Gender Differences in Psychology

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The psychological differences between men and women are well-established and widely documented. These differences can be seen in areas as influential in our lives as a career choice, with women showing greater interest in careers requiring artistic and social skills (Stoet & Geary, 2018), and communication style, with men being more goal-oriented and assertive (Newman et al., 2008; Maharani et al., 2020). Or, the differences can reveal themselves in areas as trivial as how men and women chose to alleviate boredom while sitting in an empty room for fifteen minutes with nothing to do except administer electric shocks to themselves: men more often opted to shock themselves (Wilson et al., 2014).

These differences manifest themselves across a spectrum of areas, such as the ability to discern different facial expressions (Babchuk et al., 1985), performance change in competitive environments (Gneezy et al., 2003), aggression (Hay, 2007), self-esteem, subjective well-being (Schmitt et al., 2016), basic human values (Fors Connolly et al., 2019; Schwartz & Rubel, 2005), and empathy (Klein & Hodges, 2001). The differences in personality, measured using the big five personality traits, even hold true across different cultures, with women in multiple countries scoring higher in neuroticism, agreeableness, and extraversion compared to men (Costa et al., 2001; McCrae & Terracciano, 2005; Schmitt et al., 2008; Weisberg et al., 2011).

There is extensive documentation that men and women are indeed psychologically different. But does it matter? If we are to subscribe to John Locke's underlying principle of individualism to ensure both men and women have the equality of opportunities in society (Butler, 1978), then understanding the causes for these psychological differences is critically important to design policies that effectively promote gender equality.

Environmental causes account for a considerable amount of the gender psychological differences, especially regarding abilities and skills. For instance, Alan et al. (2019) discovered that while children did not exhibit gender differences in leadership willingness, a large gender

gap was found among adolescents. They suggested that this may be caused by adolescent girls' sharp decline in social confidence resulting from social pressure. Social system and gender roles may be another significant cause. For example, Gneezy et al. (2009) found that in the matrilineal Khasi society, much different from results found in western areas, women are more prone to compete.

One way to understand how the environment contributes to the gender difference in psychology is by analyzing stereotype threat: the fear of living up to the negative stereotypes about one's group. The common stereotype threat of boys being better at math particularly harmed girls. Walton et al. (2013) estimated that stereotype threat is responsible for 57-94% of the gender performance gap in the SAT math section.

Stereotype threat contributes to performance differences even when the stereotypes are implicit. In a study by Huguet and Régner (2007), researchers selected middle school students with highly selective math grades and divided them into two groups. While the researchers provided both groups with the same test of replicating figures from memory, one group was told it was a "geometry test" and the other group a "drawing test." By naming the test "geometry test," the test activated a stereotype threat disfavoring girls and caused them to underperform boys. However, girls told that the test was a "drawing test" outperformed boys. Similarly, in Klein and Hodges' (2001) experiment, the gender performance gap on an empathic accuracy test increased when the test was presented as measuring interpersonal ability.

In addition to the performance gap, stereotype threats can also affect people's decisions. Dekhtyar et al. (2018) conducted a longitudinal study on individuals from Sweden starting from the age of 16. They found that men and women tend to exhibit a technical and a language advantage, respectively, and choose their occupations and education accordingly. However, men and women with similar strengths take different routes for their education and career, with

both men and women choosing paths that better fit their gender description. Their choices are likely also influenced by external forces such as stereotype threat caused by gender expectations.

Stereotype threat is especially damaging to people who believe that one's attributes are innate and constant, who, under mindset theory, lean toward having an entity theory of intelligence. Those having an incremental theory of intelligence, on the other hand, believe that abilities can improve over time. When viewing different matters, one can have different mindsets. Believing that one's abilities are innate and inflexible, entity theorists tend to think that negative stereotypes indicate their failure in the future and are more likely to retreat when facing obstacles (Dweck, 2008, 2012; Froehlich et al., 2016; Hong et al., 1999). Not only does having an entity theory facilitate stereotype threat, but it is also partly caused by the related stereotypes (Laurell et al., 2021; see also Froehlich et al., 2016). This may be a major force contributing to female students' higher entity theory endorsement regarding sports (Prot et al., 2014) abilities and, especially, mathematics (Todor, 2014) strengths, dissuading them from continuing their studies in mathematics and science (Dweck, 2007).

However, environmental causes alone do not explain all aspects of the psychological gender differences. For instance, infants are hardly affected by social norms; however, they nonetheless exhibit gender differences in psychology that parallel those of adults (Alexander & Wilcox, 2012; Fausto-Sterling et al., 2012). Although different parenting behaviors based on sex - the most visible being that parents tend to spend more time talking to daughters than to sons (Leaper et al., 1998; see also Fausto-Sterling et al., 2012) - may be part of the cause, they are generally minimal (Endendijk et al., 2016). To fully exclude the effects of social norms, researchers would have to control human infants' social interactions, but it would hardly be ethically possible. However, researchers can draw on experiments on nonhuman primates like macaques, whose infants exhibit many sex differences that resemble those of humans. In a

study by Simpson et al. (2016), the macaque infants raised in homogenous environments still exhibit sex differences in response to social stimuli, suggesting that they, and possibly humans as well, do have innate psychological differences. Evidence also supports that genes greatly influence personalities (Bouchard, Jr. & Loehlin, 2001).

Moreover, diving deeper into the relative cross-culture gender differences reveals the gender-equality paradox: the finding that gender differences are more pronounced in areas with more progressive sex-role ideologies. Although in modern countries sex role differences are emphasized less, they ascribe more adjectives to either men or women, suggesting greater gender differentiation (Costa et al., 2001). Scholars have found similar phenomena when analyzing gender differences in preference (Falk & Hermle, 2018), basic human values (Fors Connolly et al., 2019; Schwartz & Rubel, 2005), self-esteem and depression (Schmitt et al., 2016), and occupation interests (Stoet & Geary, 2018). This, too, suggests that some of the gender differences are intrinsic and stem from biological differences. Just like height difference is larger in richer places due to the resulting nutrition gap (Peñuelas et al., 2017), having better and more equal access to resources in more egalitarian places may make innate psychological gender differences easier to surface, as people can make choices reflecting their preferences (Falk & Hermle, 2018). More freedom leads to people showing greater differences, as is suggested by how gender differences in texting language use are typically larger on tasks with fewer language use constraints (Newman et al., 2008).

How, then, do biological differences cause innate psychological differences? Part of the answer lies in the different sex hormones. Studies show that prenatal androgens - hormones responsible for male characteristics - have a masculinizing effect on male fetuses' brains, affecting their personalities, interests, and even cognitive abilities (Berenbaum & Beltz, 2011; Schmitt et al., 2016). Evidence also showed that exposure to atypical levels of androgens in

gestation is related to male-typical play preferences (Richards & Browne, 2022) and physical aggressiveness (Hines et al., 2015).

Evolutionary psychology suggests that the root cause for these intrinsic variations is human evolution. It predicts that men and women are naturally different in areas they face different adaptive problems while similar in all others (Buss, 1995). For example, as the primary caretaker for infants, female primates may be selected to be more caring (Babchuk et al., 1985). Likewise, males' higher level of aggressiveness may result from ancestral intersexual competition (Buss, 1991). Most of these intrinsic gender psychological differences developed during the hunter-gatherer era (Schmitt et al., 2016). Schmitt offered another explanation for the gender-equality paradox: The gender differences widen in more egalitarian societies because they are psychologically more similar to the hunter-gather ones (Schmitt, 2005). As societies transitioned into the agricultural and monotheistic era, resource distribution became increasingly unequal and sex differences were suppressed. As societies now become more egalitarian, however, they resemble the hunter-gather era more and sex differences, therefore, are more visible (Schmitt et al., 2008).

Knowing how the environment affects psychological gender differences offers more direct ways to help tackle gender inequality. For instance, recognizing that gender differences in willingness to make risky leadership decisions likely stem from social pressure during adolescence (Alan et al., 2019), policymakers and teachers can focus on reducing social pressure. Knowing how stereotype threat and one's implicit theory of intelligence play a part in the gender performance gap in STEM subjects, researchers and educators can think about ways to reduce stereotype threat or promote an increment theory of intelligence to reduce the gender gap. Studies showed that praising students' efforts instead of their ability and teaching them about how the brain forms connections when one learns encourages an incremental theory of intelligence and significantly narrows the gender gap (Dweck, 2007). In addition, providing external incentives

may help in combating stereotype threats, as is evident in a study by Klein and Hodges (2001) about gender differences in empathy, wherein the gender performance gap vanished after a monetary incentive was provided. Reducing the idea of competition, especially that of women and men competing against each other, may also help to gender performance disparity (Gneezy et al., 2003). Although biological differences may be impractical to eliminate, they give hints about what social measures have the most potential to tackle inequalities. If, for example, men and women naturally prefer different jobs, then in addition to reducing the gender representation gap in each occupation, society should perhaps also try to narrow the salary/recognition gap in different occupation types.

Furthermore, understanding how psychological differences are influenced by hormones gives us insight into policies extending beyond promoting gender equality. In particular, testosterone might be responsible for the higher violence rate among men, promoting violent behaviors in those prone to aggression by increasing the feeling of associated reward (Booth et al., 2006; Geniole et al., 2019; Mims, 2007). Men's testosterone levels peak when they are young adults, increase when they divorce, and decrease when they marry and become fathers (Booth et al., 2006; Mazur & Michalek, 1998). Thus, a sex ratio skewed towards men produces more unmarried young men with higher levels of testosterone, which may consequently lead to a more violent society. By analyzing provincial data on violence rate and sex ratio, Edlund et al. (2013) concluded that one-seventh of the crime rate increase in the 1990s in China can be attributed to the surplus of young men facilitated by the one-child policy. Historians have also hypothesized that the skewed sex ratio in western America during the westward movement escalated violence against Native Americans and women (Hvistendahl, 2012). Knowledge about these potential impacts can help governments predict and prevent future conflicts related to skewed sex ratios.

Determining to what extent innate differences and social environments influence gender differences in psychology is indispensable in making policies. Good measures can hardly be devised without knowing both the intrinsic and extrinsic causes.

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