



Review

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The gender-binary cycle: the perpetual relations between a biological-essentialist view of gender, gender ideology, and gender-labelling and sorting

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Gender inequality is one of the most pressing issues of our time. A core factor that feeds gender inequality is people's gender ideology—a set of beliefs about the proper order of society in terms of the roles women and men should fill. We argue that gender ideology is shaped, in large parts, by the way people make sense of gender differences. Specifically, people often think of gender differences as expressions of a predetermined biology, and of men and women as different 'kinds'. We describe work suggesting that thinking of gender differences in this *biological-essentialist* way perpetuates a non-egalitarian gender ideology. We then review research that refutes the hypothesis that men and women are different 'kinds' in terms of brain function, hormone levels and personality characteristics. Next, we describe how the organization of the environment in a gender-binary manner, together with cognitive processes of categorization drive a biological-essentialist view of gender differences. We then describe the self-perpetuating relations, which we term *the gender-binary cycle*, between a biological-essentialist view of gender differences, a non-egalitarian gender ideology and a binary organization of the environment along gender lines. Finally, we consider means of intervention at different points in this cycle.

This article is part of the theme issue 'The political brain: neurocognitive and computational mechanisms'.

1. Introduction

Worldwide, women are disadvantaged relative to men, both at a structural level of power and at an interpersonal level. Women are extremely under-represented in leadership positions in politics [1], in top companies [2] and in academia [3]. They are also far less likely to own assets and land [4] and earn less money than men across countries [5]. Relative to boys, girls access to education is limited in many parts of the world, which translates to higher risks for unemployment and poor health [1]. Interpersonally, women are the common victims of sexual and domestic violence, with 35% of women experiencing either physical and/or sexual intimate-partner violence or sexual violence by a non-partner (not including sexual harassment) [6]. Women also tend to do a larger share of housework than their male partners, regardless of their age, income and geographical location [7]. Even though across these indices, there is an improvement over previous decades, gender inequality remains undisputedly severe and prevalent.

Factors at various levels feed gender inequality. These include macro-level sources (e.g. legal practices, policies, public discourse), micro-level factors (e.g. individuals' attitudes and motivations) and factors that stem from dynamic interactions between these levels [8]. In this review, we zoom in on gender ideology—a micro-level factor, defined as a set of beliefs about the proper order of society in terms of the roles men and women should fill [9]. Whereas prior research had clarified the antecedents and consequences of people's gender ideology (see

[9] for a review), it rarely incorporated perceptions and interpretations of gender differences into such understandings. We argue that the way individuals think about, and make sense of, gender differences plays a central role in shaping their gender ideology.

2. Gender ideology

Gender ideology is defined as ‘individuals’ level of support for a division of paid work and family responsibilities that is based on the notion of separate spheres’ [9, p. 87]. The beliefs associated with gender ideology reflect the endorsement (or lack thereof) of a binary separation of family versus work responsibilities along gender lines, and the acceptance of the gender hierarchy resulting from it. For example, research on gender ideology has asked respondents to report whether they agree or disagree with statements about separate, and gendered, responsibilities of women and men (e.g. ‘A man’s job is to earn money; a woman’s job is to look after the home and family’; [10]); and about justification of men’s privilege (e.g. ‘It is more important for a wife to help her husband’s career than to have one herself’; [11]). To the extent that support for such items is high, we refer to the gender ideology as non-egalitarian.

Longitudinal data show that over time, individuals’ gender ideology has become more egalitarian [12,13] and that overall, younger people have more egalitarian gender ideology than older people, and women are more egalitarian in their gender ideology than are men [14]. Exposure to egalitarian ideals via parental socialization, education or personal experience was further found to predict gender ideology. For example, having two parents with egalitarian gender ideology increases the likelihood that boys will be gender egalitarian [15]. In addition, working women are more likely to have egalitarian gender ideology [16], as are their male partners [12], and their children [17].

Gender ideology, like any other ideology, is a frame through which people interpret their worlds and consider what is good and proper [18]. As such, it is likely to predict the way people construct their environments and manage their own lives. For example, men with more egalitarian gender ideology tend to do a greater share of household labour [19] and to spend more time with their children [20]. Women with a non-egalitarian gender ideology are likely to get married younger, to become mothers at a younger age [21] and to perceive inequalities in their division of household labour as more fair [22]. Moreover, couples in which both partners hold a non-egalitarian (versus egalitarian) gender ideology are more likely to divide shared tasks in a traditionally gendered manner [23].

Whereas existing research underscores the role that demographic characteristics and exposure to egalitarian ideas play in shaping gender ideology, it tells us little about the psychological processes that lead to its formation and maintenance. Here, we propose that to better understand gender ideology and its origins, it is useful to consider how people think about gender differences.

3. A biological-essentialist view of gender differences and gender ideology

There are differences between women and men in many life domains. The lay theories that people hold regarding the

sources of these differences fall into two main categories. According to the first, gender differences are a result of the different way people think about and act towards women and men—a *socio-cultural* theory/explanation. This explanation is consistent with accounts that view gender ‘as an emergent feature of social situations’ rather than a property of individuals [24, p. 126]. According to the socio-cultural explanation, girls and boys, and later on men and women, are being *treated* differently by others in a way that creates and reinforces gender differences. Examples of such treatment are teachers who expect boys to be better than girls at maths (e.g. [25]), parents who expect their children to avoid toys that ‘belong’ to the other gender (e.g. [26]) and media portrayals that routinely underscore women’s sexuality [27].

Another way people understand gender differences, which we term a *biological-essentialist* theory/explanation, is to view them as stemming from biological differences between men and women. According to this explanation, owing to their different biological make-up, men and women have distinct ‘essences’ and thus are *predisposed* to differ mentally and behaviourally. At the core of this explanation are the genetic and hormonal differences between females and males, viewed as the determining factors of masculinity and femininity [28–31]. Such a biological-essentialist lay theory considers differences between women and men as predetermined and immutable, and views gender as a binary, such that men and women are viewed as different ‘kinds’.

Even though the socio-cultural and the biological-essentialist explanations are not mutually exclusive, and people often hold both to some extent, the biological-essentialist lay theory is prevalent both in children and adults [32,33], and especially among men. A recent poll conducted among a nationally representative sample of 4573 adults in the USA [34] found that the majority of respondents agree that men and women ‘are basically different’ on domains related to expression of emotions, parenting style, interests and abilities. The majority of men further indicated that the differences are mostly based on biology (61% indicated biological differences explain why men and women have different strengths in the workplace, and 58% believed biology accounts for gender differences in parenting). The majority of women viewed gender differences as based on societal expectations, though 39% believed biology explains gender differences in parenting and 35% believed biological differences explain gender differences in workplace-relevant strengths.

How do these views relate to gender ideology? Social psychological research demonstrates that a biological-essentialist lay theory of gender increases the endorsement of gender stereotypes and of a binary view of gender roles, as well as the acceptance of gender hierarchy—all central components of non-egalitarian gender ideology. For example, participants who were randomly assigned to read an article about gender differences as biologically determined (rooted in evolutionary programming, and in brain structures) were more likely to endorse gender stereotypes (e.g. to view men as more dominant, analytical and less nurturing and emotional, relative to women) compared to participants who were randomly assigned to read an article about socialization processes as explaining gender differences [35]. Such stereotypes were further shown to apply to the self. Women who were randomly assigned to read a biological-essentialist (versus socio-cultural) theory of gender differences were more likely to describe themselves with feminine traits,

including negative ones (e.g. shy, childlike; [36]). Demonstrating downstream consequences of such effects, women who were provided with a biological-essentialist account of gender differences in maths (i.e. men perform better owing to genes on the Y chromosome), performed worse on a maths test than women provided with a socio-cultural explanation (i.e. that teachers have biased expectations favouring men; [37]).

Similarly, greater endorsement of gender determinism (a belief that gender is a foundational force dictating a person's characteristics), which is consistent with a biological-essentialist outlook, was associated with greater preference for a gendered division of social roles [38]. Similarly, to the extent that fathers had essentialist beliefs about parental roles, they were less involved with childcare, independently of working hours [39].

A biological-essentialist view of gender was further found to shape support for broader patterns of gender hierarchy. Because according to this view, differences between men and women are seen as natural, differences in power and status between these groups can be attributed to inevitable and justified reasons [40,41]. For example, greater belief in the deterministic role of biology in human development was associated with more sexist beliefs (e.g. believing that progressive gender policies are unnecessary; [42]; see also [43]) and with opposition to transgender people's rights [44]. Gender essentialism also predicted greater support for gender discriminatory practices and greater perceived fairness of gender inequality [45]. These findings were corroborated by experimental evidence. People who were randomly assigned to read a biological-essentialist view of gender (versus a social-cultural view) were less likely to support rights of women and of transgender people [46]. Similarly, reading theories that provide a biological-essentialist view of gender differences increased people's acceptance of gender inequality [47]. A recent study further showed that exposure to a biological explanation of gender differences (versus a social constructionist explanation or no explanation) increased endorsement of essentialist views which led to decreased recognition of gender discrimination [48].

The findings reviewed above demonstrate that a biological-essentialist view of gender, which views men and women as distinct kinds, drives processes that strengthen a non-egalitarian gender ideology. These processes include the strengthening of stereotypic views of women and men and of their appropriate social roles, and the justification of gender hierarchy. In the next section, we consider what might be the psychological underpinnings of the tendency to interpret gender differences in a biological-essentialist way.

4. What drives a biological-essentialist view of gender?

The biological-essentialist lay theory of gender differences builds on the existence of group-level sex differences in various domains, from levels of sex-related hormones (e.g. testosterone) and the structure and function of the brain, to personality characteristics, cognitive and emotional abilities, and behaviour. At the core of this theory are the assumptions that these differences are predetermined and stable and that they add up to create two kinds of humans. In this section, we will consider what might underlie such conceptions. We will first consider whether men and women indeed belong

to two kinds in terms of their brains, hormonal levels and behaviour. We will then move to consider how the labelling and sorting of the environment in a gender-binary way can drive a biological-essentialist view of gender differences.

(a) Are women and men distinct kinds of humans?

Research from neuroendocrinology, neuroscience and psychology often reveals group-level differences between women and men, but does not support the biological-essentialist beliefs that these differences are immutable, nor the assumption that human brains, hormones and 'natures' belong to two distinct kinds.

In contrast with popular beliefs, endocrinology research reveals that humans do not possess one of two sets ('female' or 'male') of sex-related hormones. Rather, hormones that are considered 'female' (oestrogen and progesterone) and those considered 'male' (e.g. testosterone) are present in both men and women as they are produced by both ovaries and testes as well as by additional tissues that are present in all bodies (for a review, see [49]). In fact, other than during pregnancy and ovulation, men and women do not differ on average in their levels of oestradiol and progesterone [50,51]. Although testosterone levels are higher on average in men than women, the difference is smaller than widely believed, does not exist at all stages of life and the distributions of testosterone levels of men and women show considerable overlap [52]. Moreover, the levels of sex-related hormones vary widely within individuals, changing across the lifespan as well as in response to internal and external conditions, including gendered behaviours [53,54]. For example, sexual thoughts increase testosterone levels in women [55] and nurturing parenting behaviours decrease testosterone in men [56]. Thus, gender differences in levels of sex-related hormones do not conform to a fixed and binary conceptualization [53,57].

Human brains also cannot be meaningfully sorted into 'female' and 'male'. Although there are group-level gender differences in many brain measures (e.g. size of specific brain regions, strength of connections between regions), there is a great deal of overlap between the distributions of women and men for each of these measures (e.g. [58–60]). Moreover, even when considering only brain features that show large gender difference (Cohen's $d > 0.7$), individual brains typically comprise 'mosaics' of features, some in the form more common in women than in men, and others in the form more common in men than in women [58,61]. Studies in laboratory animals reveal that this 'mixing' of features within brains results from interactions between the genetic and hormonal effects of sex and a range of environmental factors (e.g. rearing conditions, postnatal stress, see [62]). These interactions may reverse, erase, create or exaggerate sex differences in specific brain features, resulting in a multitude of combinations which do not fall into a 'male' and a 'female' brain type [61,62]. In fact, a study of over 2100 human brains which tested the hypothesis that the typical female brain is different from the typical male brain found instead that the brain architectures typical of women are also typical of men, and vice versa [63].

Overlap and mosaic also characterize psychological characteristics, even in domains showing large gender differences. A review of 46 meta-analyses, covering thousands of studies which documented gender differences across a wide range of domains (e.g. cognitive abilities, aggression, helping

behaviour, leadership), revealed that 30% of the effect sizes were trivial (Cohen's $d < 0.10$) and an additional 48% were small (Cohen's $d < 0.35$; [64]). That is, the majority of characteristics expected to demonstrate gender differences showed small or trivial differences (see [65] for a replication). The few exceptions were mainly in the areas of aggression and sexuality. An analysis of the make-up of characteristics, which show large gender differences (Cohen's $d > 1$, e.g. watching porn, wearing cosmetics), within individuals, showed that humans rarely possess only feminine (i.e. more common in women compared to men) or only masculine characteristics; rather, the lion's share of people have a mosaic of both feminine and masculine characteristics [58].

Together, research from endocrinology, neuroscience and psychology converge to demonstrate that even though there are average differences between men and women, these differences are often small, context dependent and do not create two 'kinds' of people. This stands in marked contrast to the biological-essentialist explanation, according to which gender differences are immutable and gender is an inevitable binary.

(b) The binary construction of gender in the environment

Why, despite the complex biological and psychological reality reviewed, do people still tend to endorse a biological-essentialist theory of gender differences? Below we consider how being exposed to an environment in which gender is a consistently salient social category can drive a biological-essentialist lay theory of gender.

Once multiple objects or people are given the same label, they are categorized as a group. This basic cognitive process leads children and adults to infer that those objects or people who belong to the same category have many properties in common [66,67]. This is exemplified in a classic study by Tajfel [68]: participants were presented with a group of eight lines of consecutive length. In one condition, the lines appeared with no labels, and in the other condition, the four shorter lines received the label 'A' and the four longer lines received the label 'B'. When labelled, lines with the same label were rated as more similar to each other, versus when the same lines were unlabelled. In addition, lines with different labels were estimated as more different than when they were assessed in the absence of labels. Thus, the mere act of giving objects the same label suffices to produce a binary perception, that is, an accentuation of group differences and of within group similarities [69].

Furthermore, the frequency with which grouping labels are used and the emphasis they receive increases their impact on thinking about self and others [70]. For example, in one study, teachers created novel groups in the classroom by assigning children to wear a T-shirt in one of two colours. Then, in one condition, the teacher organized multiple activities based on the coloured group assignment, and in another condition, the coloured groups were not used for further sorting. Children in the former versus latter condition were likely to view the members of the two groups as more distinct [71]. Thus, categorization-induced cognitive bias was amplified when perceptual categories carried social meaning.

Gender is routinely used as a label and as a sorting dimension. By gender-based labelling, we refer to the marking of an individual as a girl or boy, as a woman or a man. Language is

central for labelling. People constantly use gender labels in everyday language ('girls' or 'boys', 'men' or 'women'), often when unnecessary (e.g. teachers who greet their classrooms with 'Good morning, boys and girls' rather than 'Good morning, students'; see [70]). Gendered labels are also used in specific domains such as occupations (e.g. *actress*, or *soundman*) and are, in some languages, routinely used to describe inanimate objects (e.g. a fork is male and a spoon is female in Hebrew; see [72]). Gender labelling is enacted not only through language. For example, throughout history, gender-differentiated dress was legally mandated in many public settings, including schools and workplaces [73], and norms continue to dictate that men and women differ in their dress and use of accessories.

The clearly labelled and distinguished gender categories across a wider range of domains are imbued with social or cultural meaning. Sandra Bem, a leading scholar on the development of gender stereotypes, described this as 'the forging of a cultural connection between sex and virtually every other aspect of human experience' [74, p. 192]; cited in [75]. Examples for this meaningful, gender-based sorting abound. The environment is saturated with gender sorting all the way from children's toys (e.g. [76]), and candy (e.g. the kinder egg; [77]) and the gendered production and marketing of various items (e.g. a pen designed for women; see [78]), to gender norms regarding appropriate interests and behaviours for girls versus boys, and for women versus men [79,80]. These gendered norms are constantly enacted and reinforced through public discourse, media representations [81], books and educational texts [82]. Consequently, gender is not only a salient category for individuals from a very early age and throughout life, it is also a highly meaningful one. Given the tendency to view categories as internally consistent and as distinct from other categories, the constant presence of gender as a significant and relevant sorting dimension can reinforce the view of men and women as two distinct kinds [70].

Beyond this binary perception, categorization also leads to a belief about a shared intrinsic essence of category members. Adults and children seek explanations for observed phenomena that are both simple and easily accessible [83,84], and explanations that draw on intrinsic properties are generally more salient and more easily retrieved from memory than extrinsic explanations, which tend to be more complex [85]. For example, studies reveal that essentialist accounts of social categories, including the perception that differences between groups are biologically innate, are more common than extrinsic accounts [86]. Thus, a child might conclude that a peer who acts in a certain way must have been born that way, because no alternative explanations are salient (see [87]). Indeed, when extrinsic reasoning is made accessible, people reduce their use of essentialist thinking including reducing their endorsement of statements such as 'Males share an underlying property that causes them to have many similarities' [86]. Thus, the salience of social categories such as gender not only encourages binary thinking, but also facilitates essentialist explanations for the existence of these categories.

Together, the work reviewed in this section suggests that people tend to adopt a biological-essentialist view of gender at least partly because gender is socially constructed as a binary category, with humans clearly marked as belonging to one of these two categories, and belonging to one of these categories has social consequences that encompass almost every aspect of a person's life. The tendency to adopt a

biological-essentialist view of gender differences is further amplified by people's tendency to exaggerate similarities within categories and differences between categories, and to view categories as determined by inherent factors.

5. The gender-binary cycle

Taken together, the work reviewed above points to a self-perpetuating cycle. According to this cycle, a biological-essentialist lay theory of gender differences—that is, a binary view of men and women as different 'kinds', feeds a non-egalitarian gender ideology—that is, the endorsement of a binary (and hierarchical) division of social roles for each 'kind'. In turn, such an ideology leads individuals to comply with, and contribute, to a binary organization of the environment through labelling and sorting along gender lines. Together with cognitive processes of categorization and inference of inheritance, such a binary organization of the environment gives rise to, and reinforces, a biological-essentialist lay theory of gender differences, ultimately resulting in a self-perpetuating cycle.

In addition to this cyclical process, the model further specifies two additional paths. According to the first, gender-based labelling and sorting of the environment reinforces a non-egalitarian gender ideology directly (in addition to its indirect path through essentialist beliefs). An environment that marks gender, or is designed as strictly 'masculine' or 'feminine', can feed a non-egalitarian gender ideology by communicating expectations for behaviours, interests and role-pursuits that are consistent with gender stereotypes. For example, when a computer science classroom was designed in a stereotypically masculine way (with Star Trek posters), versus in a gender-neutral way (with nature posters), undergraduate women were less interested in computer science [88]. The labelling of the environment as 'masculine', compromised women's sense of belonging and thereby their motivation to pursue a male-stereotypical domain (see also [89]). Similarly, research on stereotype-threat shows that when the environment signals gender distinctions, people behave in ways that confirm gender stereotypes (see [90] for a review). For example, men scored lower on a social sensitivity test after they were presented (versus not presented) with information about the gendered nature of the test (i.e. that women typically perform better; [91]). Thus, the gender labelling of the environment promotes not only categorical perception, as described above, but also gender-stereotypic behaviour which feeds a non-egalitarian gender ideology.

The second additional path indicates that a non-egalitarian gender ideology can drive a biological-essentialist view of gender differences (dashed line on the left side of the model in figure 1). A biological-essentialist view of gender can be recruited by people who endorse a non-egalitarian gender ideology in order to provide justification and validity to their ideological stance. The belief that differences between men and women are inherent, meaningful and inevitable renders role-separation and power disparities logical and justified [41]. In support of this feedback loop, research shows that the more people are motivated to sustain group-based hierarchy, the more likely they are to endorse essentialist views of gender [45].

The reciprocal relationship between a non-egalitarian gender ideology and justifying biological-essentialist explanations is also evident in the way gender has been treated

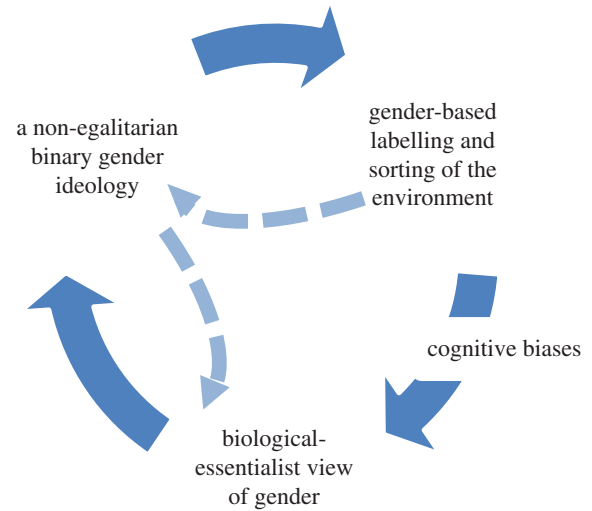


Figure 1. The cyclical relations between gender ideology, gender-based sorting and labelling, and a biological-essentialist lay theory of gender. (Online version in colour.)

as a topic of scientific inquiry. Since the dawn of scientific thinking, much effort has been devoted to providing a scientific account—in the form of sex differences in the brain—for women's social inferiority [92,93]. Early portraits of women described them not only as biologically distinct from men, but also as inferior on almost every aspect of human functioning [92]. The notion that males' brains are designed to facilitate processes that are fundamentally different than those facilitated by females' brains still prevails, and many studies are devoted to detecting sex differences in brain structure and function. The results of such studies are often interpreted, in both scientific and popular contexts (e.g. press releases, traditional news media), through the binary framework—the differences are overemphasized (in terms of their size and significance) and assumed to add up within individuals to create two types of humans [62,94,95].

While today scientists would not go on to claim that women are inferior to men, their portrayal of sex differences in the human brain often aligns with gender stereotypes. For example, a large study of connectivity in the human brain concluded: 'Overall, the results suggest that male brains are structured to facilitate connectivity between perception and coordinated action, whereas female brains are designed to facilitate communication between analytical and intuitive processing modes' [96, p.823]. This claim was made even though only several dozen connections, of the over 9000 assessed, showed moderate sex/gender differences (Cohen's $d \sim 0.3$; [97]), and the authors did not test whether the differences add up to two types of connectivity patterns. As reviewed earlier, a later study revealed that this is not the case, as most brains possess unique mosaics of connections, some with the strength more common in women and others with the strength more common in men [58].

6. Practical implications and future directions

The gender-binary cycle suggests three possible ways of intervention, each corresponding to a different point in the cycle. The first is reducing the prevalence of gender-labelling and sorting. Although gender-based sorting of products and spaces is pervasive, it may sometimes be easily modified [98].

For example, parents, as well as kindergarten teachers, can change their children's play spaces to include both 'masculine' and 'feminine' toys; companies can easily modify wording and colouring of their online advertisements to include less gendered forms of communication (e.g. an after-school organization in Israel recently changed the language of their advertisement from one that included boys versus girls classes, to classes sorted by topics; see [99]). For such change to occur, it is first necessary to raise awareness of the downstream and often unintentional consequences of gender-based labelling and sorting.

The second point of intervention is challenging the biological-essentialist perspective, either by refuting its claims that gender differences are immutable and add up to two kinds or by providing an alternative, non-essentialist explanation, to gender differences. As described above, even a short text that provides adults with a social account of gender differences can reduce the use of gender stereotypes and promote a more egalitarian outlook on gender roles and relations.

The third intervention is directed at changing the association between a biological-essentialist lay theory of gender and non-egalitarian gender ideology. Even if people conceive of gender differences as biologically innate, this does not *have to* translate to stereotypic gender views and role division [98]. Indeed, in other domains, a theory of biological causes does not lead to the justification, or celebration, of the consequences but rather to attempts to challenge them in order to provide equal opportunity and maximize individual potential. For example, when a genetic mutation that leads to a disease is discovered (e.g. Huntington's disease), the disorder is not celebrated as a gift of nature. Rather, this information is used to direct efforts to help those afflicted. Similarly, if we were to discover a genetic variation that leads to difficulties in acquiring reading skills or to enhanced aggressive tendencies, we would not give up on teaching these children how to read nor give these children a licence for violence, but would rather do exactly the opposite—increase our efforts in teaching them to read or to control their aggression.

The same approach can be harnessed for dealing with gender differences that are assumed to be innate. For example, if boys are assumed to lack in empathy or to be aggressive as a result of exposure to hormones *in utero*, then appropriate social measures (e.g. educational training) should be taken to increase their empathic and inhibitory abilities, as would have been done if their empathic deficit or aggressive tendencies were attributed to a contextual factor (e.g. maltreatment on part of parents). That this is not the approach taken in relation to biological explanations of gender differences is yet another testimony to the tight relations between these explanations and gender ideology. The alternative approach we suggest can be facilitated by raising awareness to the tendency to celebrate, rather than challenge, gender differences, and to the costs of such tendency: the perpetuation of gender inequality and the costs to people's fulfilment of their full potential [98].

To provide a deeper understanding of the gender-binary cycle, and of the forces that propel it (or can potentially

break it), it is worth considering potential moderating factors. First, individual differences can play an important role in the extent to which people are likely to engage in the outlined cyclical dynamic. For example, there is evidence that individuals who are more susceptible to cognitive biases are more prone to endorse ideological beliefs [100]; thus, to the extent that individuals rely on cognitive biases, their likelihood of developing and reinforcing a non-egalitarian ideology is expected to increase.

Second, the psychology of power relations can play an important role in shaping the processes that drive the gender-binary cycle. Men, being the advantaged group in the power hierarchy, are likely to be driven by motivations to sustain their power, which often translate to overlooking or downplaying their advantages [101]. Studies conducted under the framework of the minimal group paradigm show that it is enough to be assigned to a distinct group, to develop a motivation to increase the relative advantage of the ingroup over the outgroup (see [102] for a review). Such a manipulation also dampens empathic responses towards the suffering of outgroup (versus ingroup) members [103,104]. Together, these allow men to support a non-egalitarian gender ideology while maintaining their self-perception as moral and egalitarian. Indeed, even though women are likely to be motivated to sustain the gender-binary cycle owing to other motivations (e.g. the motivation to believe the system they are part of is just and fair; [105]), men relative to women are more likely to uphold a non-egalitarian gender ideology [14,106], and to endorse a biological-essentialist lay theory of gender [34,107]. Thus, for men (versus women), the gender-binary cycle might be more resistant to change, and when devising interventions, these varied motivations should be taken into account.

7. Concluding remarks

In closing, the reviewed work points to deep challenges associated with reducing gender inequality—biological-essentialist views of gender, which are pervasive, feed a non-egalitarian gender ideology, which in turn drives gender based labelling and sorting in society. When environments are organized in a manner that underscores gender distinctions, essentialist views are intensified, resulting in a self-perpetuating cycle. At the same time, understanding of the cyclic relations between these components offers an optimistic angle by pointing to promising avenues for promoting gender equality.

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