Are individualism and "masculinity" related when controlling for regional proximity? A reappraisal of Barry (2015).

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Abstract

Barry (2015) recently attributed the non-significant relationship between the cultural dimensions of Individualism and Masculinity to a suppression effect of regional differences. Pairing countries on regional proximity, he showed that a strong correlation between these cultural dimensions emerged. However, we point to significant issues with this analysis, including how countries were paired, ordered, and included/excluded, as well as in the cultural meaningfulness of regional proximity. Re-analysis of the data after addressing these issues shows that Individualism and Masculinity are not significantly related at a cultural level after controlling for regional proximity, nor after controlling for two other prominent geographic factors: latitude and climate demands. The weight of evidence suggests that Individualism and Masculinity are not correlated at a cultural level.

Understanding the dimensions of cultural differences generates important insights into the variety of human experience and improving intercultural interactions. Hofstede and colleagues (e.g., Hofstede, 2001; Hofstede, Hofstede, & Minkov, 2010) identified major dimensions of cultural differences, however their overlap is often debated. Recent attention has turned to Individualism (IND) and "Masculinity" [1] (MASC), which cultural-level analyses have shown are independent (Hofstede et al., 2010). MASC reflects assertive and other agentic behavior, and some people see an intuitive link between assertiveness and individualism, as well as between the opposite poles of modest behavior and collectivism. These intuitions imply that IND and MASC should be related.

Barry (2015) provided a way to reconcile this intuition with the null relationship in Hofstede et al.'s (2010) analyses. Barry (2015) argued that a relationship existed, but it was masked by large regional differences in levels of IND and MASC. After controlling for these "…undesired effects of regional differences" (p. 291) by comparing countries paired on geographic proximity, he identified a strong correlation between IND and MASC (r = .54).

Barry (2015) was unclear about why these regional differences would influence the IND-MASC relationship, but this intriguing finding can prompt new explorations into links between geography and cultural values. There are many possible explanations (e.g., pathogen prevalence, Fincher, Thornhill, Murray, & Schaller, 2008), but here we focus on climate. That is, regional proximity might indicate similar climates or climate demands, which influence the cultural values best suited to these environments, often in interaction with other factors such as affluence (Hofstede, 2001; Kashima & Kashima, 2003; Van de Vliert, 2007).

Pursuing these explanations of regional influences is predicated on the reliability and robustness of Barry's (2015) finding. However, when we looked deeper into Barry's (2015) analysis we identified very significant issues that we believe warrant a reappraisal of this central finding. These issues involve how countries were paired on regional proximity and the

grounds for excluding pairs. Additionally, we examine whether climate and climate demands can explain the influence of regional differences. The main issues are described below.

Regional proximity. Barry's (2015) principal criterion for pairing geographically proximal countries was sharing land borders, but this criterion was not consistently applied. Without listing every issue, some examples are:

a. Suriname was paired with Panama (which are separated by three countries in the shortest direction, including two in the sample), even though it shares a border with Brazil;
b. Turkey was paired with Israel with whom it does not share a border, even though it shares borders with three other countries in the sample (Greece, Bulgaria, Iran);
c. Malta was excluded on the basis of not having a nearby nation, even though it is proximal to Italy. Instead, Italy was paired with Greece (where there is no land border), even though Greece has land borders with other countries in the sample.

Barry (2015) noted that land borders were supplemented by other (unspecified) judgments about geographic proximity, and where proximity was similar other criteria such as population size or shared customs like religion were also used to form country pairs. However, how these criteria were applied was not described, and it is difficult to see how this accounts for pairings like Turkey and Israel that also differ in both population size and religion. Moreover, these additional criteria move away from geographical proximity that is central to Barry's (2015) conclusions. Hence, we think it is imperative to re-analyze this data using clearer decision rules for pairing countries based on regional proximity.

Order of countries in pairings. Barry (2015) asserted that the ordering of countries in pairs does not affect the correlation, as this only changes the sign of the difference (e.g., scores of +5 and +10 are -5 and -10 when reversed, preserving a consistent direction). However, this is correct *only* when the order of every country is reversed simultaneously. Changing the order of a single pairing or a subset of pairings can change correlations. To

illustrate using Barry's (2015) data, if the single pairing of Czech Republic-Slovakia was reversed, the correlation between IND and MASC increases from .54 to .56. While there is no objectively "correct" pairing order, it should follow a transparent decision rule to reduce researcher discretion in choosing orders as these choices influence correlation strength.

Inclusion/exclusion of countries. Barry (2015) excluded country pairs who had identical scores on one dimension, but there is no statistical or theoretical reason to do so. Countries identical on one dimension but different on the other provide real information about relationships between variables and need to be included. To illustrate, if one country pairing is identical on IND and +50 on MASC, and another country pairing is also identical on IND and -50 on MASC, this indicates that MASC varies widely and independently of IND.

Meaning of regional differences. Barry (2015) is unclear about what regional differences represent, but there is increasing interest in how climate and climatic demands (e.g., wide variations in temperature) influence a country's dominant challenges and stressors and their cultural responses, both directly and in conjunction with economic resources (Kashima & Kashima, 2003; Van de Vliert, 2007, 2013). Hence, in addition to controlling for regional proximity using borders, a deeper theoretical understanding of geographic effects on relationships between IND and MASC may be revealed through established indices of climate and climate demands. This also begins to test theoretical explanations of why Individualism and Masculinity may be related at a cultural level.

Addressing these issues

Our main point is that if Masculinity and Individualism are indeed related after controlling for regional proximity, this finding should be robust when clear and transparent criteria for pairing countries on regional proximity are used. Below we describe our approach and decision rules for re-analyzing the relationship between these dimensions.

Regional proximity. Because countries are irregularly shaped and sized, there is no

single objective measure of regional proximity. Barry's (2015) principal criterion for pairing countries was shared borders, so we adopted this approach using more systematic decision rules ("Longest border"). Additionally, we used the proximity of each country's capital as a second measure of regional proximity ("Capital Proximity"), as capitals are typically the cultural and population centers of a country. By using two approaches to regional proximity we aimed to reduce the possibility of idiosyncratic findings when a single index of proximity is used. The decision rules used to determine country pairings using each approach are below.

Longest border. Pairing rules were applied in this order:

1. If a country shares a land border with only one other country in the sample (or major sea border for island nations), pair those countries (e.g., Suriname-Brazil, New Zealand-Australia, Malta-Italy, Hong Kong-China; Canada-USA). Continue iteratively, pairing remaining countries that share a border with only one other country in the sample (e.g., Uruguay-Argentina, Pakistan-Iran), until there are no countries sharing just one border. This rule was used to minimize the number of countries excluded based on shared border.
2. All remaining countries share two or more borders. Start with the smallest country and pair it with the country with whom it shares its longest border (e.g. El Salvador-Guatemala rather than Mexico-Guatemala; Ecuador-Colombia rather than Venezuela-Colombia). This optimizes geographical proximity for at least the smallest country in the pair.

Capital proximity. The pairing rule was:

1. For countries sharing a border, pair those with the smallest distance between capitals. Continue iteratively until all countries with a shared border are paired.

We do not claim that these rules provide objectively valid or "true" pairings of countries. However, compared to Barry (2015) they provide more transparent decision rules, and reflect better measures of regional proximity as they are not confounded by cultural and religious factors. Moreover, using multiple pairing criteria enables stronger conclusions about

the robustness of relationships, with over 50% of pairs differing between these approaches.

Order of countries in pairings. Although the rule for ordering pairs is not meaningful in itself, it serves as a transparent criterion to remove researcher discretion. However, as any individual ordering criterion could produce anomalous findings, we obtained multiple orderings using three different criteria – country size (smallest first), latitude (most southern first), and climate demands (lowest first).

Inclusion/exclusion of countries. Like Barry (2015), we used Hofstede's country scores for IND and MASC, which are available for 69 countries (Hofstede et al., 2010; available at http://geerthofstede.com/research--vsm). However, we did not exclude countries with the same scores on one dimension, and we included Hong Kong, which although part of China is a region with its own scores on the Hofstede dimensions[2]. This resulted in 31 country pairs, leaving the following countries unpaired: Israel, Venezuela Vietnam, Mexico.

Meaning of regional differences. In addition to assessing geographic proximity through shared borders, we also assessed climatic explanations for potential geographic factors in two ways: we rank ordered countries on latitude (Kashima & Kashima, 2003) and combined adjacent pairs from most southerly to most northerly ("Latitude"); and rank-ordered countries on climatic demands (using scores from Van de Vliert, 2013) and combined adjacent pairs from least to most demanding climate ("Climate demands").

In sum, if pairing on regional proximity produces strong IND-MASC relationships as identified by Barry (2015), then this finding should be robust for other systematic pairings of regional proximity that avoid some of the shortcomings of the original analysis. Our analyses test this assertion, and consider dimensions that provide a more theoretically-grounded basis for potential geographic effects (latitude, climate demands).

Results

Several univariate outliers were identified in the datasets, which can create or mask

more general relationships. Hence, we report Pearson correlations to match Barry's (2015) analyses, and Spearman (rank-order) correlations which are less sensitive to outliers. Table 1 shows that correlations were positive in all but one analysis, but unlike Barry (2015) no correlations between IND and MASC were significant. This was the case whether countries were paired according to longest border or capital proximity, and no matter which rule was used to order country pairs. Further analyses pairing countries on latitude or climate demands also failed to yield significant correlations, both when pairs were formed purely on climate demands, and when these pairings were made within regions (the same continent).

A question remains about whether the lack of significance is a result of small samples in analysis. Taking the mean of the eleven Pearson correlations in Table 1 yields an average correlation of .186. For this correlation to be significant at $\alpha = .05$ requires 112 country pairs ($N = 224$ countries), exceeding the number of countries in the world. The average rank-order correlation was .155, which would require 322 countries to identify a reliable association. Of course, if data from the whole population of countries was obtained inferential statistics would not be required, but these correlations suggest that the shared variance between IND and MASC after controlling for regional differences is in the order of 2-4%, rather than the 30% suggested by Barry's (2015) analysis.

Discussion

These results confirm that regional differences are not responsible for the lack of relationship between individualism and masculinity dimensions at a cultural level. Using clearer decision rules for the pairing and ordering of countries to control for regional differences, we failed to replicate Barry's (2015) finding of a strong positive correlation between IND and MASC in any of our analyses. Controlling for potential climatic explanations for regional differences also failed to identify significant correlations. After addressing regional proximity in multiple ways and addressing shortcomings in the analytical

approach, Barry's (2015) strong correlation appears to be an anomaly.

We want to be clear that we are not claiming intentional mishandling of data in Barry's (2015) analyses. In fact, our ordering decision rule even resulted in a slight increase in the IND-MASC correlation using Barry's (2015) data, showing that the pairings he used were not selected to maximize correlations. However, the lack of clear decision rules for country pairings and ordering may have inadvertently led to identifying a significant, strong correlation between IND and MASC. We do believe that Barry (2015) erred in excluding pairs that had the same scores on one dimension, and in claiming that the order of pairs does not affect correlations. Our re-analysis serves as a reminder for researchers using country pairings that these factors do matter, and clear decision rules should be adopted and communicated to reduce the likelihood of spurious correlations.

If there is indeed a strong relationship between IND and MASC after controlling for regional proximity, it should be robust to situations where clearer decision rules for country pairing and ordering are applied. In applying these rules, we conclude that the vast weight of evidence suggests that individualism and "masculinity" are not correlated at a cultural level.

Endnotes

1. We place "masculinity" in quotes as we believe it is important to reiterate the problems with labeling cultures as "masculine" (or "feminine"). These labels support the continued application of gender stereotypes and roles (i.e., that men are competitive and women are communal) that change and are increasingly outdated (Twenge, 1997). We strongly endorse replacing "masculinity/femininity" with labels that more directly represent the basic underlying dimensions, often referred to as competence-warmth or agency-communion (Judd, James-Hawkins, Yzerbyt, & Kashima, 2005).

2. We use "country" to refer to these samples, but acknowledge that this is merely a term of convenience for Hong Kong.

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Table 1.

Correlations between IND and MASC dimensions for Barry' (2015) analysis, and for ten alternative approaches to control for regional proximity and orderings.

	Pearson	Spearman (rank-order)
Barry (2015) (n = 32)	.54, p = .001	.43, p = .014
"Longest Border" set (n = 32)		
Pairs ordered by country size	.15, p = .421	.04, p = .848
Pairs ordered by latitude	.24, p = .193	.16, p = .380
Pairs ordered by climate demands	.22, p = .226	.08, p = .659
"Capital Proximity" set (n = 28)		
Pairs ordered by country size	.17, p = .377	.20, p = .320
Pairs ordered by latitude	.21, p = .277	.24, p = .210
Pairs ordered by climate demands	.21, p = .292	.17, p = .400
Latitude (n = 34)		
Paired on rank only	.17, p = .339	.19, p = .274
Paired on rank within continent	.05, p = .794	.04, p = .833
Climate demands (n = 34)		
Paired on rank only	.19, p = .283	.23, p = .182
Paired on rank within continent	-.10, p = .587	-.08, p = .643