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Gender Equality ≠ Gender Neutrality: When a Paradox is Not So Paradoxical, After All.

GENDER EQUALITY PARADOX (/BLOG/CATEGORY/GENDER+EQUALITY+PARADOX)

Artist credit: Brianna Weir, 2019

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What makes for a "gender equality paradox" in STEM? Stoet and Geary analyzed gender equality and residents' attainment of tertiary degrees in STEM fie score higher on the GGGI. They interpret this as evidence that gender-equal countries are contexts that "exaggerate" sex differences in individuals' choice will become more similar as they become more equal.

Stoet and Geary's apparent surprise at their finding reflects what Maria Charles and her colleagues have dubbed the "degendering" assumption. The idea areas like literacy, life expectancy, education, and representation in government, gender differences in personalities and preferences will disappear.

This post explains why this assumption is unfounded, drawing on research from my field, social psychology. Societies with high scores on gender equalit

- 1. persistence of gender stereotypes and norms despite formal equality,
- 2. persistence of gender inequality in some domains (e.g., political empowerment) even as there is high gender equality in others (e.g., health and surv
- $3.\ persistence\ of\ gender\ inequality\ in\ some\ demographic\ groups\ (e.g.,\ race,\ class)\ even\ when\ others\ have\ achieved\ gender\ equality\ and/or\ when\ measu$

For these reasons, social scientists do not expect nation-level measures of gender equality to predict the degree of similarity between women and men on t (https://doi.org/10.1177/0956797619892892)³—we raise questions about their data (https://www.genderscilab.org/blog/gender-equality-paradox-methods://journals.sagepub.com/doi/full/10.1177/0956797619872762)⁵) are neither surprising nor a "paradox."

Gender stereotypes and norms

Stoet and Geary interpret a country's GGGI score as an indicator of gender attitudes and stereotypes in that culture. For example, they claim that, "gender-But gender equality measures like the GGGI are comprised of indicators such as literacy rate, representation in elected office, and participation in the paid

Understanding gender norms and stereotypes is critical to understanding the gender equality and gender neutrality are not the same concepts. Norms, at system and started as Gally Charles and that they contribute

We learn about gender early. Children become attuned to gendered information by 9 months of age, associating women's voices with women's faces and maccumulate social experience. As social animals, fitting in with our group is important and children use their developing knowledge of gender to guide the

In the United States, stereotypical beliefs about gender are related to a wide variety of consequences for women and men. ¹¹ Identical achievements, behavimore competent, which garners them more job opportunities, mentoring, and higher pay. ¹³ And these are the gender beliefs we are aware of and can consequence.

Attitudes: Explicit vs. implicit

The psychological study of attitudes goes back to the early days of the field, 14 with much of the research focusing on people's self-reports of their beliefs, th

	Explicit attitudes	Implicit attitudes
Available to consciousness?	Yes	No
Subjective experience?	Known and readily claimed as "my beliefs"	Unknown (without research tools) and often rejected as foreign, "not me/mine"
How measured?	Directly, often by self-report	Indirectly, often by reaction time
Concern/shortcoming	Deceit, self-presentation	When and to what extent they matter

Why (and in what contexts) do implicit attitudes matter?

Taking implicit attitudes into account is important because even if we hold egalitarian beliefs, we may still have sexist implicit associations that may influer research-intensive universities in the United States rated a male applicant for a lab manager position as more competent and hirable than a woman with an to have repercussions for women (and other folks, though in different ways) in the United States, a fairly high-GGGI country.

In many situations, our behavior aligns with our explicit beliefs, but in others, such as when we must act quickly or are distracted, our behavior tends to be boiling over, so my attention would be switching back and forth between these tasks. Or I might read an application during a few minutes of down time be influenced by my implicit associations, whereas if I considered the applications when I had more time and was able to devote my full attention to the task,

Implicit attitudes also influence behavior when the potential relevance of stereotypes isn't obvious. For example, if I'm considering a group of potential lab and science. However, if I'm evaluating a single candidate (as sometimes happens when applications get distributed amongst members of a lab or hiring teaptitude and/or competence in science, might be tinging how I evaluate her credentials and accomplishments.

Implicit associations leak into our interactions

Automatic behavior is more closely related to implicit attitudes than is deliberate/intentional behavior. ¹⁶ Much of our nonverbal behavior is automatic, gui observe and interact with us are attuned to these nonverbal behaviors and are influenced by them. ¹⁸ Thus, we may be sending mixed signals via our words

For example, in interviewing the lab manager candidates, my verbal communication with them may be very similar—I ask them the same questions, follow encouragement across candidates. When verbal and nonverbal signals conflict, people tend to put more stock in the nonverbal message, ¹⁹ infer that the collikelihood of being offered the job, and whether they would accept the position if an offer were made.

Even strictly verbal communications can reflect implicit biases. A study of parents' interactions with children at a California children's museum found that kinds of parental speech observed in this context did not show this difference, as parents instructed girls and boys how to manipulate the exhibits to the sa expectations about their children's interests and proclivities are guiding their behavior in this context. It is worth noting that the sample for this study cons STEM, so their differential engagement with their girls vs. their boys is likely unconscious.

Pervasive, persistent, and problematic

By 9 years of age, German girls associate math more strongly with boys than with girls and prefer language arts to math, and these implicit math-gender st so thoroughly that they are processed outside of awareness and their influence often goes unrecognized.

Research conducted with college students in the United States found that students' feelings of belonging and interest in fields of study or careers are influencomputer parts, Star Trek posters, and science fiction books with neutral objects like water bottles, nature posters, and lamps resulted in female college stu about who was expected to be in the space, and that women anticipated that they wouldn't belong.

Of course, many women pursue careers in STEM in spite of the gender-science stereotypes and various messages they receive about whether such careers a students' implicit gender-math stereotypes, but it does strengthen their implicit identification with math.²⁵ Female students who identify more strongly wi

The point here is that STEM fields continue to be associated with men/masculinity and these stereotypes influence if and how individuals engage with the gender equality indices, gender continues to influence people's opportunities, experiences, and outcomes. Gender equality isn't the same as gender r

So what are the correlates, as the societal level, of STEM fields being stereotypes as masculine?²⁷ For one, at a country level, implicit gender-STEM bias is a heart and science. And we know that gender stereotypes about science indication that a country is gender-neutral.

Variability in gender equality: Domains

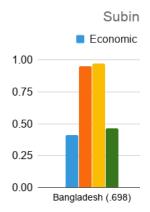
The "paradox" interpretation of Stoet and Geary's finding hinges on the assumption that higher gender equality scores imply gender-neutral environments interest (e.g., an economic sector, such as agriculture; a field of employment, such as healthcare; an occupation, such as teacher). Related domains can be n

First, countries often lack uniformity across domains. Even with gender equality in some domains, it is lacking in others. Second, within a broad domain, of the gender ratio in another field. This variability means that a gender equality metric cannot be taken to characterize domains not included within that

Variation across subindices

As explained in our post on measuring gender equality (https://www.genderscilab.org/blog/measuring-gender-equality-why-the-gggi-is-not-the-right-me grouping them into subindices. For example, the GGGI is comprised of four subindices: 1) Economic Participation and Opportunity, 2) Educational Attain Opportunity: labor force participation, wage equality, earned income, etc.).³¹ The subindex scores are combined in order to determine the country's overal

It can be easy to forget the process of weighting, calculating, and averaging that goes into producing the overall GGGI score, and as a result assume that this is not the case:

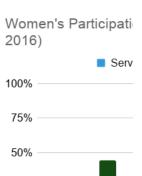


Note that Thailand's scores on the economic, education, and health subindices are all above .75, but its political subindex score is abysmal. As composite n

Variation across domains within subindices

In addition to divergence across subindices, in focusing on a specific subindex, we see that women's status varies across the domains that comprise it. Here

Looking at the three broad economic sectors for the countries examined above, women's participation across sectors varies within a country. In Mexico, fo that despite their nearly identical overall GGGI scores, the proportion of women vs. men in various economic sectors varies. Variations like these are across-different-economic-sectors) themselves.³³ Note that for both this example and the one in the previous section we're referencing the countries' overa



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In the United States, Bureau of Labor Statistics (BLS) reports from 2018 (https://www.bls.gov/cps/aa2018/cpsaat11.htm)³⁴ show that women and men are 1 and development managers (49% women). But these examples of near-parity coexists with dramatic disparities in some management areas. Other manage and fundraising managers and 78% of human resource managers are. Likewise, in education, women comprise 49% of post-secondary teachers, but 98% o

Finally, many occupations are skewed toward either women or men. For example, women are 36% of dentists, but 97% of dental hygienists. Women are on

Examples of occupations close to gender parity	Examples of occupations in which women are overrepresented	Examples of occupations in whicl
Optometrists 46%	Maids and housekeeping cleaners 90%	Security and fire alarm systems insta
Biological scientists 48%	Receptionists and information clerks 91%	Automotive body and related repairs
Gaming services workers 48%	Hairdressers, hairstylists, and cosmetologists 92%	Carpet, floor, and tile installers and
Photographers 48%	Dietitian and nutritionists 93%	Cement masons, concrete finishers,
Retail salespersons 49%	Childcare workers 94%	Drywall installers, ceiling tile install
Statisticians 49%	Medical records and health information technicians 94%	Electricians 2%
Advertising sales agents 50%	Secretaries and administrative assistants 94%	Operating engineers and other cons
Private detectives and investigators 50%	Speech-language pathologists 96%	Structural iron and steel workers 2%
Insurance sales agents 51%	Dental hygienists 97%	Logging workers 3%
News analysts, reporters, and correspondents 52%	Preschool and kindergarten teachers 98%	Surveying and mapping technicians

NB: All numbers reflect the percentage of women in the occupation (in the United States for 2018, according to BLS data).

Many fields and careers remain strongly gender-skewed, even in Iceland (http://datatopics.worldbank.org/gender/country/iceland), the country with the h

The differences outlined above further illustrate the point that a composite gender equality score is a coarse estimate that tells us very little about the speci do measure gender equality, they cannot be used to infer overall gender neutrality.

Variability in gender equality: Demographic groups

Finally, Stoet and Geary's conflation of gender equality with gender neutrality erroneously assumes uniformity of outcomes across the broad categor women vs. men who are literate in a given country is useful information, but it would be even more informative to know whether the gender ratios are cor it comes to political empowerment, equal representation of women in government might obscure the fact that male politicians reflect a country's two mair

Sex is an important dimension along which to track people's outcomes, but sex is entangled with other dimensions of social hierarchy.³⁵ Sexism affects all women found that the Black women participated in STEM majors at a higher rate than the white women did and had weaker implicit gender-STEM attitudied of study has shown that women of color majoring in biological sciences reported feeling they belonged at a much lower rate than white women or me

Women's outcomes are related not only to their sex, but to other aspects of their personhood. Therefore, it is important to take an intersectional approach

Due to the design of gender equality measures, a high score on one can occlude significant gender inequalities across various social strata within a country *equality* is not the same as gender *neutrality*.

Whither the gender equality paradox in STEM?

The only basis for viewing Stoet and Geary's finding as a paradox is the assumption that greater gender equality indicates a more gender-neutral society. A multitude of ways in which these attitudes manifest—directly and indirectly—even highly "gender equal" environments cannot be characterized as gender dimensions of social hierarchy. When we recognize that gender-equal on some measures is not synonymous with gender-neutral in stereotypes and at spheres, including STEM.

AUTHORSHIP STATEMENT:

This blog series on the Gender Equality Paradox emerged from collective GenderSci Lab discussions. Each author outlined and drafted their own piece. G final version of her interview answers and provided images and figures for our use. Tyler Vigen developed a "women in STEM" spurious correlations widg Heidorn oversaw the blog series development, review, and publishing process. For the Psychological Science paper, Sarah Richardson drafted the manuscr approved the final version of the manuscript for submission. Action editor Tim Pleskac shepherded the Corrigendum and Commentary through the peer

RECOMMENDED CITATION:

ENDNOTES:

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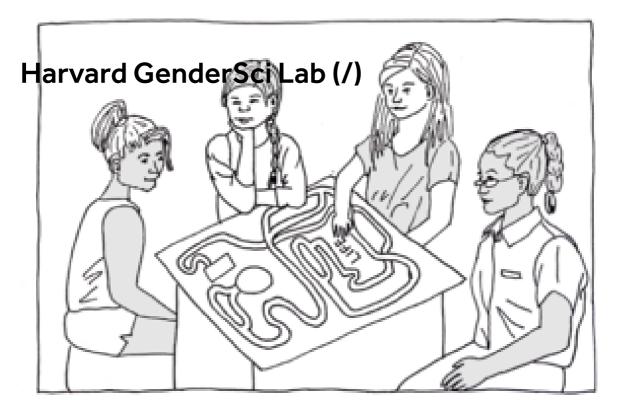
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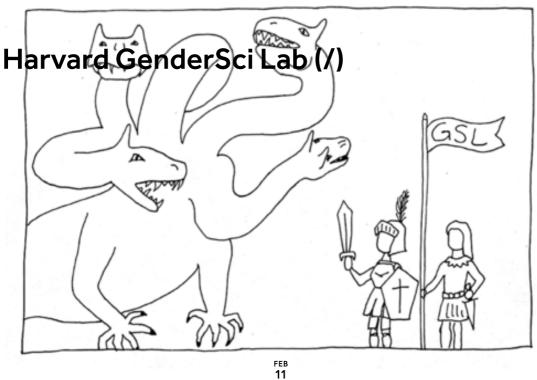
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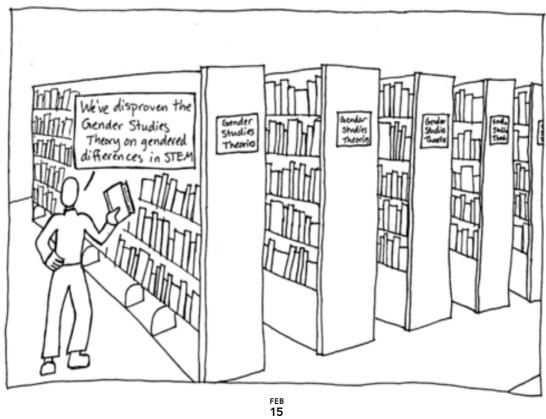
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