Editorial

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Editorial: Let's talk about sex – the gender binary revisited

A growing number of organizations and companies have introduced unisex restrooms in their buildings to prevent transgender and genderqueer individuals being harassed by other toiletteers because of their perceived use of the wrong facility. Although the abandonment of urinary segregation may go too far in the eyes of some citizens, it does indicate that the sex binary is debated more than it used to be. It is increasingly acknowledged that some individuals feel ill-placed in the category they were assigned to at birth, or not comfortable with a binary classification at all. The shifting notions about the dichotomous nature of sex have begun to generate changes in societal environments and habits and raise the question of whether the scientific world should change its methods too. So let's talk about sex… and let's talk about gender. As is probably well-known, sex refers to biological differences and gender to socioculturally delineated masculine and feminine roles.

Sex and gender differences play a role in many child psychology and psychiatry studies (Zahn-Waxler, Shirtcliff, & Marceau, 2008). Some gender differences found, such as the over-representation of boys in early-onset neurodevelopmental disorders and of girls in adolescent-onset emotional disorders (Rutter, Caspi, & Moffitt, 2003), have appeared to be quite large and robust, and gender is often a powerful ingredient of prediction models. As is nicely illustrated in the current issue of the *JCPP*, this role varies from modest, that is, a variable tested for equality of distribution (Wolff et al., p. 939–949; Zonneveld et al., p. 913–921), a covariate adjusted for in the analyses (Barona et al., p. 931–938; Betancourt et al., p. 922–930; Suor et al., p. 902–909), or a potential effect modifier (Bornstein et al., p. 880–892; Feurer et al., p. 950–957) to one of the key determinants under study (De Zeeuw et al., p. 893–901; Ewijk et al., p. 958–966).

In general, the conceptualization and interpretation of differences between boys and girls is unrelated to whether authors use the term sex or gender to denote these differences. This is hardly surprising because, aside from the specific situation where someone's sex and gender do not match, being male or female represents an inextricable interplay of biological and sociocultural influences. Yet, the distinction between sex and gender is relevant when taking into account potential pitfalls of considering the variable as a binary.

The most unequivocal way to define individuals as males or females is based on the number of X and Y chromosomes. With some relatively rare exceptions, the vast majority of the population can be classified as either XX or XY, and hence a binary – in some cases perhaps extended with additional categories to account for more exceptional chromosomal patterns – is a highly appropriate way to describe the distribution of sex. The within-sex heterogeneity is larger for the direct biological consequences of genetic sex, such as gonadal hormone levels and primary and secondary sex characteristics, but a binary to summarize these differences is still very useful from a practical point of view. In terms of explanatory power, however, using a sex binary has limitations because being male and females reflects a multidimensional range of continuous features (e.g., height, strength, and hormone levels), some of which may be more relevant to the topic under study than others. The issue of limited explanatory potential becomes even more salient when we enter the domain of gender, which includes diverging and partly context-dependent factors such as social expectations, possibilities, exposure, and many more (*Knaak,* 2004). It is evident that a binary variable can only be a crude representation of these determinants.

Does this imply that the use of the gender binary is obsolete in child psychology and psychiatry research? Obviously, no. Gender differences in youth mental health outcomes have proved to provide an excellent starting point for the generation of hypotheses regarding underlying biological, psychological, or sociocultural mechanisms. These more proximal explanatory factors bear more potential from an intervention point of view than their binary counterparts, and their usually continuous nature paves ways for more precise risk assessments than being a boy or a girl alone.

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That said, one may wonder to what extent the plethora of sex differences that have been reported in our field in the last decades have actually deepened our understanding of the onset and course of psychiatric disorders in childhood and adolescence. My personal impression is that, on the one hand, the theoretical gain has been huge. As mentioned above, gender similarities and differences found in the prevalence, determinants, and consequences of various kinds of psychopathology have

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fueled theories about causal mechanisms (see, for instance, Rutter et al., 2003) and so served much broader purposes than merely descriptive ones. Numerous noteworthy biological, psychological, and social mechanisms have been proposed to explain why girls are at higher or lower risk than boys regarding specific mental health pathways. A fine example of such a postulated mechanism is provided by *Van Ewijk* et al. (this issue), whose study revealed a female-specific association of the *NOS1*-VNTR with white matter microstructure proposed to be due to estrogen influences on *NOS1* expression. Together, these ideas have contributed substantially to the complexity and elegance of current etiological models.

On the other hand, the widespread and sometimes almost perfunctory consideration of possible sex or gender differences has also yielded a muddle of inconsistent and seemingly arbitrary effects, which cannot be integrated in an overarching model. Moreover, although theoretical notions about gender differences in developmental psychopathology have reached a high level of sophistication, the actual testing of hypotheses that can be derived from these notions, is lagging behind. This lack of evidence does not concern associations with postulated explanatory factors as such, but rather the question whether these associated factors actually diminish the variance explained by gender when included in the model. If a variable underlies specific gender differences, then the remaining effect of gender should be reduced when this variable is taken into account. Although fairly easy to perform, such tests have rarely been reported in the literature, and so we assume a lot of things about the why and how of gender differences, but actually do not know an awful lot yet.

More knowledge and empirical evidence regarding the active agents of specific gender effects could speed up scientific progress and improve treatment for several reasons. First, it would support and improve the interpretation of diverging gender effects across studies. Given that the effect of gender is context-dependent and that the variable is usually included in an analytical model as one of multiple determinants, each of which may capture part of its active agents, varying and sometimes even opposite gender effects are not only possible, but even inevitable. To interpret these –residual– gender effects and assess the extent to whether they are actually inconsistent with prior research, it is essential to have a well-founded sense of the working mechanisms of gender in a specific context. The second reason is that gender is a classification variable, a distal marker at the most, not a causal risk factor. It can be a convenient tool to identify high-risk target groups for prevention or intervention, but otherwise has little clinical relevance because it is unchangeable and may mask relevant variation. More, and more integrated, information about the factors that are causally implicated in the onset and course of the psychopathologies under study will help to develop and select more effective and more personalized intervention strategies.

Altogether, these considerations suggest that it may be worthwhile to move beyond the binary notion of gender and raise the question how that might be accomplished in our field. A fruitful first step would be to delineate which aspects of sex or gender are assumed to be of relevance every time the variable is included as covariate or effect modifier in analytical models. All too often, gender is included because previous studies found differences between boys and girls, but this reason is hardly satisfying. A more substantive justification increases conceptual clarity and precision (*Johnson & Repta,* 2012), and lays the foundation for a more constructive use of gender differences, by explicitly acknowledging that the gender binary is a quick-and-dirty way to capture unmeasured, still-to-be-explained variance. A natural next step would then involve attempts to reduce the variance explained by gender by including better, that is, more precise and changeable, risk factors in studies and models, ideally up until the point where the gender binary does not add predictive power anymore and so has become redundant. It is obvious that there is still a long way to go before we reach that goal, but the journey will be an inspiring one. Moreover, feminine boys, masculine girls, and all other young people who feel uncomfortable with the binary gender classification will be grateful for these efforts.

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