tested in small groups in a lab; Chinese participants completed the online

study at a time and place of their convenience. Participants were instructed to respond based on their own thinking, and were informed that there were no right or wrong answers to any of the questions. Participants typically took 20-30 minutes to complete the survey.

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Table1. Varimax-rotated loadings of the essentialism items (decimal omitted) for US and NI participants, Study 1. Values from Haslam et al. (2000) are included for comparison.

Essentialism Items	Factor 1 (Naturalness)			Factor 2 (Cohesiveness)		
	US	NI	Haslam et al. (2000)	US	NI	Haslam et al. (2000)
Discreteness	<b>80</b>	<b>85</b>	<b>81</b>	-22	05	25
Naturalness	<b>93</b>	<b>96</b>	<b>91</b>	-08	05	-21
Immutability	<b>83</b>	<b>88</b>	<b>86</b>	-12	08	04
Stability	<b>65</b>	<b>85</b>	<b>78</b>	37	40	-25
Necessity	<b>94</b>	<b>90</b>	<b>88</b>	-08	-10	23
Uniformity	-03	04	-09	<b>96</b>	<b>97</b>	<b>89</b>
Informativeness	-14	-25	-13	<b>96</b>	<b>92</b>	<b>90</b>
Inherence	-24	21	04	<b>94</b>	<b>94</b>	<b>86</b>
Exclusivity	34	51	23	<b>80</b>	<b>70</b>	<b>73</b>
% Variance	42.4	52.9	40.8	38.1	32.4	34.4

Table 2. Varimax-rotated loadings of the essentialism items (decimal omitted) for US and China participants, Study 2.

Essentialism Items	Factor 1 (Naturalness)		Factor 2 (Cohesiveness)	
	US	China	US	China
Discreteness	<b>75</b>	<b>73</b>	-16	52
Naturalness	<b>91</b>	<b>83</b>	-20	-49
Immutability	<b>89</b>	<b>92</b>	-19	-17
Uniformity	-08	-06	<b>92</b>	<b>97</b>
Informativeness	-05	-17	<b>96</b>	<b>90</b>
Inherence	-07	-08	<b>81</b>	<b>94</b>
% Variance	45.9	55.8	31.8	31.8



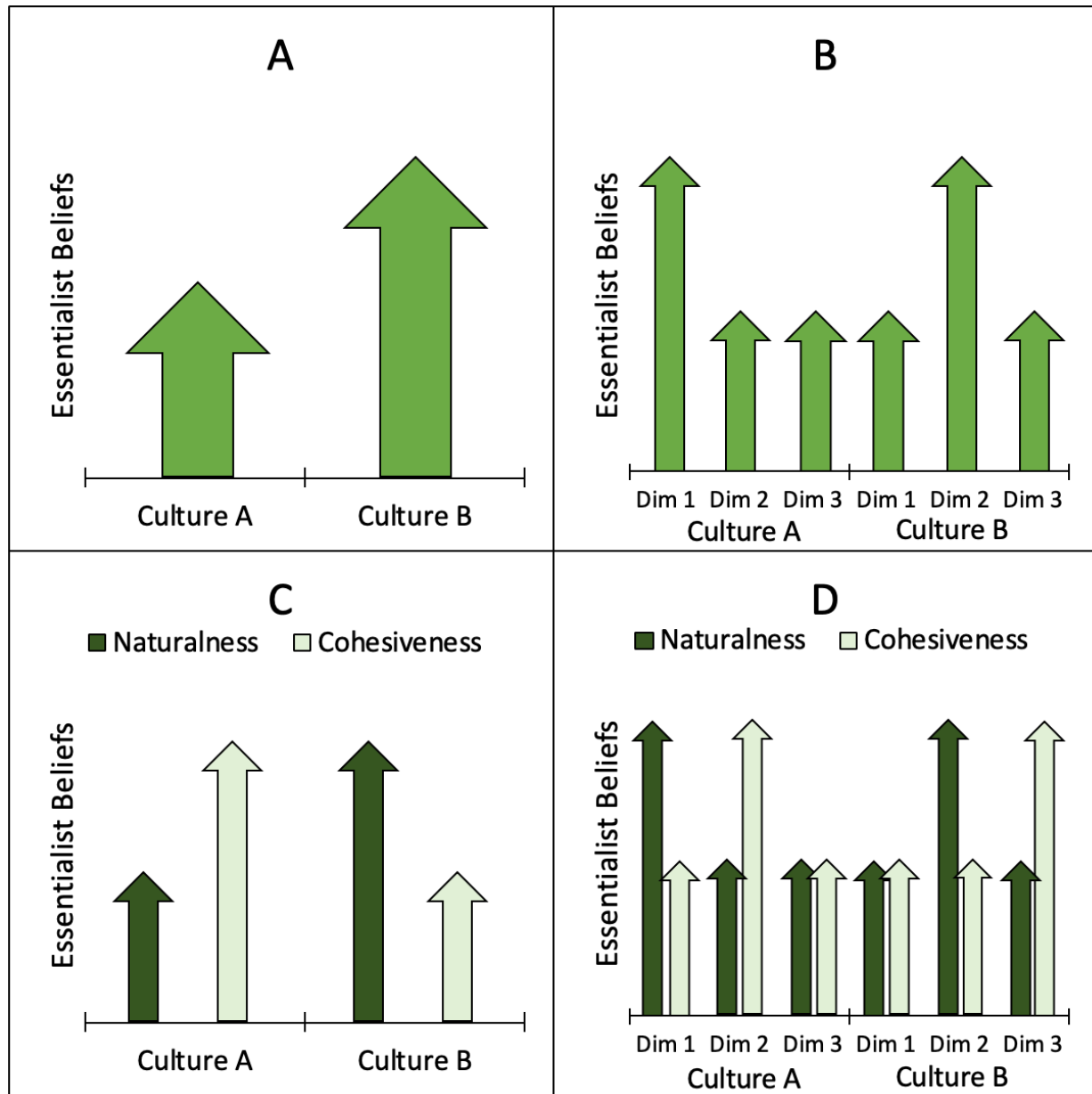


Figure 1. Possible Cultural Differences in Essentialist Thinking about Social Categories: (a) Main Effect of Culture, (b) Culture x Social Dimension, (c) Culture x Essentialism Component, (d) Culture x Social Dimension x Essentialism Component

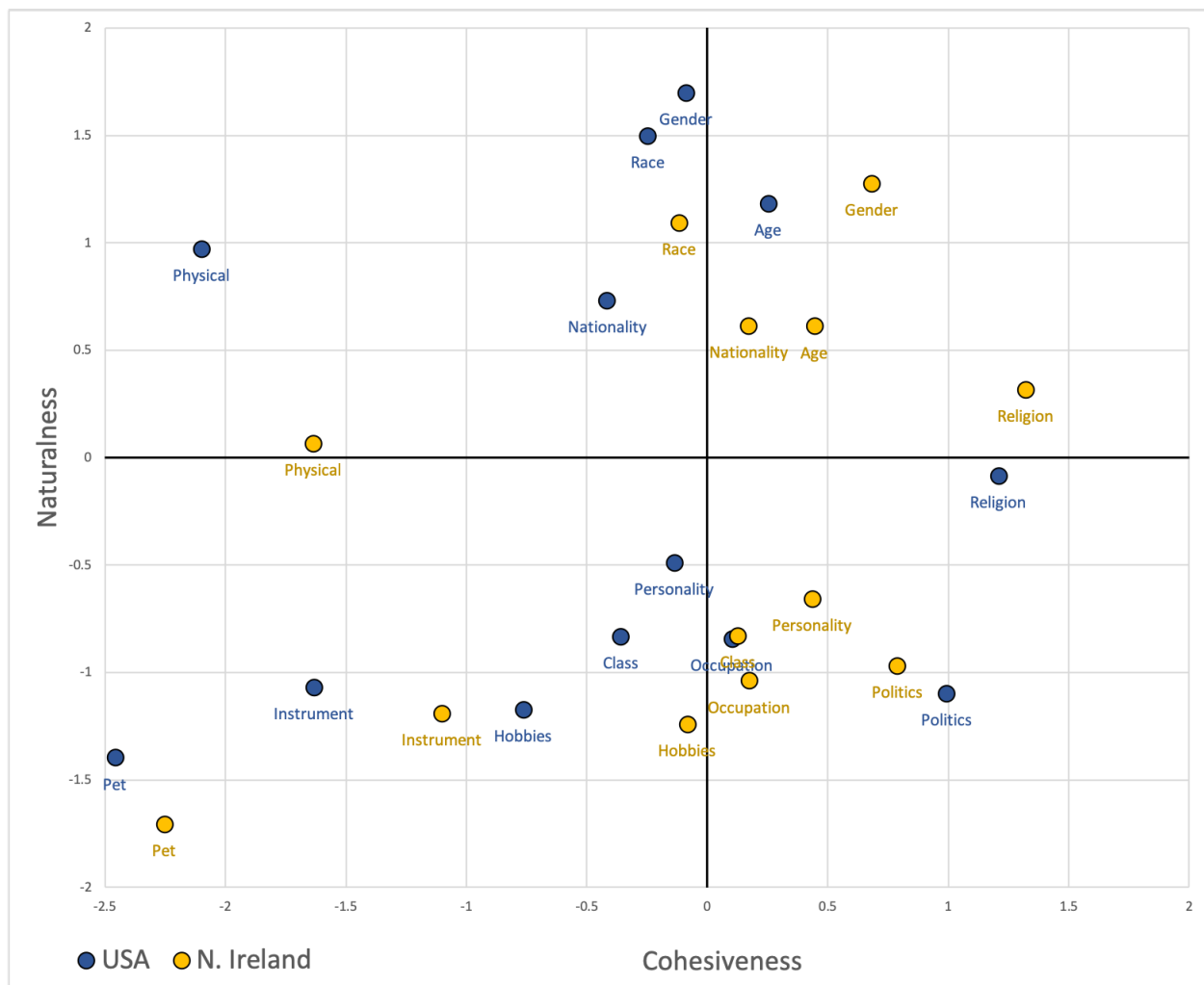


Figure 2. Scatterplot of Social Dimensions (averages of constituent social categories) Along Naturalness and Cohesiveness for Participants from US (blue) and Northern Ireland (gold).

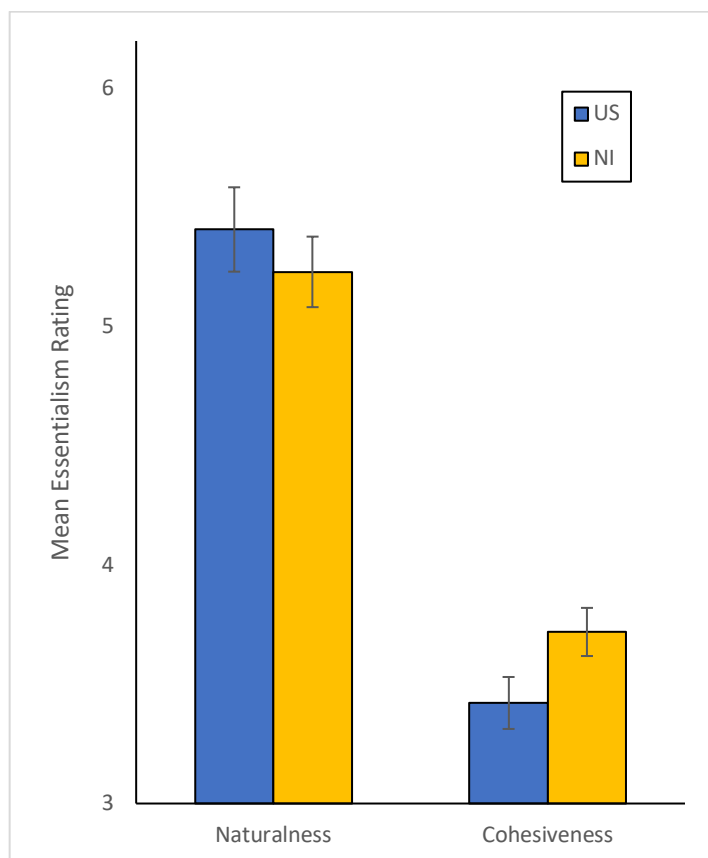


Figure 3. Mean naturalness and cohesiveness ratings for social categories in the US and Northern Ireland (error bars represent one standard error of the mean).

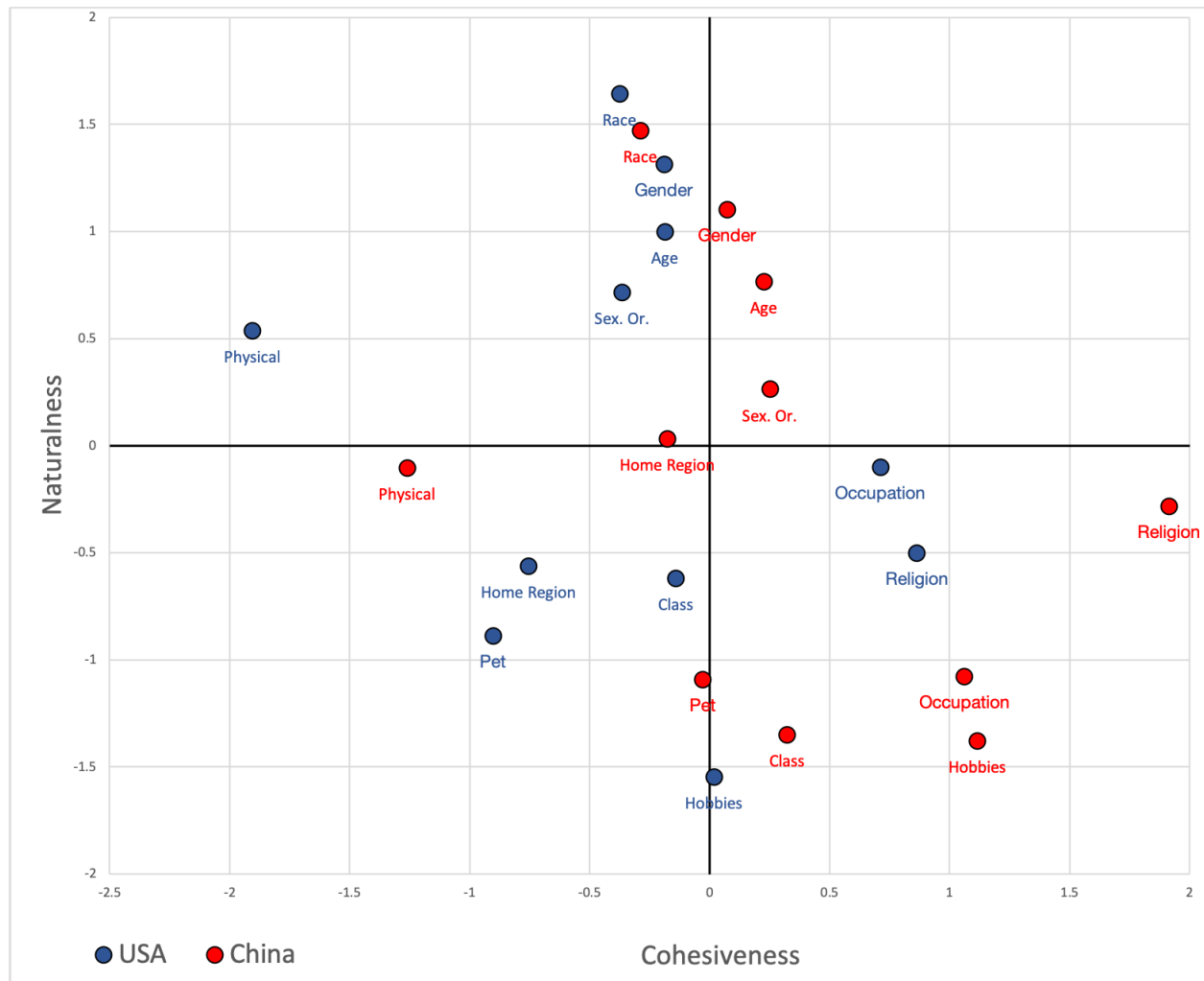


Figure 4. Scatterplot of Social Dimensions (averages of constituent social categories) Along Naturalness and Cohesiveness for Participants from US (blue) and China (red).

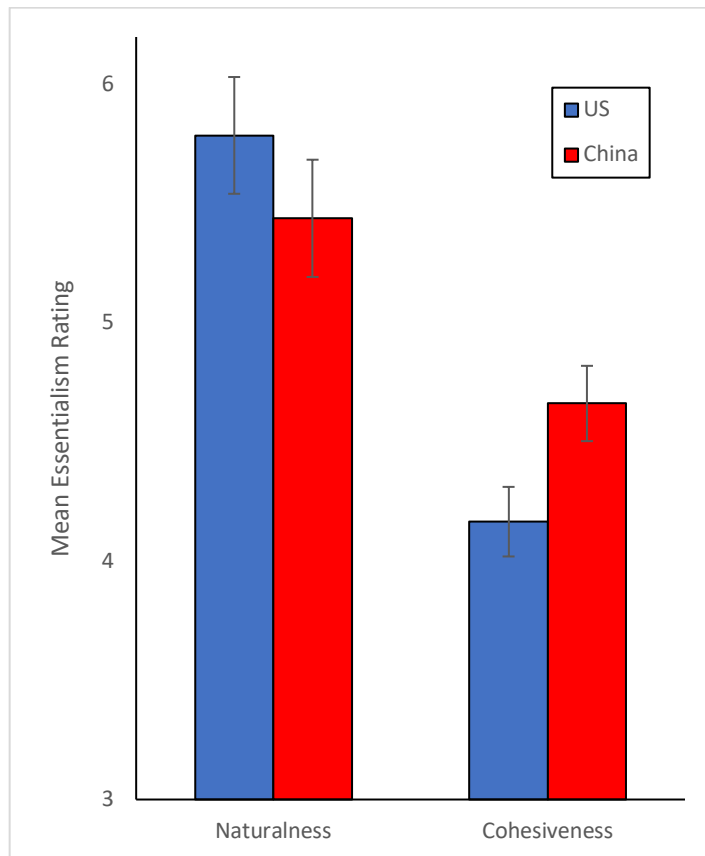
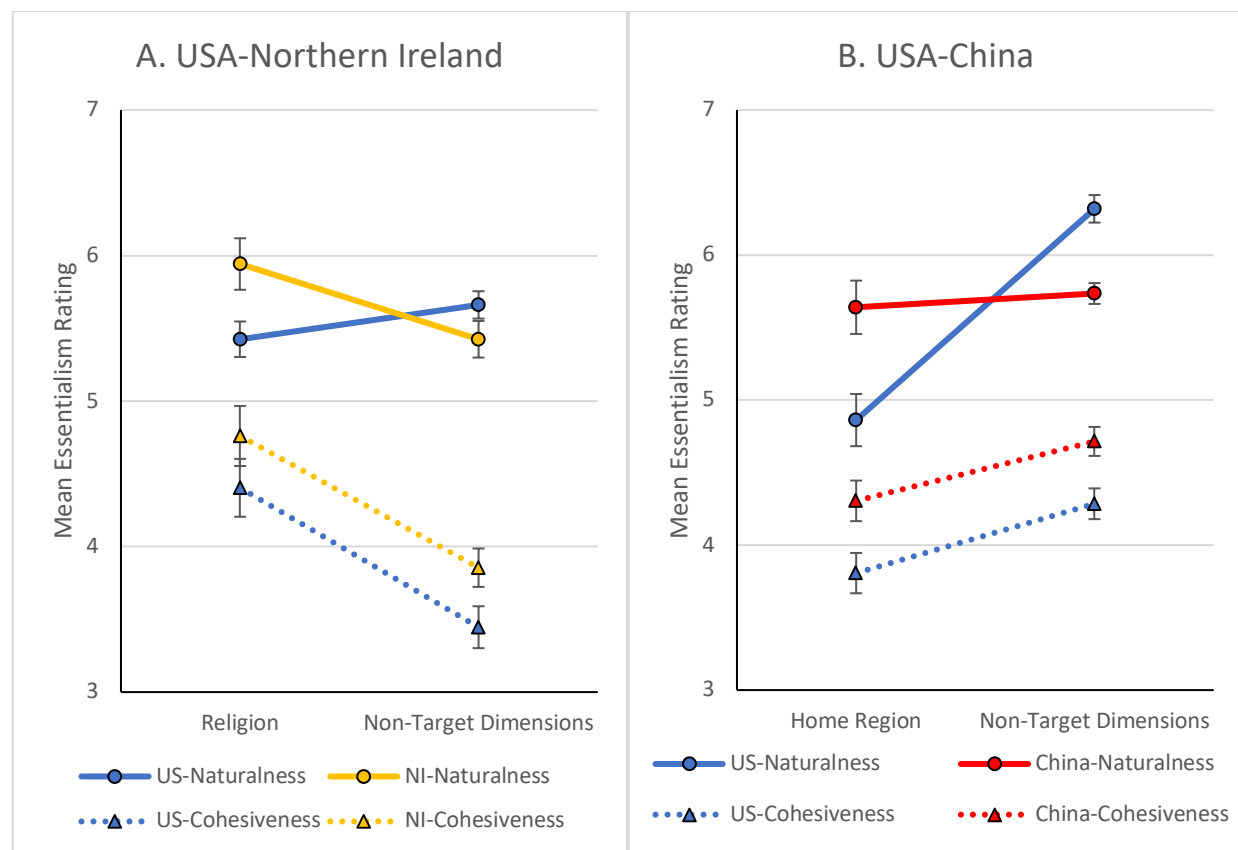


Figure 5. Mean naturalness and cohesiveness ratings for social categories in the US and China (error bars represent one standard error of the mean)



**Figure 6.** Mean naturalness and cohesiveness ratings for (A) religion categories versus other social dimension for participants from the US and Northern Ireland, and (b) home region categories versus other social dimension for participants from the US and China.

## Supplemental Materials

Table S1. Wording of Essentialism Items, Study 1

Dimension	Question
<b><i>Naturalness</i></b>	
Discreteness	Some categories have sharper boundaries than others. For some, membership is clear-cut, definite, and of an “either/or” variety; people either belong to the category or they do not. For others, membership is more, “fuzzy”; people belong to the category in varying degrees. To what extent is ____ discrete?
Naturalness	Some categories are more natural than others, whereas others are more artificial. To what extent is ____ natural?
Immutability	Membership in some categories is easy to change; it is easy for members to become non-members. Membership in other categories is relatively immutable; it is difficult for category members to become non-members. To what extent is ____ immutable?
Stability	Some categories are more stable over time than others; they have always existed and their characteristics have not changed much throughout history. Other categories are less stable; their characteristics have changed substantially over time, and they may not have always existed. To what extent is ____ stable?
Necessity	Some categories have necessary features or characteristics; without these characteristics someone cannot be a category member. Other categories have many similarities, but no features or characteristics are necessary for membership. To what extent does ____ have necessary features?
<b><i>Cohesiveness</i></b>	
Uniformity	Some categories contain members who are very similar to one another; they have many things in common. Members of these categories are relatively uniform. Other categories contain members who differ greatly from one another, and don’t share many characteristics. To what extent is ____ uniform?
Informativeness	Some categories allow people to make many judgments about their members; knowing that someone belongs to the category tells us a lot about that person. Other categories only allow a few judgments about their members; knowledge of membership is not very informative. To what extent is ____ informative?
Inherence	Some categories have an underlying reality; although their members have similarities and differences on the surface, underneath they are basically the same. Other categories also have similarities and differences on the surface, but do not correspond to an underlying reality. To what extent does ____ have an underlying reality?
Exclusivity	Some categories do not allow their members to belong to other categories; belonging to such a category excludes a person from these other categories. On the other hand, some categories do not limit which other categories their members can belong to; they do not exclude a person from these categories. To what extent is ____ exclusive?

Table S2. Wording of Translated Essentialism Items, Study 2

<b>Dimension</b>	<b>Question</b>
<b><i>Naturalness</i></b>	
Discreteness	Some groups have sharper boundaries than others. For some, membership is clear-cut, definite, and people either belong to the group or they do not. For others, membership is more "fuzzy"; people belong to the group in varying degrees. How clear cut is the boundary for the following group?
Naturalness	Some groups exist naturally; we know about them because someone discovered them or because their existence is evident to us all. Other groups are created artificially; they are invented by people. To what extent do you think the following categories are natural?
Immutability	For some categories, membership is easy to change; it is easy for members to leave the group, and nonmembers to join. For other categories, membership is very difficult to change; it is almost impossible for members to leave or non-members to join. How difficult is it to change the membership of the following group?
<b><i>Cohesiveness</i></b>	
Uniformity	Some groups are very uniform; members are very similar to one another and have many features in common. Other groups are not very uniform; members differ greatly from one another, and don't share many characteristics. To what extent are members of the following group uniform?
Informativeness	Some categories are very informative; knowing that someone belongs to a particular category tells you a lot about that person. Other categories are not informative; knowing that someone belongs to that category doesn't tell you much about them. To what extent is knowing the following category informative?
Inherence	Some groups share an underlying essence; although members might have similarities and differences on the surface, underneath they are basically the same. Other groups do not share an essence; although they may share superficial characteristics, they vary underneath. To what extent do members from the following group share something deep in common?



Table S3. Social Dimensions and Specific Categories, Study 1

<b>Social Dimension</b>	<b>Category (Version A / Version B)</b>
Race	Black, White, Asian
Gender	Male, Female
Religion	Catholic, Protestant, Jewish, Muslim
Nationality	English, Irish, Mexican, American
Political Affiliation	Conservative, Liberal, Moderate
Age	Children, Middle-aged people / Adolescents, Elderly people
Class	Rich, Working Class / Poor, Middle Class
Occupation	Doctors, Firefighters / Business Executives, Teachers
Personality	Shy, Logical / Outgoing, Creative
Physical Appearance	Tall, Blonde / Short, Brown-haired
Hobbies	Sports Fans, Avid Readers / Puzzle Enthusiasts, Animal Lovers
Instrument	Guitar / Piano
Pet	Hamster / Goldfish

Note: Each participant saw all categories in the unshaded dimensions, and one of the two category options (depending on which version) for the shaded dimensions

Table S4. Social Dimensions and Specific Categories, Study 2

Social Dimension	Category (Version A / Version B)
Race	Black, White
Gender	Male, Female
Religion	Christian, Buddhist, Muslim
Class	Rich, Poor
Sexuality	Heterosexual, Homosexual
Home Region	US: East-coasters, West-coasters China: Northerners, Southerners
Age	Children, Middle-aged / Adolescents, Elderly
Occupation	Doctors, Farmers / Police, Teachers
Physical Appearance	Tall, Overweight / Short, Slim
Hobbies	Sports Fans / Comic Fans
Pet	Cat Owners/ Dog Owners

Note: Each participant saw all categories in the unshaded dimensions, and one of the two category options (depending on which version) for the shaded dimensions.

\*For Home Region, all U.S participants saw the categories *east-coasters* and *west-coasters*, and all Chinese participants saw the categories *northerners* and *southerners* to ensure cultural meaningfulness.