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The national psychological/intelligence profile of Romanians: An in depth analysis of the regional national intelligence profile of Romanians

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Abstract

The national psychological profile of a country/culture have important practical implication in today's globalized world and the psychological characteristics of a country/culture might be used as a basis for effective public policy designed to reduce social inequalities/inequities. Recent developments in the field (e.g., Rentfrow et al., 2013; Rentfrow, Jokela, & Lamb, 2015) have extended this approach from national level analysis to regional analysis, in order to understand the psychological profile of different geographical regions within a country. For Romania, a national psychological profile (David, 2015a) and a regional one (David, Iliescu, Matu, & Balaszi, 2015) for personality have been recently elaborated. However, the relationship between geographic areas in Romania and cognitive abilities, such as intelligence, has not been investigated. The present article examined the differences in intelligence levels across eight broad geographical regions of Romania. The total sample (N = 2755) was a national representative one, with ages between 5 and 89 years. We compared intelligence scores across the eight regions in a multifactorial analysis of variance, while controlling for the effects of demographic variables. Results show that there are no major differences in intelligence between the eight geographical areas. Thus, intelligence has a quite homogenous distribution across Romania. Education and age had the highest impact on intelligence scores. Implications for educational policies are discussed to counter social inequalities/inequities.

Keywords: national psychological profile, intelligence, regional analysis, Romania

Introduction

In today's globalized world, countries/cultures interact more and more often one with another, and thus knowledge coming from cross-cultural psychology is important for facilitating human communication/cooperation and overcoming barriers in such interactions. Indeed, in the modern world, the knowledge on the psychological profile of a country/culture is fundamental in order to understand the behavior of its citizens in relation to each other, but also with individual from other countries/cultures. Moreover, this knowledge is important for understanding the country's social and cultural environments as well as its institutions (Hofstede, Hofstede, & Minkov, 2010; Peabody, 1985/2011).

Following the logic of cross-cultural (e.g., Bond, 1986, 2000; Peabody, 1985/2011; Terracciano et al., 2005), psychological attributes of a population of a country/culture can be assessed and compared with rigorous psychological instruments. These psychological attributes could be used then to build a psychological profile of a nation (*national profile*/*psychology of a nation*). Indeed, Peabody (1985/2011) presented such profiles for France, Germany, Italy, Russia, USA, and UK, Bond (1986, 2000) for China, and David (2015a) for Romania. More specific, as relating to global national personality profile, Terracciano and collaborators (2005), in a seminal article published in *Science*, discussed the national global personality profile (i.e., national character) for 49 cultures (47 countries), showing that there is a discrepancy between the actual national character of a country (i.e., how the citizens of a country really are) and the perceived national character (i.e., how the citizens of a country believe they are). McCrae and Terracciano (2005) also showed in a cross-cultural investigation that personality traits from the *Big Five* model (Costa & McCrae, 1992) are related to various cultural and social indicators, such as values from Schwartz's model (1994) and cultural dimension from Hofstede's model (2001). Recently, David (2015a) also proposed a global personality profile of Romanians, based on the Big Five

Model, in relationship to various socio-cultural indicators. Thus, national psychological characteristics are in complex relationships with socio-cultural indicators. Causal pathways have not been fully elucidated, but are possible that these interactions are working both ways, with psychological characteristics and socio-cultural indicators enhancing and diminishing reciprocally.

From national to regional analysis of the psychological profile of a country/culture

Recently, the interest for psychological characteristic of a population has extended from country level to the analysis of different regions within a country. Rentfrow and his colleagues (2013) identified three personality clusters that are differently distributed on the USA territory: "Friendly and Conventional" cluster (high levels of extraversion, agreeableness and conscientiousness, and low levels of neuroticisms), "Relaxed and Creative" cluster (low extraversion, agreeableness and neuroticism, high openness, and close to average conscientiousness), and "Temperamental and Uninhibited" cluster (low extraversion, agreeableness and conscientiousness, and higher levels of neuroticism and openness). For Great Britain, Rentfrow et al. (2015) showed that there are differences between geographic regions in the distribution of the individual personality traits from the *Big Five* model. For example, higher levels of neuroticism were found in Wales and Midlands, while in South West, Southern England, and Scotland, neuroticism had the lowest levels. Recently, David et al. (2015) proposed a regional national profile of personality of Romanians, proving a highly homogenous distribution in various regions of Romanian of the two bipolar profiles, which were identified by cluster analyses.

Rentfrow et al., (2013; 2014; 2015) argued that the differences in the distribution of the personality traits across regions within a country are related to various socio-economical indicators. Such analyses can serve to understand to relation between individual behavior and various macro socio-economical indicators (see Rentfrow, 2013; 2015). Moreover, such

information regarding the regional psychological profile could be used to solve important societal problems we are confronted with (e.g., to better integrate immigrants in various the resident regions see David 2015b).

The case of intelligence

An important ability, given its predictive power across a large number of relevant activities, such as academic achievement, social functioning, and work performance, is intelligence (for a comprehensive review see Kan, Wicherts, Dolan, & van der Maas, 2013; Neisser et al., 1996; Sternberg & Kaufman, 2011).

Although there are various definitions and models of intelligence (see for details Sternberg and Kaufman, 2011), it can be typically operationalized as (1) learning potential (the ability to learn during a short period of time after training and to apply to new situations; see Feuerstein et al., 2002), (2) fluid intelligence (the ability to solve problems in new situations through logical thinking - identifying and establishing patterns and relationships; see Catell, 1963), and crystallized intelligence (ability to solve problems based on procedural and declarative knowledge achieved during lifetime; see Catell, 1963). Fluid and crystalized intelligence are the most important components of the general intelligence expressed in the intelligence quotient (IQ, see also Kan et al., 2013).

An understanding of the global national profile of intelligence has been naturally and regularly proposed for various countries/cultures during the process of adaptation of classical intelligence test in those countries/cultures. Moreover, Lynn et al. (e.g., see Lynn & Meisenberg, 2010) even proposed a somehow controversial concept of *national coefficient of intelligence* (see for a discussion in Sternberg and Kaufman, 2011).

David (2015a) offered a complex and detailed analysis of Romanians' psychological characteristics in a cross-cultural logic and showed that these characteristics are related to various social and cultural indicators. A global national profile of intelligence for Romanians

has also been discussed, based on various intelligence tests adapted in Romania, in a cross-cultural psychology logic, with suggestions for improving national curriculum (e.g., including early childhood education curriculum) in order to better use the intelligence potential and to eliminate social inequalities and inequities.

Overview of the present study

Following the evolution of personality studies – moving from the analysis of global national personality profile (e.g., Terracciano et al., 2005) to regional national personality profiles (e.g., Rentfrow et al., 2013; 2015) -, the aim of the current study was to explore the potential differences in intelligence across different regions from Romania. This is as an extension of the research done so far (David, 2015a) regarding the global national profile of intelligence in Romania. Namely, we intended to explore the differences in intelligence scores between different regions from Romania and their pattern of distribution. If such patterns will emerge, they will be then related to various (macro) socio-economic indicators.

In order to answer these questions, we set to compare the intelligence scores for eight geographical regions, which are officially recognized as developmental regions, each comprising between approximately 2 and 3.5 million inhabitants: 1) North-East (Bacău, Botoșani, Iași, Neamț, Suceava, and Vaslui couties), 2) South-East (Brăila, Buzău, Constanța, Galați, Tulcea, and Vrancea counties), 3) South (Argeș, Călărași, Dâmbovița, Giurgiu, Ialomița, Prahova, and Teleorman counties), 4) South-West (Dolj, Gorj, Mehedinți, Olt, and Vâlcea counties), 5) West (Arad, Caraș-Severin, Hunedoara, Timiș), 6) North-West (Bihor, Bistrița-Năsăud, Cluj, Maramureș, Satu-Mare, and Sălaj counties), 7) Center (Alba, Brașov, Covasna, Harghita, Mureș, and Sibiu counties), and 8) Bucureşti and Ilfov.

Methods

Basically, we reanalyzed the data collected and presented in Dobrean, Raven, Comşa, Rusu, and Balazsi (2008) (see also Domuta, Comşa, Balazsi, Porumb, & Rusu, 2003). The method section, excepting the data analysis section, is described based on these studies.

Participants

The total sample (N = 2755) was aged between 5 and 89, out of which 1234 aged between 5 and 17 (44.8%) and 1521 aged between 18 and 89 (55.2%). The sample included 1518 females (55.1%). For the supplementary analysis on the historical regions of Transylvania (see below) the sample was N = 1422, with 56.5% females and 53.9% 18 years old or above.

The total sample was stratified according to the next criteria: cultural area (18 areas), the size of the urban locations (4 types), and the level of development of the rural locations (3 categories). In sampling we used a probabilistic selection of the locations (117), of the sampling places (199 streets) and houses (all the people in a household aged between 5 and 85 have been selected). The sample is representative for the non-institutionalized Romanian population aged between 5 and 89 with a ±2% maximal tolerated error. We weighted the sample according to the age, education, residence, and sex variables (all interrelated), in order to obtain numbers very close to the official representative data. Assessments took place in the participants' houses.

Measures

The Raven's Standard Progressive Matrices Plus (SPM+; Raven, Raven, & Court, 2000 revised, up-dated, and extended 2004), was used as a non-verbal measure of fluid intelligence. This test consisted of 5 sets (A, B, C, D and E) of 12 items, with the maximum possible score being 60. For the present study the psychometric properties were adequate,

with high internal consistency (Cronbach alpha = .91) and test-retest reliability with 1-month interval (r = .88).

Procedure

Each participant in the sample completed the test at home, after expressing his/her willingness to do so. In a first step we asked them to complete the SPM+ test and then we collected a series of socio-demographic data. The SPM+ test was administered individually. Children, old people, and people who met difficulties in completing the answering sheet have been assisted by the administrator. There was no time limit for the testing. The mean time for solving the SPM+ test was 43 minutes.

The second part consisted in completing some socio-demographic data. These data referred to the following categories: occupational status, schooling, socio-economic status, nationality. Each participant in the study was given the option not to reveal this socio-demographic and private information (although we assured the confidentiality of this information).

Data analysis

We tested a multifactorial univariate linear model (data was weighted to control for sampling deviation from the population structure) in which the fixed between-subjects factors (all categorical) were: gender, type of residence (rural vs. urban), ethnic group (Romanian, Hungarian, Romani, and other), educational level (primary school or less, secondary school, vocational education, high school, post-secondary education, higher education), age (17 categories, starting with the age of 10, with 5 years intervals except for the last one which included individuals 85 or more), and geographical area (the 8 areas of development listed above). Interaction effects between these factors were not included in the model given that we did not have any explicit predictions on these interactions. The dependent variable was the raw test score on Raven SPM+ (Raven, 2003). If an overall main

effect proved to be significant and ecologically relevant (at least a medium effect sizes, indexed as an η^2 of .06 or larger; see Cohen, 1988; Levine & Hullet, 2002) then we conducted pairwise comparisons between the estimated marginal means of the categories in the factor using the Bonferroni correction for the significance level.

Results

Due to some missing values on demographic variables and to weighting, the total sample in this analysis was $N = 2597$. Results indicated significant main effects for almost all the factors in the model (with the exception of ethnic group): gender, $F(1, 2563) = 14.171$, $p < .001$, $\eta^2 = .004$, type of residence, $F(1, 2563) = 42.493$, $p < .001$, $\eta^2 = .013$, age, $F(16, 2563) = 22.585$, $p < .001$, $\eta^2 = .109$, education, $F(5, 2563) = 55.458$, $p < .001$, $\eta^2 = .084$, and geographical region, $F(7, 2563) = 5.524$, $p < .001$, $\eta^2 = .012$. Most of the effects were however very small (in the range for irrelevant effects), and only those for age (explaining 10.9% of the test scores variance) and education (explaining 8.4% of the variance) were above the medium effect cutoff, both of them in the medium to large interval. The effect of region was in the lower part of the small effect size interval, explaining 1.2% of the variance. We further explored the effects for age and education, the only ones that were both significant and crossed the threshold for what we considered a relevant effect. For age, the distribution of scores had an inverse "U" shape, with the peak being reached for the 20 to 24 years old interval. These participants had similar scores to those in the 10 to 14, 15 to 19, but had significant scores in comparison to all other age categories (ps < .04); there were just 2 participants in the 85 years and above interval and thus this category was not considered when reporting these results). Older children (10 to 14 years old) and adolescents (15 to 19 years old) had higher scores than younger children (aged between 5 and 9 years; $p < .001$). Older children also had higher and those 45 years or above (all ps < .05). Adolescents

however had higher scores than all adults 35 year old and above (all *p*s < .05). Age categories on the right side of the peak (see Figure 1), despite the apparent decreasing trend, were generally similar to those closer to them, but significant differences are observed when comparing with more distant intervals (e.g., five or more).

Comparing across categories of education, individuals whom graduated some form of higher education have the highest scores, significantly higher than all other categories (all *p*s < .05). On the left of this peak (see Figure 2), scores are generally decreasing once with education levels. Graduates of high school and post-secondary education have similar scores, higher than all other categories indicating lower education (all *p*s < 0.05).

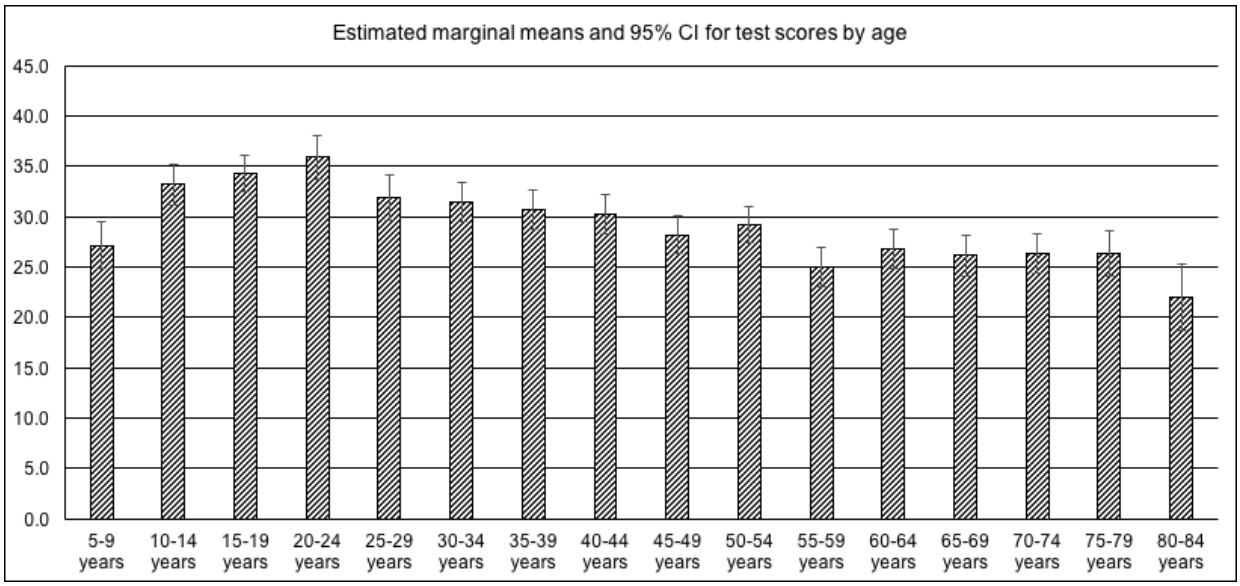

Figure 1. Intelligence scores by age interval. The bars depict estimated marginal means of test scores from the univariate model, while error bars depict 95% CI.

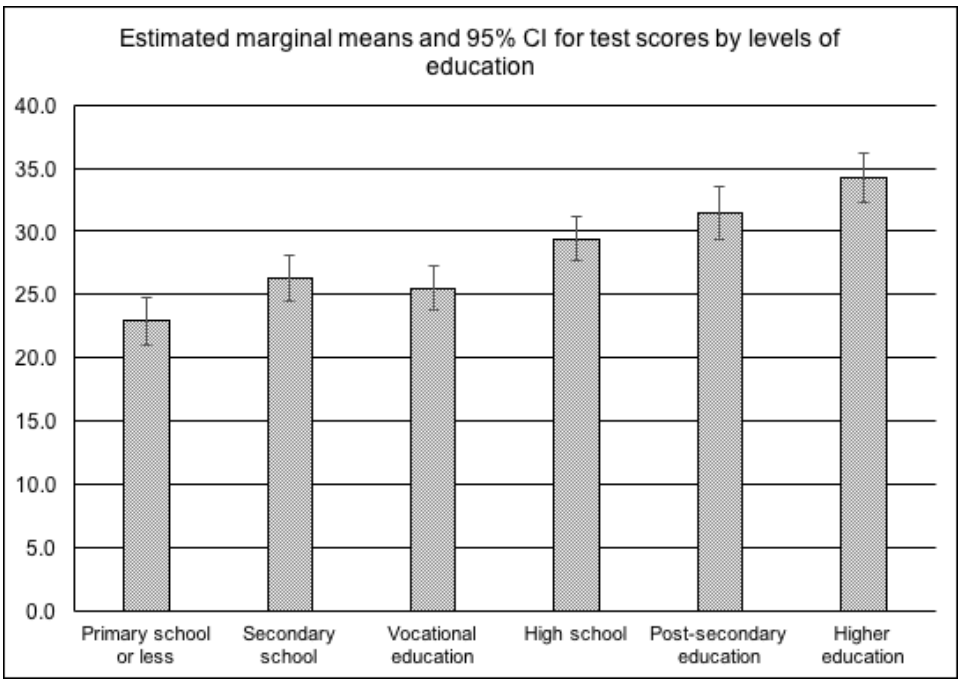

Figure 2. Intelligence score by education level. The bars depict the estimated marginal means from the univariate model, while error bars depict 95% CI.

Supplementary analyses: An exploratory analysis on the historical region of Transylvania

To explore if geographical regions defined by historical context rather than more by administrative context (as are those investigated above) would have a better impact on intelligence, we extended the main analysis described above on Transylvania's population, by introducing historically delimited regions, as identified by Mate, Neda, and Benedek (2011), as a between subject factor, instead of broad geographical regions. Indeed, in an innovative research, Máté et al., (2011) used a computational model inspired by research in physics (*the spring-block system*) and by taking into consideration the geographic positioning and the connectivity between different settlements, expressed as a covariance between several social and economic indicators (e.g., population, gross domestic product/GDP, taxation levels, all available from census data since 1850) they discriminated four distinct regions in the extended territory of Transylvania: Banat (today the Arad, Timiș, and Caraș-

Severin counties), North of Transylvania (today Bihor, Bistrița-Năsăud, Cluj, Maramureș, Satu-Mare, and Sălaj counties), South of Transylvania (today Alba, Hunedoara, Mureș and Sibiu counties), and Szekler region (today Covasna, Harghita and a part of Brașov counties). This analysis was intended only for Transylvania's territory and thus does not cover much of the country's today territory. However, it could be illustrative for our research question and if results prove that historically delimited regions are useful for understanding the psychological characteristics of their inhabitants, then future research could extend this approach to other historical regions or the entire country.

The results were somewhat similar to those on the full Romanian population. The total sample for this analysis decreased to N = 1336, due to missing values on some demographics and sampling weighting. We found significant main effects for the following variables: gender, $F(1, 1306) = 11.462$, $p = .001$, $\eta^2 = .006$, type of residence, $F(1, 1306) = 19.787$, $p < .001$, $\eta^2 = .010$, ethnic group, $F(3, 1306) = 5.290$, $p = .001$, $\eta^2 = .008$, age, $F(16, 1306) = 20.979$, $p < .001$, $\eta^2 = .177$, education, $F(5, 1306) = 41.499$, $p < .001$, $\eta^2 = .109$. The effect for historic regions was however not significant, $F(3, 1306) = .183$, $p = .908$, $\eta^2 = .001$. The effect size of gender and ethnicity were below the small effect threshold, while for type of residence the effect was right on this threshold. For age and education however the effect sizes were larger this time, with education on the upper end of the intermediate effect size interval and age just above the middle of the large effect size interval.

Sensitivity analysis

Given that these results have important theoretical and practical implications statistical power has to be taken into account before formulating any conclusions. For the comparison between the 8 geographical regions, our main focus in this article, the total sample size allowed us to detect effect size lower than $\eta^2 = .01$ (the threshold for a small

effect), while keeping statistical power at the generally accepted level of .80. Thus we could consider that adequate statistical power was achieved for the overall analysis. However, for pairwise comparisons, smaller samples were compared and we used a conservative correction for the significance level (Bonferroni adjustment), which could have altered our ability to detect significant relevant effects. For the comparison between the 8 regions, the minimum detectable effect size with .80 statistical power varied between a *Cohen's d* of .26 to 0.45. We computed the effect sizes for these comparisons based on both the observed raw means and the estimated marginal means (corrected for all the variables in the model). The observed effects expressed as *Cohen's d* ranged between .01 and .34, with an average of .16. The effect sizes calculated based on the estimated marginal means ranged between 0 and .20, with an average of .08. This suggests that for our primary analysis, there were no relevant effects that we were unable to observe due to lower statistical power. Finally, for the analysis on the historical regions of Transylvania, for the omnibus univariate analysis we were able to detect effects of lower that an $\eta^2 = .01$, which indicates that we were able to detect even irrelevant effects. However, in our analysis historical region did not explain the variance in test scores and no additional comparisons were performed.

Discussion and conclusions

In an attempt to follow recent developments related to the psychological characteristics of country/culture, we aimed to investigate whether there are differences in term of intelligence between the geographical regions of Romania.

The distribution of the intelligence across Romanian's geographical regions is remarkably homogenous (see Figure 3). Therefore, the investigation of its relationship with various socio-economical indicators was not further conducted. This conclusion is similar with that formulated by David (2015a) regarding the relative homogeneity of the Romanian

psychological and cultural environments. We speculate that this homogeneity might be a consequence of the population migrations inside Romania's territory.

Figure 3. Intelligence scores by region. Levels of intelligence are similar across all major regions of Romania.

From all the variables investigated, the level of education and age had the highest contributions to the intelligence scores. In David (2015a) we found some differences related to various ethnic backgrounds and we attributed these differences to the lack of access to proper education (i.e., social inequalities and inequities); in consequences we proposed public policies to correct this social inequality/inequity. This conclusion seems to be supported to present data, as the ethnic background was not important anymore in intelligence, when we controlled for education (and other variables).

Is important to note that both our results and those from the broader scientific literature point out the role that education plays in shaping intellectual abilities (Gorey, 2001). Indeed, some authors attribute the increases in IQ that was observed during the last century in U.S. to widespread education and early life educational programs (Blair et al.,

2005). Given that intelligence promotes on the other hand better academic performances (Deary et al., 2007), we can think that education, especially in early years, might have a cumulative effect on cognitive abilities. Moreover, education might reduce the impact that social and economic inequalities have on intellectual abilities. Indeed, research related to genetic and environmental influences on intelligence has indicated that for those with high socio-economic status genetic factors play a larger role in intellectual development than for individual with lower status, thus pointing that full intellectual potential is achieved only by those from upper social classes. However, a recent meta-analysis suggests that high quality national educational systems (such as those in Western Europe, contrasted to U.S. educational system) can nullify this interaction between genetic factors and socio-economic status (Tucker-Drob & Bates, in press). This means that education can allow even disadvantaged groups to fully reach their intellectual potential. Therefore, if our goal is to fully use Romanians' intellectual potential, then an educational reform (especially for early types of education; e.g., primary school) can be a starting point. Given the bidirectional relationship between education and intelligence, such an intervention could be a self-sustaining one: education could enhance the expression of the latent intellectual potential in the manifest intelligence, which, in turn, will further enhance the involvement in educational environments.

The results of the current research should be interpreted taking into consideration several limitations. One such limitation is the fact that only fluid intelligence was assessed here using SPM+. Future studies should investigate the stability if similar conclusions are reached using other instruments, assessing other types of intelligence (e.g., crystallized intelligence). A second limitation is related to the exploratory nature of our study. We used geographically/adminitratively broadly defined regions, rather than more meaningful boarders that could reflect the action of social and economic factors across history. However,

the analysis on the extended Transylvanian territory, based on such historical analysis, confirmed the conclusions based on more geographically/administratively-based analysis. Future studies should try to identify relevant criteria (not necessary geographic; such criteria could be described in terms of social, economic, historical, and cultural indicators) in order to specify regions where differences in terms of cognitive abilities might emerge. Therefore, our results should be replicated on different samples and with different instruments, and to test differences between sub-populations that are derived based on meaningful variables.

To sum up, our results point that Romania has a quite homogeneous profile of intelligence across all major geographical regions and education is the most relevant factor that can be manipulated trough public policies and social change in order to increase the expression of the intellectual potential and to counter potential social inequalities/inequities.

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