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WEIRD sampling in Cross-cultural psychology, should it not be less WEIRD and more representative?

The overrepresentation of individuals from Western Educated Industrialized and Democratic countries as sample populations in Cross-cultural psychology Research

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Table of Contents

Table of Contents.....	2
Abstract.....	4
Introduction.....	5
Universality in Psychology and the WEIRDness spectrum.	7
Scientific Accuracy in Psychology.	9
Cross-cultural psychology.	10
Method.....	13
Journal selection.	13
Procedure.	14
Results.....	16
Exploring the data.....	17
Krippendorff's alpha.....	18
Hypothesis testing.....	18
Impact factors.	20
Country representativeness mapping.	21
Discussion.....	26
Inclusiveness.....	27
Representativeness.....	28
Limitations.....	30

Recommended practice changes.....	31
Conclusion.	33
References.....	35

Abstract

Cross-cultural psychology is the branch of psychology that tests the universality of psychological principles across cultures and examines psychological processes varying in individuals across cultural situations. Through a review of the participants that took part in studies in 893 articles in 5 top-ranking journals in Cross-cultural psychology the aim of this study is to investigate if the participants used for Cross-cultural psychological research in 2015 and 2016, represent humanity effectively by representing individuals from the complete spectrum of cultures. The findings show a predominance of studies including individuals from WEIRD (Western, Educated, Industrialized, Rich, Democratic) cultures. Furthermore, the representation of the countries of the world is out of proportion, favouring individuals from WEIRD societies, which make up only 5.44% of the world's population. Overall, the results show that Cross-cultural psychology is not researching non-WEIRD participants in high enough numbers.

Introduction

To attain manhood and have the right to take a wife, the men of the Kaluli tribe in New Guinea have to ingest their elders' semen via their anus. The neighbouring tribe of the Etoro condemn the details of the Kaluli's ritual. Their belief is that for a young man to attain manhood, the boy must ingest the said semen through fellatio. As seemingly unusual as these practices are to some, Boy-inseminating practices of this kind are not unusual around the world, for example the Tokugawa Japanese, Ancient Greeks, Aboriginal Australians and Melanesian all took part in such rituals (Herdt, 1984). The practices of these populations are deemed unusual, by our standards and the Etoro's standards even though both stances on Boy-inseminating rituals are very different. We, as humans, tend to base our judgement of others' societal practices on our own society without looking at the bigger cultural picture (Henrich et al., 2010). To counteract such a bias in judgment, and evaluate cultural practices more effectively and scientifically, one should measure how usual the practice(s) in question are compared to the entirety of our species, instead of only compared to ones own (narrow) cultural standpoint (Henrich et al., 2010). These differences in Boy-inseminating practices are a good example of the human population's Psychology varying by geographic location via culture.

Historically, the field of anthropological science has been the one to observe, and study such seemingly "exotic" peoples and their practices. The interest of this paper will not be these exotic societies but W.E.I.R.D. populations. Western, Educated, Industrialized, Rich and Democratic populations that seem to saturate sample populations in psychological research (Henrich et al., 2010; Arnett, 2009). Psychology, as the previous anthropological example seems to be using one standpoint, that of WEIRD populations to make judgements on psychological behaviors and findings (Henrich et al., 2010). The science of psychology

has long advocated being a universal science of which the principles and findings are all-inclusive among the species and applicable to the whole of humanity regardless of temporal boundaries (Ho & Wu, 2001, Rozin 2006). The field of Cross-cultural psychology was thus created parallel to Psychology to study the psychological processes which vary in cultural situations as well as to investigate how general psychological principles are, in effect (Ho & Wu, 2001), as to avoid such judgements based on narrow points of view, which would avoid an overuse of WEIRD sample populations. The question asked here is how well Cross-cultural psychology is doing in reporting these psychological processes that vary in cultural situations and in its investigation of the generality of psychological principles.

This question was addressed via the country from which participants used in research published in 5 high rankings journals in Cross-cultural psychology during the years of 2015 and 2016 were from. Much research into WEIRD sample populations has looked at Psychology in general and found a saturation of WEIRD cultures in the literature (Henrich et al., 2010; Arnett, 2009). This paper, by investigating Cross-cultural psychology aims to explore the field of psychology that was created to study how universal the psychological principles in psychology are (Ho & Wu, 2001). The fact that there is a saturation of WEIRD participants makes logical sense as they are the easiest population to study as researchers are mostly from WEIRD Universities (Arnett, 2009). However, in Cross-cultural psychology, specifically, the aim is to compare cultures and one should expect to find more countries being represented and contrasted against one another (Ho & Wu, 2001). These WEIRD societies have to be present in Cross-cultural literature, as to compare to other cultures you have to start with previous findings that were, as Arnett (2009), Henrich (2010) and Sue (1999) showed, mostly based on WEIRD populations. However these WEIRD populations should not saturate Cross-cultural literature as that would imply that cultural differences in

psychological processes are not being studied across humanity as much as the cultural differences between WEIRD countries are being studied. Thus being, many different cultures should be found in number of countries and individuals.

Universality in Psychology and the WEIRDness spectrum.

Such a saturation of WEIRD participants in Cross-cultural psychology would be problematic considering psychological processes are not always universal. The notion of universality in psychology is extrapolated to two related presumptions based on one fact: the biology of the human brain does not differ between humans (Chi, Dooling & Gilles; 1997). Two assumptions are as follows: the first being that the nationality of subjects used for research does not influence results as most psychological research is valid for the whole of humankind; and the second that there is little to no variation between participants of different countries when it comes to psychological observations (Henrich et al., 2010; Rozin, 2006; Arnett, 2009). Due to these presumptions, most journal publishings in the social sciences use the sample easiest in access to them: individuals from WEIRD societies, and from this population inductions are made that are meant to represent the human species as a whole (Henrich et al., 2010). Our intuition dictates us to assume, that research on "fundamental" psychological processes such as, for example social, emotional and cognitive functioning, is identical for the human species, regardless of the country of origin of participants (Henrich et al., 2010; Arnett, 2009; Rozin, 2006); one can assume that most people would a priori agree on this, based on intuition. Visual perception, for example is considered a low level, basic function, the universality of which seems undeniable (Henrich et al. 2010; Segall, Campbell & Herskovits, 1966). However, research has revealed that not all low level Psychological functions are universally human. Research published in 1966 by Segall, Campbell and Herskovits compared the United-States and 14 non-western societies' perceptions of one of

the most well known optical illusions: the Müller-Lyer, illusion. The Müller-Lyer illusion is an optical illusion including three stylized arrows presented together, all three with the same length “shaft”, the first arrow has fins at both ends facing outwards which creates an arrow with two heads. The second has both fins facing inwards, and the last has a fin facing outward and the other facing inward creating an arrow with a head and a tail. The illusion is as such, subjects that are shown these three arrows and asked to place the middle of the shaft on each of them, both on the second and third arrows the middle point is placed more towards the tail end, to the right. A variation of the same illusion is that some seem to view the second and third shafts as being longer than that of the arrow with two heads. When one compares results of this optical illusion in 14 non-western societies and the United States, results show substantial variation between societies and more importantly, America is at the extreme end of the distribution. This means that when it comes to this optical illusion there is not only variation between countries but that when it comes to these variations, that the USA is at the extreme end of this distribution (Henrich et al., 2010; Segall, Campbell & Herskovits, 1966). The USA being at the extreme end of variations is not unique, it has often been observed as with the Müller-Lyer experiment that the USA finds itself at the end of a distribution when compared to other countries or even as an outlier within the outlying category of WEIRD countries (Henrich et al., 2010; Arnett, 2009). Low level psychological functions such as visual perception, spatial reasoning, categorization, the heritability of IQ, and inferential induction amongst others can and do differ between cultures as Henrich et al., illustrated in their 2010 article. Research seems to show that when cultures do differ on psychological findings, these cultures differ so much that they are all found along a spectrum ((Henrich et al., 2010; Segall, Campbell & Herskovits, 1966). Countries at the high end of the spectrum have been observed as being WEIRD and for clarity we will call the rest, and majority of the

spectrum, non-WEIRD, however it is not to be forgotten that WEIRDness is on a spectrum and that WEIRD non-WEIRD has been defined to aid in analysis and is not a real separation. A tool that is in beta testing has been created to visually map out these cultural differences and scale WEIRDness (Muthukrishna et al., in prep), with this tool the researchers, in the present study, defined a cutting point to WEIRD and non-WEIRD based on cultural differences visualized by Muthukrishna et al (in prep). A scale of cultural difference having been established means that relying in majority on American participants for research in psychology, researchers would seem to be going above the issue of inclusiveness. Psychology has shown that differences between cultures on Psychological processes, that were assumed not to differ between cultures, do indeed exist and can be subsequent enough, as in the case of the Müller-Lyer illusion, that WEIRD societies seem to be outliers in the population of humanity (Henrich et al., 2010; Arnett, 2009). This being said, generalizing from WEIRD societies seems, in the cases where the assumption of universality does not hold, to be invalid as well as a risky scientific oversight (Henrich et al., 2010; Arnett, 2009).

Scientific Accuracy in Psychology.

To counter scientific oversight and for the discipline of psychology to confidently claim that their findings are indeed valid for the human species, science dictates that the results need to be cross referenced with the same research across different populations (Arnett, 2009). Some researchers back up their claim of universality among the human species, using Cross-cultural comparison (Medin & Atran, 2004; Rozin 2001). However this is not the case for the majority of researchers (Henrich et al., 2010; Arnett, 2009). Which means that conclusions in psychological literature are mostly derived from a fraction of the population, namely the United States which counts 5% of the world's population today (Arnett, 2009). It has been stated that, a majority of the research in the field of psychology

has been derived from 5% of the global population and is said to represent the other 95% of the world without scientific basis to this generalization, solely based on intuition (Arnett, 2009). This is problematic when it comes to the scientific accuracy of the field of psychology and only adds to the internal criticism of the field's scientific status. This in a discipline that already has a long-lasting Public Relations problem, when it comes to the public perception of psychology as being a science (Lilienfeld, 2011). As early as the mid-19th-century Auguste Comte, the forefather of sociology who was defining a theory of science, completely disregarded and omitted psychology on his list of the hierarchy of sciences (Coon, 1992). More recently, Lilienfeld (2011), describes a field of psychology that is faced with public skepticism; with the collective opinion being that not only findings in the field but psychology's scientific status are scientifically dubious.

Cross-cultural psychology.

An important question to consider to gain more insight into this scientific oversight, and hopefully help to turn public skepticism surrounding psychology around; is to see whether or not there is a difference in the very category of psychology that by definition strives to study both the differences and similarities between cultures by comparing the psychology of different cultures: Cross-cultural psychology (Ho & Wu, 2001). Due to the very nature of Cross-cultural psychology one would expect to find a variety of cultures studied in the journals of the field. This research into the participants chosen for Cross-cultural psychology research could either alleviate pressure on the field of psychology, if the participants used are found to come from all parts of the world. Or on the other hand if a predominance for WEIRD cultures used as participants is observed it would solidify the fact that a propensity to study WEIRD populations is well and truly present in all areas of psychology. The procedure of the present paper is based on past research by authors who

have published similar studies by investigating high impact journals as to discern trends in other fields such as Robins, Gosling, & Craik (1999) who looked into four branches of psychology; Graham (1992), who focused on African-American participants & McLoyd and Randolph (1985) that looked into the representation of African-American children. Numerous other researchers have looked at the global representation of journals through the first authors' country of origin. May (1997) looked into a database of over 4000 journals over 14 years, from 1981 to 1994 and found that a grand total of 70% of research in psychology was from the United States, his results also state that 14 WEIRD countries wrote 80% of the world's scientific papers. Looking at the years of 1975, 1980, 1985, 1990 and 1994, Bauserman (1997) found an overwhelming presence of American authors throughout the years, however the trend of the presence of American 1st authors declined 16% from the first year of observation, 1975, to the last, 1994. Similar percentages were mirrored in Adair, Coelho and Luna's 2002 research into the years of 1990, 1994 and 1998 with 55% of first authors' countries being from the United States in 1998. A more recent study in 2008 by Arnett, including the articles of 6 top tier APA journals from 2003 to 2007 show a presence of 73% of American first authors and 68% of participants used in the studies being from the United States.

Similarly to the second part of Arnett's study, that looked into the nationality of the participants in high impact journals, this study will look into the participants used for research in five high impact journals in Cross-cultural psychology during the years of 2015 and 2016. The two main questions this study aims to answer are: "Was there a WEIRD predominance in the participants used for research on Cross-cultural studies in psychology in 2015-2016?" and "Were the countries of the world proportionally represented in 2015-2016's Cross-cultural studies in psychology?". By reviewing articles published in relevant high-

ranking journals in Cross-cultural psychology in 2015-2016 the aim is to see if the field-wide predisposition of selection of WEIRD participants is present in the subcategory of Cross-cultural psychology as it has been found in the field of psychology in general, or not. Cross-cultural psychology should be the subcategory in the field with the least prevalence of a WEIRD overrepresentation and hopefully could bring a positive conclusion to at least some extent to the scientific validity of worldwide generalization of psychological research. The reason for this research is thus to observe and describe the WEIRDness of participants in Cross-cultural psychology to see if research is done into countries along the whole WEIRDness spectrum to assure the universality of findings in psychology.

H1: I hypothesize, following the aforementioned studies, that there will be more WEIRD participants used in studies in Cross-cultural psychology in 2015-2016, not only in actual number of participants but in the number of studies they are included in as well.

H2: Furthermore, I hypothesize that analogously to May's findings published in 1997 that the WEIRD participants used for research in Cross-cultural psychology in 2015-2016 will consist of at least 70% Americans, if not more, making American participants more over-represented than between 1981-1984.

H3: I predict, following the same study that there will not be a change in the WEIRD countries whose participants are used in studies the most, in sum, my opinion is that the G7 countries, the world's seven largest economies, will be in the top 10 WEIRD countries, mirroring May's 1997 findings on the global trend in participants used in science.

H4: Finally I hypothesize that mapping the data will show some journals representing the world population better than others.

H4a: I hypothesize, based on Arnett's findings in 2008 that, the impact factor the journal has will not influence how inclusive of the world population the journal will be, that across journals one will find the same proportion of inclusiveness.

H4b: Mapping the data of all five journals will show, in my opinion an overrepresentation of North America and Europe and a net underrepresentation of the other continents in psychological data such as previous studies have shown (Arnett, 2009; Henrich et al., 2010).

Method

Journal selection.

The focus of this study is to evaluate if research is done into countries from the whole WEIRDness spectrum. In addition, as to assure the universality in findings in Psychology, the WEIRDness of participants in Cross-cultural psychology needs to be researched and described. The present study is an analysis of the populations investigated in publishings in five high impact journals in Cross-cultural psychology as to evaluate the field, while keeping in mind the already studied penchant for WEIRD participants in psychological research. The subfield of psychology that this analysis is directed to is Cross-cultural psychology due to it being the domain of psychology that a priori should be the least impacted by an overrepresentation of subjects from weird cultures as the very purpose of the field is to study behavior that varies due to cultural differences. The journals to be coded and analyzed were selected, based on the available 2015 ranking, impact factors and journal content. The content of these journals in the Cross-cultural field were looked at in order based on their numerical ranking and impact factor and selected after review of their content. If the majority of articles in the journal were theoretical the journal was set aside and the next on the list was reviewed.

Five journals were chosen : *Cross-Cultural Management - An International Journal* (Cross-Cultural and Strategic Management in 2016), *Cross-Cultural Research*, *Cultural Diversity and Ethnic Minority Psychology*, *International Journal of Intercultural Relations*, *Journal of Cross-Cultural Psychology*.

Procedure.

In total 893 articles from five journals published in 2015 and 2016 were coded by three coders, firstly on relevance. To be relevant, the published article in the journal had to have human participants, could not be a pilot study or reuse participants of a previously published study. If the article was deemed irrelevant the reason for its irrelevance was coded. When found relevant the article was coded by discipline in Psychology, then the initial or aimed N that the researchers planned on studying and the final N the researchers analyzed were coded and any discrepancies between the two of over 10% were noted. Each study in the relevant papers was coded separately for the type of sample, the number of participants, their country of residence and nationality if different from country of residence, proportion of females and finally age mean and standard deviation as well as the top and bottom of the age range were coded. The types of samples were, *Student Sample*, *Inbound Crowdsourced sample* (e.g. M-Turk), *Outbound Crowdsourced representative of population sample*, *Working adults*, *Other Adult Sample*, *Younger than 18*, *Ethnic minority*, *Unspecified*, *Other*. Country of residence and nationality were encoded following the ISO 3166-2 Alpha-3 country codes. Later the countries are placed in a WEIRD or not WEIRD category for interpretation of analyses. This category was defined thanks to Muthukrishna's web-based tool in beta testing that uses the world values survey to create a scale of WEIRDness that the researchers were very graciously allowed to use. Muthukrishna coded cultural information for all countries with available surveys on 34 dimensions contained in the world values survey from 1981 to

2004. The online tool measures cultural distance through these dimensions that are categorized in larger groups being *Political*, *Group Membership*, *Beliefs*, *Social Relations*, *Financial*, *Sexuality*, *Law* and *Miscellaneous*. The tool then produces a visualization of the distance between the countries one selects (Muthukrishna et al., in prep). Seeing as the tool is a scale of WEIRDness the researchers in this paper, decided on a cutting point at which one side would represent the WEIRD country category and the other which would be the non-WEIRD country category. Based on a tree created by the tool using the countries that were coded in the database this separation between WEIRD and non-WEIRD could be defined through an observed difference in the cultures shown by a different branch of the tree. Studies where the country that the participants were from was unknown was coded as non-WEIRD rather than WEIRD as non-WEIRD participants constitute most of the world's population. The *Mixed* and *Unknown* studies could not be included in the mapping but were used for all other analyses.

The proportion of females was coded to three decimal points, age means and standard deviations were coded to two decimal points. Missing values were coded as "999". Studies that had populations from multiple different countries were coded separately in the adjacent sample cell and highlighted in the same colour to make clear that they are different populations in the same study instead of a different sample. Finally, inter-rater reliability was calculated during data analysis with SPSS. Krippendorff's alpha was selected as it calculates the agreement the coders have between each other, fits itself to sample sizes and can be used with missing data (Hayes & Krippendorff, 2007). The statistic generated by Krippendorff's alpha can be compared amongst coders regardless of: the number of coders, values, different units of measure and unequal sample sizes. Krippendorff's alpha was calculated for the variables: *Relevance*, *Country*, *Initial N* and *Actual N*. The result of this statistic the alpha (α)

is reported in the results below. Before analyses are run, the proportion of the human population that each country represents is coded per country to be used in representativeness mapping.

The first analyses described the amount of WEIRD participants used and compares it to that of non-WEIRD participants, the next was the number of studies that used WEIRD participants vs. non-WEIRD, both were calculated using one-way analyses of variance to answer H1 through comparisons of means. The country of origin of the WEIRD and non-WEIRD samples were then looked at and ranked by the number of individuals used using multi-level one-way analyses of variance to answer H2 & H3 where comparisons of means were also used to generate the rankings and number of individuals used. H4a is calculated with a χ^2 test to see if the journals had significantly different proportions of inclusiveness. The percentage of individuals used per country is calculated per journal as well as for all journals then compared to the percentage that their country represents of the human population in 2016. This comparison is the proportion of representativeness. The Log10 transformation of this proportion is then used for graphical mappings of the proportion of representativeness of each country per journal used to answer H4b. This is repeated for each journal then all 5 journals together to see if any journals are representing the world population better than others and globally to see how well represented the world's population is in Cross-cultural research in psychology.

Results

Considering χ^2 testing was not possible on number of participants due to the large number (3407075); it was used only on the number of times a country was studied.

To present the results consistently and for clarity reasons representativeness mapping was generated with the Log10 transformation of representativeness on all six maps, the level of representation was then added to the labels.

Exploring the data.

Before answering Hypotheses the data was observed through bar charts to have a preliminary observation of the data. Image 1 represents the number of individuals coded per country categorized into a WEIRD vs. non-WEIRD category. The two categories are broken down into the major contributors of the data. The WEIRD data is mostly comprised of participants from the USA. The non-WEIRD is mostly comprised of “*non-WEIRD M*”. This coding was used for participants from countries that could not be coded separately and comprised of a mix of non-WEIRD countries.

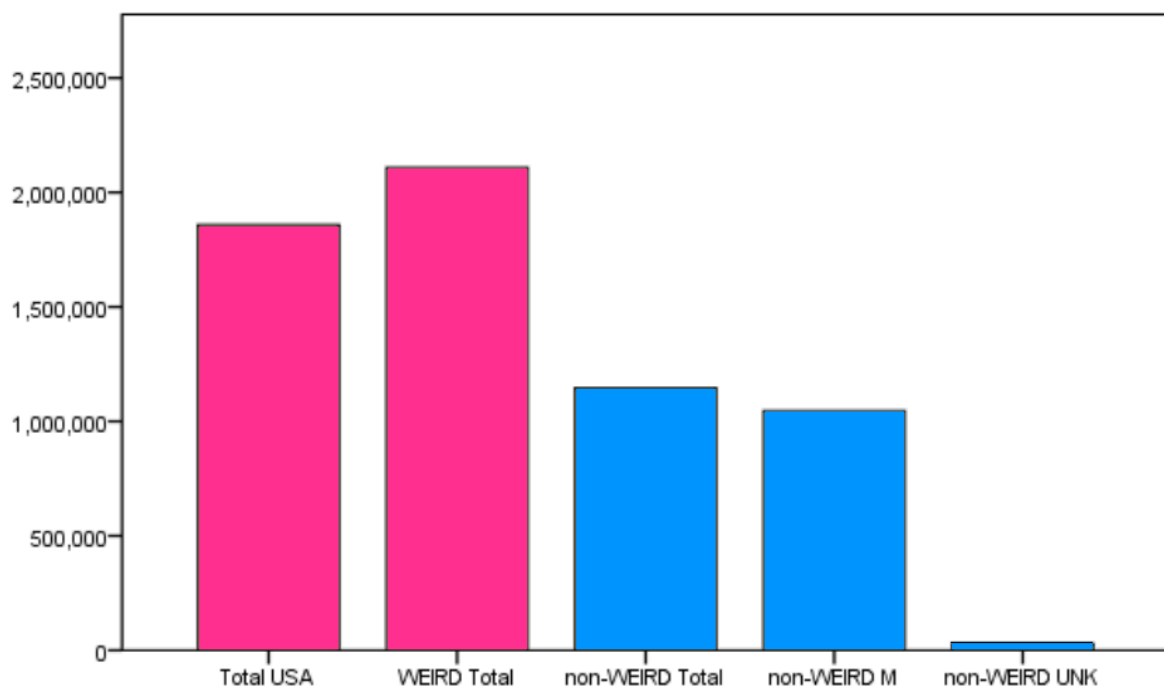


Image 1. *Preliminary exploration of data per numbers of individuals studied*

Krippendorff's alpha.

The results show that the inter-rater reliability was high ($\alpha = .946$) meaning that the three coders agreed with each other significantly.

Hypothesis testing.

The first step of analysis involved exploring the WEIRDness of the data. The percentage of numbers of participants and sample populations were compared for WEIRD and non-WEIRD subjects to answer the first hypothesis.

Table 1. *WEIRD tendencies*

	Number of sample populations (%)	Number of participants (%)	Number of different countries (%)	Percentage of World Population
WEIRD	430 (64.6)	2107717 (96.7)	18 (13)	10.017
Non-WEIRD	236 (35.4)	71324 (3.3)	120 (87)	65.995
Total	666	2179041	138	76.008

Results regarding the WEIRD tendency of the database can be found in Table 1. Studies using WEIRD participants as well as the number of WEIRD participants dominate Cross-cultural psychology journals with 64.6% of samples being WEIRD and 96.7% of participants being WEIRD. 13.04% of the countries looked into by all journals during 2015 and 2016 in Cross-cultural psychology were WEIRD and comprised of 10.017% of the world population. A goodness of fit χ^2 test was run to test for minor majority (51%) of WEIRD samples. The test was significant and indicated that WEIRD participants are found in a significantly higher number of studies ($\chi^2 (1, N=666) = 49.037 p < .001$).

Table 2. *Top 10 WEIRD countries ranked by number of participants*

	Number of sample populations	Total sample populations (%)	Number of participants	Total number of participants (%)
United States of America	220	33.03	1857311	85.235
New Zealand	11	1.65	25889	1.188
Netherlands	29	4.35	18084	.830
Canada	28	4.20	14381	.660
Germany	34	5.11	10096	.463
Belgium	9	1.35	5572	.256
Israel	24	3.60	2760	.127
Australia	18	2.70	2029	.093
Great Britain	12	1.80	1851	.085
Finland	9	1.35	1801	.083
Total	394	59.14	1939774	89.02

Table 3. *Top 10 non-WEIRD countries ranked by number of participants*

	Number of sample populations	Total sample populations (%)	Number of participants	Total number of participants (%)
China	58	8.71	21752	.998
Hong Kong	18	2.7	6190	.284
Korea	20	3.00	5479	.251
India	19	2.85	4595	.211
Spain	10	1.50	4367	.200
Taiwan	9	1.35	3612	.166
Zambia	1	.15	2711	.124
Malaysia	5	.75	2323	.107
Turkey	11	1.65	1989	.091
Russia	8	1.2	1972	.090
Total	159	23.86	54990	2.522

The top 10 WEIRD countries ranked by number of sample population show that American participants were overrepresented in percentage of the total sample population (33.03%) as well as the total number of participants (85.235%). Two WEIRD G7 countries were not among the top 10 highest number of WEIRD participants, France and Italy. France missed the ranking by 3 positions, ranking in at number 13 with 6 sample populations which made up 0.9% of the total sample populations, 619 participants which made up of 0.028% of the whole number of participants. Italy was ranked 11, with 10 participants making it comprise of 1.5% of the total sample populations and 1505 individuals being .069% of the total number of participants. The last G7 country, Japan is ranked as the 16th non-WEIRD country ranked by number of participants comprising of 1.35% of the total sample population and .051% of the total number of participants.

Impact factors.

In Table 4 each journal was ranked by impact factor. The journal with the highest mean impact factor accounted for the least number of countries studied which means that 66.67% of the countries that *Cultural Diversity & Ethnic Minority Psychology* looked into comprised of 6.55% of the world population. The journal with the lowest mean impact factor (.828), *Cross-cultural Research*, studied 27 countries, 6 of which were WEIRD (22.2%) and made up of 7.67% of the world's population.

A χ^2 test showed a significant association between WEIRD vs. non-WEIRD and Journals ($\chi^2(4, N=666) = 123.75, p < .001$). Meaning that the proportion of WEIRD and non-WEIRD studies was not equal across journals. Further χ^2 tests were insignificant when comparing the percentage of the world population studied and Journals ($\chi^2(16, N= 5) = 20.00, p = .220$). Indicating that inclusiveness did not differ statistically across journals.

Table 4. *Countries studied per journal ranked by impact factor*

Journal	Number of countries	Number of WEIRD countries (%)	Number of WEIRD participants (%)	% World population studied WEIRD	% World population studied total	Mean Impact factor 2015-2016
Cultural Diversity & Ethnic Minority Psychology	12	8 (66.67)	1846185 (99.91)	6.55	26.41	1.915
Journal of Cross-cultural psychology	42	14 (33.33)	81520 (69.29)	9.69	59.68	1.726
International Journal of Intercultural Relations	38	18 (47.37)	66802 (80.16)	10.02	67.89	1.073
Cross-cultural management - an international journal	19	6 (31.58)	3686 (33.88)	6.55	50.27	.929
Cross-cultural Research	27	6 (22.22)	109524 (91.78)	7.67	51.62	.828

Country representativeness mapping.

Each map shows, the proportion of representativeness of each country per journal based on the percentage of individuals studied each country comprises of and the percentage of the world's population that each country represents. Countries that were coded as being Mixed Western, Mixed non-Western as well as Unknown and Mixed were not included in the analyses for the mapping as mapping them was impossible as no specific country was defined. These proportions of representativeness are based on the percentage of total individuals used in the study per country, and the percentage of the world population that the country that the country represents. Therefore, a small number of individuals from a country

that contains a small amount of the world population can very easily be over represented by the journals.

Image 2 is the representativeness of Cross-Cultural Management - An International Journal (Cross-Cultural and Strategic Management in 2016). This journal looked into nineteen separate countries during 2015 and 2016. Six were WEIRD (31.58%). No countries were proportionally represented. 18 countries were under represented (94.74%) and 1 was over represented (5.26%). 33.34% of under represented countries were WEIRD. No over represented countries were WEIRD. With Jamaica being grossly overrepresented (1.73 times over represented) with 2 studies and 1357 individuals.

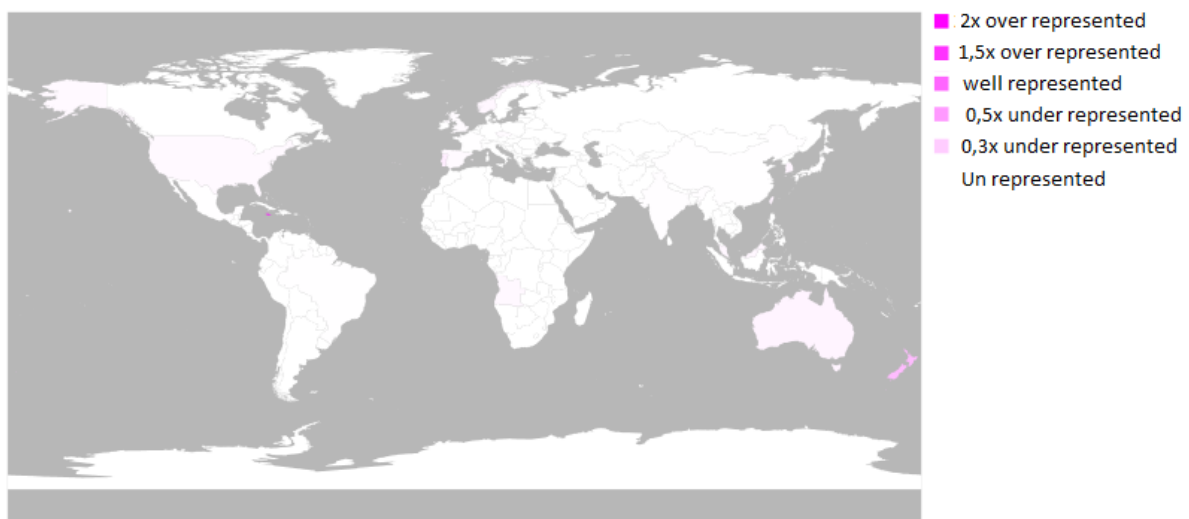


Image 2. *Mapping of country representativeness for Cross-Cultural Management - An International Journal*

Image 3 represents the representativeness of *Cross-cultural Research*. This journal looked into 27 separate countries during 2015 and 2016. Six were WEIRD (22.22%). Great Britain and Turkey were the most proportionally represented. Two countries were under represented (7.40%) and 23 were over represented (85.19%). No under represented countries were WEIRD. 26.09% of over represented countries were WEIRD. With Georgia being grossly overrepresented (73 times over represented) with 1 study and 436 individuals.

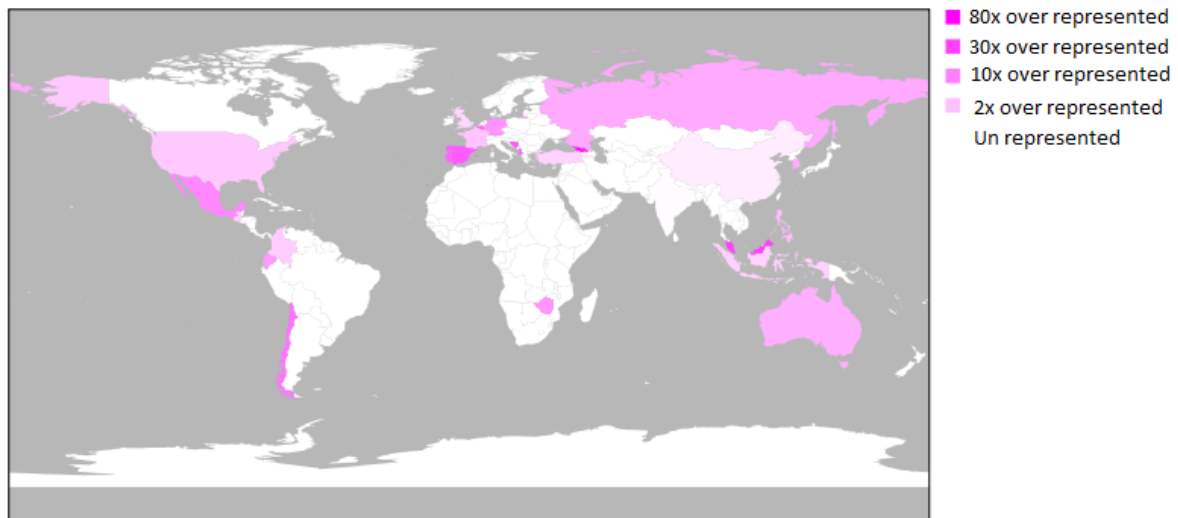


Image 3. *Mapping of country representativeness for Cross-cultural Research*

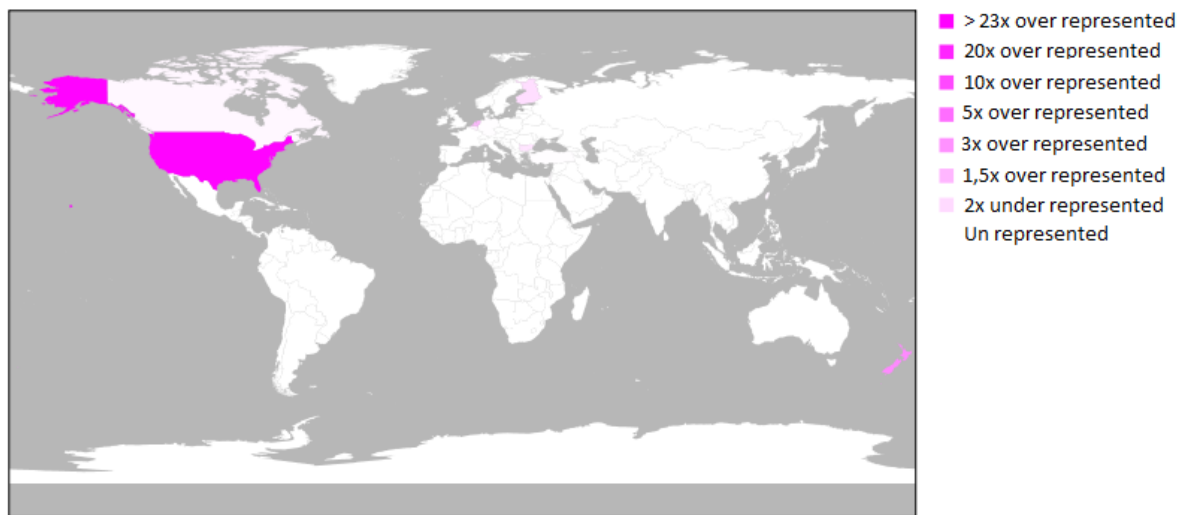


Image 4. *Mapping of country representativeness for Cultural Diversity & Ethnic Minority Psychology*

Image 4 represents the representativeness for *Cultural Diversity & Ethnic Minority Psychology*. This journal looked into 12 separate countries during 2015 and 2016 eight were WEIRD (66.67%). The Netherlands was the most proportionally represented. 9 countries were under represented (75%) and 2 were over represented (16.67%) 55.55% of under represented countries were WEIRD 100% of over represented countries were WEIRD. With the United States of America being grossly overrepresented (22.90 times over represented) with 131 studies and 1832959 individuals.

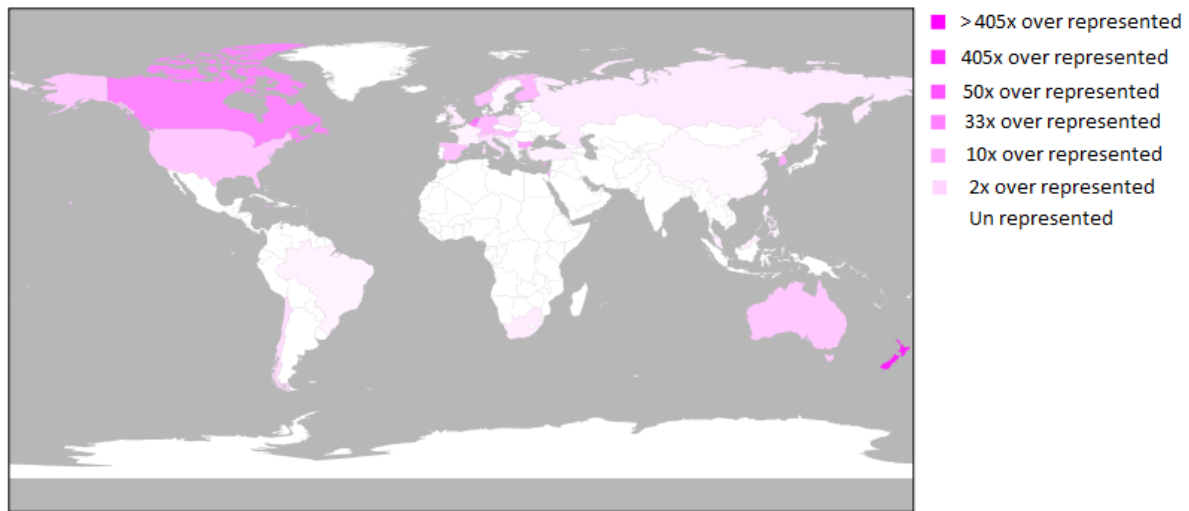


Image 5. *Mapping of country representativeness for International Journal of Intercultural Relations*

Image 5 is the representativeness per country for *International Journal of Intercultural Relations*. This journal looked into 38 separate countries during 2015 and 2016. Eighteen were WEIRD (47.37%). Poland was the most proportionally represented (Proportion of 1.04). 14 countries were under represented (36.84%) and 23 were over represented (60.53%). 35.71% of under represented countries were WEIRD. 56.52% of over represented countries were WEIRD. With New Zealand being grossly overrepresented (404.56 times over represented) with 2 studies and 20998 individuals.

Image 6 shows the representativeness of *Journal of Cross-Cultural Psychology*. This journal studied 42 separate countries during 2015 and 2016. 14 were WEIRD (33.33%). Saudi Arabia was the most proportionally represented (Proportion 1.26). 17 countries were under represented (40.48%) and 24 were over represented (57.14%). 5.88% of under represented countries were WEIRD. 54.17% of over represented countries were WEIRD.

With Hong Kong being grossly overrepresented (91.77 times over represented) with 15 studies and 5629 individuals.

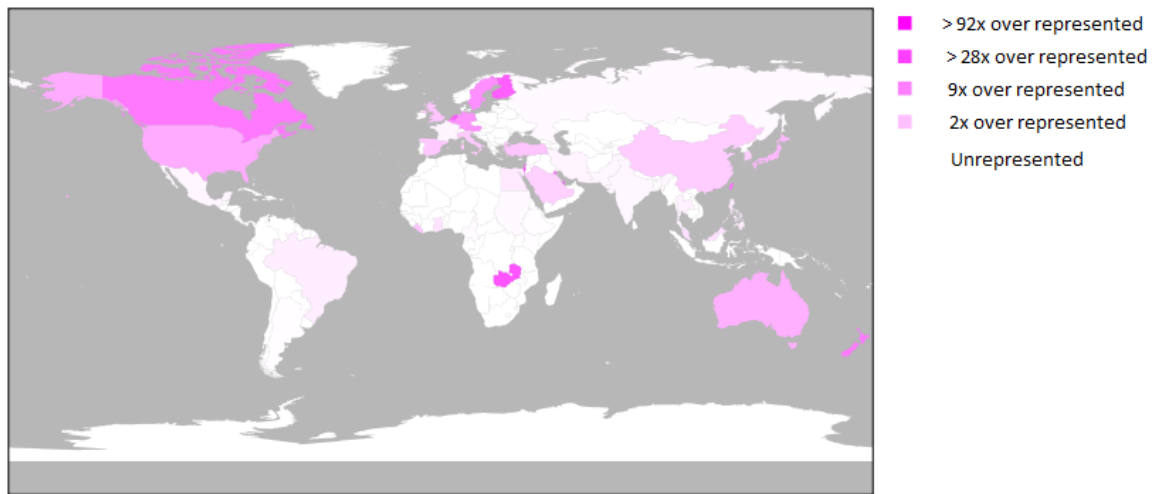


Image 6. *Mapping of country representativeness for Journal of Cross-Cultural Psychology*

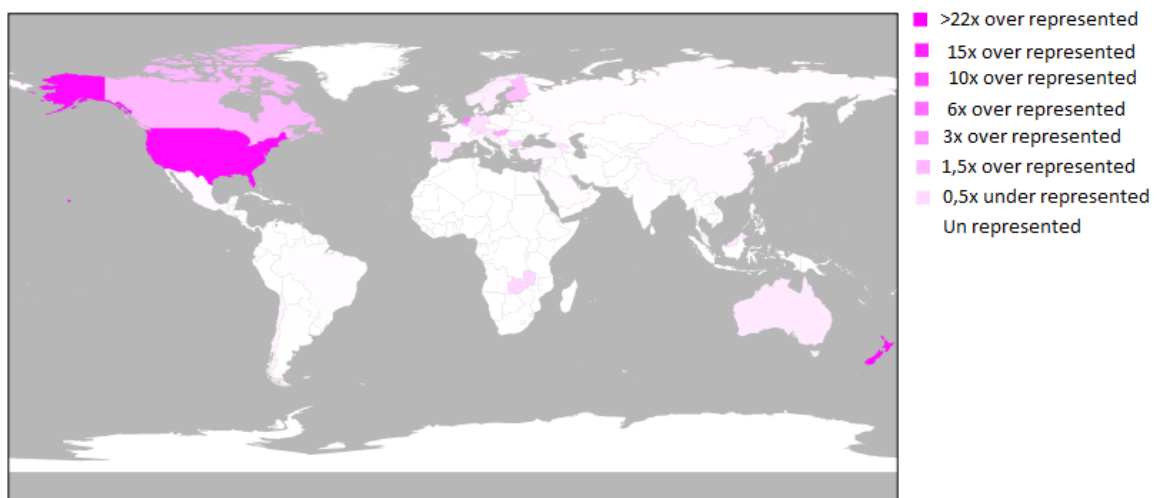


Image 7. *Mapping of country representativeness for all journals*

Image 7 compiles the data and representativeness for all 5 journals. In total, the journals looked into 66 separate countries during 2015 and 2016. 18 were WEIRD (27.27%). Israel was the most proportionally represented (Proportion 1.18). 56 countries were under represented (84.84%) and 9 were over represented (13.63%). 19.64% of under represented countries were WEIRD. 77.78% of over represented countries were WEIRD. With The

United States of America being grossly overrepresented (21.29 times over represented) with 220 studies and 1857311 individuals.

Discussion

As the universality of findings is of utmost importance in psychology, studies that shed light upon differences due to culture in fundamental psychological processes have engendered research into participants used for psychological research. The results of this research displayed a great majority of participants being from countries with a WEIRD culture prompting important questions surrounding the universality of findings in Psychology. Yet, to date investigative research into participants had failed to look into Cross-cultural psychology, the very branch that by definition tests the universality of findings in Psychology and describes psychological processes that vary in cultural situations. This state of affairs was problematic as the current alarm caused by the lack of diversity in participants used in psychology is not necessarily warranted. Indeed, if Cross-cultural psychology is functional, thus compensating for this lack of diversity and testing the universality of findings on individuals from an array of different cultures, then previous reactions, absent of sufficient proof, would be an overreaction. Accordingly, this study has a key contribution to the state of affairs. In this study, individuals used for research in Cross-cultural psychology were separated per country and mapped according to how much of the research they accounted for and how much of the world population their country consists of, thus mapping representativeness. To our knowledge nor Cross-cultural psychology, nor representativeness per country has ever been researched with regards to WEIRD societies. The results mirror findings in the general field of Psychology (Arnett, 2009; May, 1997), and move the WEIRD

discussion forward by highlighting the same WEIRD sampling tendency in the very branch that is meant to counteract this WEIRD sampling oversight in psychology.

Inclusiveness.

The findings showed inclusiveness issues. The variation in country of participants used in Cross-cultural psychology was minimal. The overall lack of variation in country of participants examined implies that Cross-cultural psychology could be doing a better job of comparing different cultures. Is the research really Cross-cultural if the most people that are studied come from one extreme end of the cultural spectrum and only represent 10% of the global population?

Accordingly, participants are, in majority, WEIRD. This inclination to study in majority WEIRD participants skews the data when the psychological processes studied, do differ between cultures, to only be valid for WEIRD societies. This overrepresentation of WEIRD participants exhibits the fact that Cross-cultural psychology is not doing a good job describing the cultural differences at the non-WEIRD end of the spectrum, which contains most of the world's population. Populations that would, arguably, benefit the most from psychological research.

When one moves past this, for the most part WEIRD inclusion, and looks at the non-WEIRD participants, the findings uncovered that these participants were mainly from the same countries. The non-WEIRD participants are in majority from China, the rest of the non-WEIRD world not being studied in high enough numbers or at all. In addition, the non-WEIRD countries that were studied were principally rich societies. This means that these countries that were studied are placed as close as non-WEIRD countries get, to the WEIRD end of the scale, on the WEIRDness spectrum. In sum, when studies are conducted on non-WEIRD participants they were mostly conducted on participants that were close to the

WEIRD end of the cultural scale. There is a clear need to move away from the WEIRD end of the spectrum and dive into the non-WEIRD societies that are the most different, when compared to WEIRD societies.

The continent that stood out as far as inclusiveness is concerned is Africa. Participants from the African continent are for the most part, inexistent in Cross-cultural psychological research. Africans represent a significant amount of the WEIRDness spectrum and find themselves on the opposite end of the WEIRDness spectrum. They are not being studied which means that conclusions in Cross-cultural psychology are not being examined at the non-WEIRD end of the WEIRDness spectrum or between both ends of the spectrum.

In general, participants are from richer countries this could be because the richer countries have the resources to do more research and are choosing their participants in geographic proximity. However this reasoning is too superficial as the USA does not have the highest GDP and not all countries with high GDP's are represented in Cross-cultural psychology. Furthermore, even though the most researchers have been proven to be from The United States of America, and most research funds are found in Universities there (Arnett, 2009), the Cross-cultural research that they are deciding to investigate is cultural variations within their country regardless of the fact that Americans live in a substantially different culture than the rest and majority of the world. This oversight in inclusiveness needs more research to be fully explained.

Representativeness.

Not only was the inclusiveness insufficient, but certain countries were systematically overrepresented in the results. The unhypothesized overrepresented WEIRD country was New Zealand. New Zealand's over representativeness overall can be explained by the very small percentage of the world's population that are from the country. Seeing how this

percentage is so small, one would not need so many participants and studies for New Zealanders to be overrepresented. These studies published in Cross-cultural journals that pertain to New Zealanders are essentially between the different tribes on the island of New Zealand and urbanized New Zealand. This research is indeed cross cultural but looks at a very limited and precise scope of cultures and is very similar to how participants from the United States are investigated in Cross-cultural research.

In relation, the country that was expected to be overrepresented was the United States of America. It makes sense that there are a lot of American participants as most research that Cross-cultural psychology has to compare between cultures would emanate from research on Americans. However, such an overrepresentation of Americans goes over and beyond being the main country that Cross-cultural psychology is comparing cultures from. As previously stated the research that investigates American participants in Cross-cultural psychology is mainly between Americans. Notably a study that is included in analyses in this paper included 1,7 million American participants. These participants were contrasted between each other based on their ethnic background and their inclination to study certain fields in University was measured. This study is a good example of how the number of American participants is so much higher than that of the rest of the world in Cross-cultural research as well as the extremely narrow cultural nature of this research. There is a need for American researchers to use funds in cross-cultural psychological research to investigate and compare cultures that are highly different to Americans. This does not mean that American participants should disappear from cross-cultural psychological research but be better used. A possibility would be to utilize American participants as one end of the spectrum, to compare more of the other side of the spectrum with. Rather than being the only part of the spectrum, the variations of which are measured.

Limitations.

The first possible limitation that this study could have would be in the journal selection method. Journals being selected by impact factor means that there was a good chance that the selected journals were APA journals. The journal with the highest impact factor was indeed an APA journal. However, out of the five chosen journals, *Cultural Diversity and Ethnic Minority Psychology* was the only APA journal. Interestingly, this journal had the lowest number in all regards, including the lowest inclusiveness rate of all although this was not statistically significantly different from the other four journals.

Another limitation of this study could present itself in the samples that included more than 10 different countries that could not be coded. Table 4 shows that 1234479 individuals could not be mapped. These would constitute about a third of all participants investigated in this paper. The influence these individuals would have on the study is questionable. This number is just under the the total number of American individuals that was coded and contains individuals from the United States of America so this should not affect the predominance of individuals from the United States of America. These un-mappable individuals are, nonetheless, promising as they would come from at least 80 different countries making Cross-cultural psychology more world inclusive than the results found in this paper. However one can ask themselves if the proportion of WEIRD vs. non-WEIRD societies in these samples are comparable to the overall proportion found. If they are comparable, these individuals may constitute a lot of extra participants. However, in numbers, they would represent in majority people from WEIRD cultures.

Table 4. *Un mappable cases of over 1000 participants from 10 or more countries*

Journal	Number of individuals	Number of countries	Number of WEIRD countries
Cross-Cultural Management - An International Journal	8435	16	11
Cross-Cultural Research	107144	20	19
Cross-Cultural Research	49729	34	20
Cross-Cultural Research	27423	37	-
Cross-Cultural Research	41975	30	-
Cross-Cultural Research	22270	30	-
Journal of Cross-Cultural Psychology	32553	43	-
Journal of Cross-Cultural Psychology	6138	37	-
Journal of Cross-Cultural Psychology	2688	10	2
Journal of Cross-Cultural Psychology	27847	49	19
Journal of Cross-Cultural Psychology	2561	11	4
Journal of Cross-Cultural Psychology	10068	10	3
Journal of Cross-Cultural Psychology	726977	80	-
Journal of Cross-Cultural Psychology	54540	29	15
Journal of Cross-Cultural Psychology	29080	45	-
Journal of Cross-Cultural Psychology	85051	27	-
TOTAL	1234479	-	-

Cross-cultural psychology is a domain with very few journals of low impact factor this could limit the validity of results. This limited amount of research in the domain, compared to other branches in psychology could be hopeful for this branch as if more research is conducted in Cross-cultural psychology in the future, these could constitute more inclusive studies which could substantially change world representativeness. However, the current state of affairs limits the number of publications that can be investigated.

Recommended practice changes.

Cross-cultural psychology has been gaining importance in the field of psychology during the last twenty years. Still, its world inclusiveness needs to be improved upon. Cross-cultural psychology by definition should be looking at cultures at all levels of the WEIRDness spectrum, or at the very least cultures at both ends of the spectrum as to see if

any variation exists between the two, as the differences would be the biggest between countries at both ends of the spectrum.

1. *Findings in psychology should be tested in two cultures in very different places on the WEIRDness spectrum or cultures that are often found to be close to the poles.* If significant differences are not found, when investigated in this manner, it is safe to say that the psychological process in question is applicable for the entire human population. If significant differences are found between the opposite poles, further research into a bigger array of cultures should be completed by Cross-cultural psychology as to describe the nature of the variations across each culture specifically.

2. *Universities should include classes on Cross-cultural psychology in their curriculums to bring awareness to psychological processes that vary due to culture.* Especially cases where culture variation exists in seemingly universal psychological processes. Future researchers should be made aware that the universality of findings in psychology is not a given and that cultural variations are found in psychological processes that were previously thought to be universal. Knowing that cultural differences are present in certain cases could lead to more world inclusive and representative research.

3. *Cross-cultural psychological research needs to proactively explore non-WEIRD cultures in greater amounts.* Populations that are not in the WEIRD category need to be investigated in more cases as well as in much larger numbers. Compared to WEIRD societies, non-WEIRD societies' presence in Cross-cultural psychological literature seems to be more like an honourable mention rather than a participation towards critical cultural comparisons. This proactive change could move Cross-cultural psychology towards being a more world inclusive science.

Conclusion.

The findings in this paper illustrate the fact that, in Cross-cultural psychology, the cultures that are being crossed are in great majority WEIRD cultures. This, in turn, means that the observed differences between cultures that are published and investigated are mostly found at the extremely WEIRD end of the WEIRDness spectrum making the practices researched small on the scale of humanity. The possible extent of the cultural differences that could be present in these psychological observations on the rest of the WEIRDness spectrum are often completely disregarded. This makes Cross-cultural psychology, most often than not, a science pertaining to WEIRD populations and not to the human population. Whether it is acceptable or not for the field of Cross-cultural psychology to remain at this same level of inclusiveness is a question that needs to be further considered. Perhaps, just the knowledge of the WEIRD penchant for participants that prevails in Cross-cultural psychology could be enough to make the field more world inclusive. However, the field of Cross-cultural psychology is extremely young, gaining importance only half a century ago. Psychology itself is barely two times older and has not stopped evolving since its inception. This scrutiny could thus be of great benefit due not only to the youth of the field, but the small number of journals that encompass it and the low impact factor these have. Hopefully aiding its evolution into a more world inclusive science that represents the whole human population. World inclusiveness seems like one of psychology, and more importantly Cross-cultural psychology's challenges, in the 21st century. More research into the individuals used in Cross-cultural psychological research is needed to positively affirm that Cross-cultural psychology needs to make drastic changes when it comes to individuals it uses for research. This paper included not more than five journals and only looked at two years of publication. There would be a definite benefit for research investigating further back in time and across

more journals as to see if Cross-cultural psychology has been getting more inclusive recently or if the level of inclusiveness does not vary significantly over time.

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