



Gender identity and sexuality in an online sample of intersex-identified individuals: a descriptive study

Roi Jacobson & Daphna Joel

To cite this article: Roi Jacobson & Daphna Joel (2020): Gender identity and sexuality in an online sample of intersex-identified individuals: a descriptive study, *Psychology & Sexuality*, DOI: [10.1080/19419899.2019.1711447](https://doi.org/10.1080/19419899.2019.1711447)


To link to this article: <https://doi.org/10.1080/19419899.2019.1711447>

 View supplementary material [↗](#)

 Accepted author version posted online: 01 Jan 2020.
Published online: 05 Jan 2020.

 Submit your article to this journal [↗](#)

 Article views: 2

 View related articles [↗](#)

 View Crossmark data [↗](#)



Gender identity and sexuality in an online sample of intersex-identified individuals: a descriptive study

Roi Jacobson^a and Daphna Joel^{a,b}

^aDepartment of Psychological Sciences, Tel-Aviv University, Tel-Aviv, Israel; ^bSagol School of Neuroscience, Tel-Aviv University, Tel-Aviv, Israel

ABSTRACT

Common scientific scholarship typically assumes direct relations between the development of sex, gender identity and sexual orientation. Recent studies, however, reported a range of gender identities and sexualities in individuals with typical sex development. Here we investigated aspects of gender identity, sexuality and the relations between them in an online sample of intersex-identified individuals ($N = 107$) using the Multi-Gender Identity Questionnaire (Multi-GIQ) and a measure of sexuality. Conducting the study outside of clinical surroundings provided an opportunity to reach intersex-identified individuals who may not be willing to collaborate with studies organised by the medical establishment. Results show a range of gender and sexuality experiences, and no correlation between sexuality and gender identity. Aspects of both showed small to large correlations with dissatisfaction with gender-atypical body characteristics. The implications to our understanding of the relations between the development of sex, gender identity and sexuality are discussed.

ARTICLE HISTORY

Received 15 April 2019
Accepted 30 December 2019

KEYWORDS



Intersex; DSD; gender identity; sexuality; gender-diverse


Introduction

Intersex or differences of sex development¹ (DSD; Wiesemann, Ude-Koeller, Sinnecker, & Thyen, 2010) are umbrella terms for several conditions in which chromosomal, gonadal, hormonal, and/or anatomical sex are atypical.² Providing care for intersex individuals has long been a matter of controversy. Whereas intersex activists are often very critical of early 'sex-assignment' procedures (Preves, 2003, 2005), advocates of early 'sex-assignment' interventions claim that most intersex individuals are satisfied with the medical interventions they have received (Preves, 2003, 2005).

The rationale for early medical interventions often relies on the prevailing psychological framework within which biological sex, gender identity and sexual orientation are considered. In this framework, two biological sexes (male and female), are each associated with a clear-cut, binary gender identity (boy/man or girl/woman) and a sexual attraction towards the 'opposite' sex (Diamond & Butterworth, 2008; Richardson, 2007). In addition, atypical development of one of these constructs (biological sex, gender identity or sexual orientation) is expected to be linked with atypical development of the other two (for a critical review of this assumption see Jordan-Young & Rumati, 2012; Ponce, 1978; Richardson, 2007).

In recent years, this framework has been challenged by the results of studies conducted on individuals with presumably typical sex development (TSD). Research concerning the lived experiences of cisgender, transgender, genderqueer and other non-binary identified individuals revealed

CONTACT Daphna Joel  djoel@post.tau.ac.il  Department of Psychological Sciences and Sagol School of Neuroscience, Tel-Aviv University, Tel-Aviv 39040, Israel

 Supplemented data of this article can be accessed [here](#).

© 2020 Informa UK Limited, trading as Taylor & Francis Group

that, while some may hold only a male or a female gender identity, others may foster ambiguous identities, incorporate both male and female identifications, alternate between different identities or reject gender identity altogether (Bockting & Coleman, 2007; Diamond, Pardo, & Butterworth, 2011; Girchick, 2008; Jacobson & Joel, 2018a, 2018b; Joel, Tarrasch, Berman, Mukamel, & Ziv, 2013; Martin, Andrews, England, Zosuls, & Ruble, 2017; Matsuno & Budge, 2017; Richards et al., 2016; Wilson, 2002). In parallel, research on sexual orientation has shown that it is better represented as a spectrum than as a binary (reviewed in Savin-Williams, 2016). Moreover, assessment of several aspects of both gender identity and sexuality in cisgender, transgender, and non-binary individuals revealed that these two constructs are very weakly correlated (Jacobson & Joel, 2018a, 2018b; Joel et al., 2013). It was therefore of interest to explore gender identity, sexuality and the relations between them in individuals with atypical sex development.

Studies of intersex/DSD individuals most often report that they maintain the gender identity in which they were raised and are heterosexual in relation to the assigned gender (Berenbaum & Meyer-Bahlburg, 2015; Callens et al., 2016; Cohen-Kettenis, 2010; DeVries, Doreleijers, & Cohen-Kettenis, 2007; Kreukels et al., 2018; Sobel & Imperato-McGinley, 2004; Zucker, 2006; for a review see Bakula et al., 2017). Other studies, however, found elevated levels of gender dysphoria (Bakula et al., 2017; Cohen-Kettenis, 2005; Jürgensen et al., 2013; Khorashad et al., 2016; Kreukels et al., 2018; Meyer-Bahlburg, 2005; Praveen et al., 2008) and non-heterosexual tendencies (Meyer-Bahlburg, Dolezal, Baker, & New, 2008; Schönbucher et al., 2012) in individuals with intersex conditions compared with the general population. Yet, most previous studies have used crude measures of gender identity and sexuality, including treating sexuality as a binary measure – heterosexual versus non-heterosexual (Callens et al., 2016; Hines, 2011). In addition, most of these studies were clinic-based, and as such were restricted to individuals willing to collaborate with medical institutions. That low response rate may be a problem is evidenced by the observation that only 36% of intersex individuals approached by the large multi-centre DSD-Life study, agreed to participate (Kreukels et al., 2018; Röhle et al., 2017).

The present study is part of a large online study of the relations between the development of sex, gender identity and sexuality. Two previous publications described gender identity, sexuality and the relations between them in individuals with TSD (Jacobson & Joel, 2018a, 2018b). The aim of the present study was to explore these constructs in individuals with atypical sex development, and specifically, in individuals who self-labelled as intersex in our online study. In addition to providing insight into the relations between gender identity and sexuality in this group, our study provided an opportunity to explore these in a different population than that typically sampled in studies of DSD. Specifically, conducting our study outside of clinical surroundings provided an opportunity to also reach intersex individuals who perceive clinicians and researchers as representatives of the establishments who have wronged them (Lossie & Green, 2015), and may not be willing to collaborate with studies conducted by the establishment. On the other hand, given the rejection of the intersex label by many parents and adults with DSD (Dreger & Herndon, 2009), the present study, in which one had to identify as intersex to be included in this group, might have an under-representation of individuals with DSD who are satisfied with their current state to the extent that they may not self-label as intersex or be reluctant to do so.

The Multi-GIQ (Jacobson & Joel, 2018a, 2018b; Joel et al., 2013) was developed based on existing questionnaires for the assessment of gender dysphoria in clinical populations, such as the gender identity/gender dysphoria questionnaire for adolescents and adults (Deogracias et al., 2007). The Multi-GIQ is designed to assess gender identity also in cisgender individuals and differs from previous gender identity questionnaires in that it assesses several aspects of gender identity without presupposing that some aspects (e.g. wishing to be the 'other' gender, feeling as the 'other' gender) are dysphoric or nonconforming. The questionnaire includes items that assess feeling as a woman, feeling as a man, sometimes feeling as a man and sometimes as a woman, feeling between a man and a woman, feeling as neither gender, wishing to be a man, wishing to be a woman, feeling as a 'real' man and feeling as a 'real' woman. (For a discussion of the Multi-GIQ content and construct

validity, see Joel et al., 2013; for the results of a principal component analysis of the responses of cisgender, transgender and gender-diverse TSD individuals on the Multi-GIQ and sexuality questionnaires, see; Jacobson & Joel, 2018b.)

Method

Participants

We recruited participants to complete an Internet questionnaire with an aim to recruit individuals from sexual minority groups ('minority' in terms of the prevalence in the population). No means were taken to guarantee random sampling of the population. Invitations were sent to several groups and organisations that concentrate on LGBT and intersex issues and posted on relevant online forums. Invitations were also posted on the Facebook profiles of the researchers. The invitation included an explicit request to forward the invitation to as many people as possible. One hundred and seven intersex-identified individuals participated in the study, of which 82 were raised as boys and 25 were raised as girls (Caucasian, 69.2%; Multiracial, 10.3%; Other, 6.5%; Would rather not say, 4.7%; Black, 2.8%; Hispanic, 1.9%; Arab, 0.9%; Asian – Pacific islander, 0.9%; Indigenous or Aboriginal, 0.9% – two individuals didn't identify by race). Mean age was 43.64 ($SD = 14.12$). The results of participants who self-identify as *male* or *female* (rather than *intersex*) were described in Jacobson and Joel (2018a, 2018b).

Procedure

The questionnaire was administered online. On the first page, participants were informed about the research aims (studying how people perceive their gender identity), were assured that they could stop filling out the questionnaire at any point and that their contribution and responses were anonymous. In addition, they were asked to give their consent to participate in the study. Ways of contacting the researchers were presented on this page, as well as at the end of the questionnaire. By pressing 'continue', the Multi-GIQ questionnaire was displayed and was followed by the sexuality and demographic questionnaires. All questions on the Multi-GIQ and sexuality measures were presented one at a time whereas the demographic items were presented simultaneously. Participants could press 'next' without answering a question but could not go back and change their chosen answers.

Measures

The Multi-gender Identity Questionnaire (Multi-GIQ, Hebrew version – Joel et al., 2013, English version – Jacobson & Joel, 2018a; 2018b) is comprised of 24 questions that are gender-neutral (e.g. Q24. In the past 12 months, have you wished you had the body of the 'other' sex?) or presented twice, once as if addressed to a female participant and once as if addressed to a male participant (e.g. Q1. In the past 12 months, have you felt satisfied being a woman? Q2. In the past 12 months, have you felt satisfied being a man?). Answers were marked over a 5-point Likert scale ranging from 'Never' (0) to 'Always' (4). A 'Not relevant' item was added where necessary (e.g. the question: 'In the past 12 months, have you had the wish or desire to be a man?' is not relevant for men; for the full text of the questionnaire see (Jacobson & Joel, 2018a, 2018b)). The analysis of the questionnaire followed our analysis in Jacobson and Joel (2018a, 2018b). Specifically, 12 variables were analysed, of which nine were scores on single items of the Multi-GIQ and three were created based on theoretical considerations using scores of two or more questions ('Not relevant' was treated as a missing value). The 12 variables were: feeling-as-a-man (mean of Q4 and Q13, Spearman-Brown = .90); feeling-as-a-woman (mean of Q3 and Q14, Spearman-Brown = .87); sometimes-feeling-as-a-man-and-sometimes-as-a-woman (Q15); feeling-between-a-man-and-a-woman (Q16); feeling-as-neither-gender (Q17); wish-to-be-a-man

(Q20); wish-to-be-a-woman (Q21); dislike-of-the-sexed-body-due-to-its-female-form (Q22); dislike-of-the-sexed-body-due-to-its-male-form (Q23); feeling-as-a-'real'-woman (Q9); and feeling-as-a-'real'-man (Q10). A measure of deviation from a 'binary' gender identity (i.e. either a man or a woman) was created on the basis of items Q3, Q4, Q13, Q14, Q15, Q16 & Q17, to create a score between 0 = completely binary, to 4 = highly non-binary. (To obtain the maximum score one had to have the same score on feeling as a man and feeling as a woman, as well as the maximal score on feeling as both genders, in-between genders, and neither gender.)

Please note that Q15 and Q16 were analysed separately in the present study, whereas in Jacobson and Joel (2018a, 2018b), they were averaged to assess 'feeling as both genders'. The reason for this change was that the scale score reliability of the combined variable in the present study was too low (Spearman-Brown = .78). Questions Q11 and Q12, which were included in Jacobson and Joel's study (2018a) and pertain to buying and wearing clothes of the 'other' sex were excluded from the current analysis because it was not clear how the term 'other sex' was understood by intersex individuals. We also excluded items Q1 and Q2 (... , have you felt satisfied being a man? and ... , have you felt satisfied being a woman?). In our previous studies most of the participants chose 'Not relevant' for the question referring to the 'other' gender, leaving only information about how much they are satisfied with their affirmed gender (Jacobson & Joel, 2018a, 2018b). As this was true for only 51.4% of the participants in the present study, we preferred to exclude these items altogether rather than analyse data of only half of the participants.

The sexual orientation questionnaire is comprised of eight questions assessing sexual fantasies, sexual attraction, sexual behaviour and romantic relationships, in relation to women and in relation to men (e.g. 'How would you rate the level of your sexual attraction to men?' and 'How would you rate the level of your sexual attraction to women?'). For the attraction questions, the response options were: Very high, High, Medium, Low, Very low, None. For the other questions, the response options were: Very often, Often, Sometimes, Rarely, Very rarely, Never. Because only the response options for attraction to men and to women allow independence between the two measures (because they relate to 'how much' rather than to 'how often', e.g. one can be highly attracted to both men and women but cannot 'always' have sex with men and 'always' have sex with women), only these two items were used to assess sexuality in the present study. Please note that the sexuality questionnaire, as the Multi-GIQ, refers only to the two most common gender identity labels (woman and man) and leaves out the multiple other ways in which individuals may self-label. In addition, to assess the relations between deviation from 'normative' sexuality and deviation from 'normative' gender identity, we looked at the correlation between the difference between attraction to women and attraction to men and the difference between feeling-as-a-man and feeling-as-a-woman. The normative assumption is that the two variables are highly correlated (i.e. as the difference score between attraction to women minus attraction to men increases so, too, does the difference score between feeling as a man minus feeling as a woman).

In addition to filling in the sexual orientation questionnaire, participants were asked to mark a sexual orientation category with which they identify (exclusively straight/heterosexual, mostly straight/heterosexual, bisexual, mostly gay/lesbian, exclusively gay/lesbian, pansexual, asexual or other).

The demographic questionnaire included items concerning sex at birth (male, female, intersex), rearing gender (boy, girl) and adult gender (man, woman, transman, transwoman, transgender, genderqueer, other), age, place of origin, residency (urban, suburban, rural), education, and religion.

Data analysis

Nominal variables (gender identity, sexual orientation) were analysed using the chi-square test followed by a standardised residuals analysis. We treated as significant standardised residuals that were larger than 2 or smaller than -2 (Sharpe, 2015). We adopted Cohen's (1992) criterion for

interpreting the size of significant correlations, treating correlations of 0.1, 0.3 and 0.5 as small, medium and large, respectively.

Results

Tables 1 and 2 show the distribution of participants raised as boys or as girls, respectively, according to gender identity and sexual orientation. Many individuals (75.7%) did not maintain their rearing gender identity, and this was more evident in individuals raised as boys (85.4%) compared with those raised as girls (44%, $\chi^2 = 17.82$, $p < .001$; Adjusted residual = 4.2). Only a small minority (7.5%) identified as heterosexuals, and those who did were more likely to have maintained the gender identity they were raised in compared to individuals choosing other sexual identities, who were more likely to currently identify in gender identities different from the one they were raised as ($\chi^2 = 12.08$, $p = .001$; adjusted residual = 3.5).

Figure 1(a,b) present the scores of feeling as a man (X axis) and feeling as a woman (Y axis) for individuals who were raised as boys (1a) or as girls (1b). Different colours mark different current self-labelled gender-identity categories (e.g. blue – man, red – woman). Participants' responses included a wide spectrum of combinations of feeling as a man and feeling as a woman, regardless of the gender they were raised in. These combinations overlapped both across current self-labelled gender identities and across the sex assigned at birth. For example, of the individuals who chose '1' on feeling as a man and '3' on feeling as a woman, some were raised as boys and currently self-identified as 'genderqueer' or as 'other'; others were raised as girls and currently self-identified as 'woman'.

This large variability was visible in all measures of the Multi-GIQ. Figure 1(c,d) present the scores of dislike of the body due to its male form (X axis) and dislike of the body due to its female form (Y axis) for individuals who were raised as boys (1c) or as girls (1d) (For the scores of the other variables, see supplementary Figure S1). Again, participants' responses included a wide spectrum of combinations of dislike of the body due to its male form and dislike of the body due to its female form, and an overlap across both current self-labelled gender identities and the sex assigned at birth. Many individuals reported body dysphoria (i.e. dislike of the body due to its sexed form), gender dysphoria

Table 1. Distribution of participants who were raised as boys according to self-labelled gender and sexual orientation.

	Total	Exclusively straight/heterosexual	Mostly straight/heterosexual	Bisexual	Mostly gay/lesbian	Exclusively gay/lesbian	Pansexual	Asexual	other
Total	82	7	12	18	8	6	20	7	4
Man	12	5	3	3	0	1	0	0	0
Woman	24	1	6	5	4	1	4	3	0
Transman	0	0	0	0	0	0	0	0	0
Transwoman	8	0	0	1	3	3	1	0	0
Transgender	5	0	2	1	0	0	2	0	0
Genderqueer	11	0	1	2	0	0	6	1	1
Other	22	1	0	6	1	1	7	3	3

Table 2. Distribution of participants who were raised as girls according to self-labelled gender and sexual orientation.

	Total	Exclusively straight/heterosexual	Mostly straight/heterosexual	Bisexual	Mostly gay/lesbian	Exclusively gay/lesbian	Pansexual	Asexual	other
Total	25	1	2	5	1	3	5	1	7
Man	4	0	0	1	0	0	2	0	1
Woman	14	1	2	2	1	2	2	1	3
Transman	1	0	0	1	0	0	0	0	0
Transwoman	0	0	0	0	0	0	0	0	0
Transgender	0	0	0	0	0	0	0	0	0
Genderqueer	4	0	0	1	0	1	0	0	2
Other	2	0	0	0	0	0	1	0	1

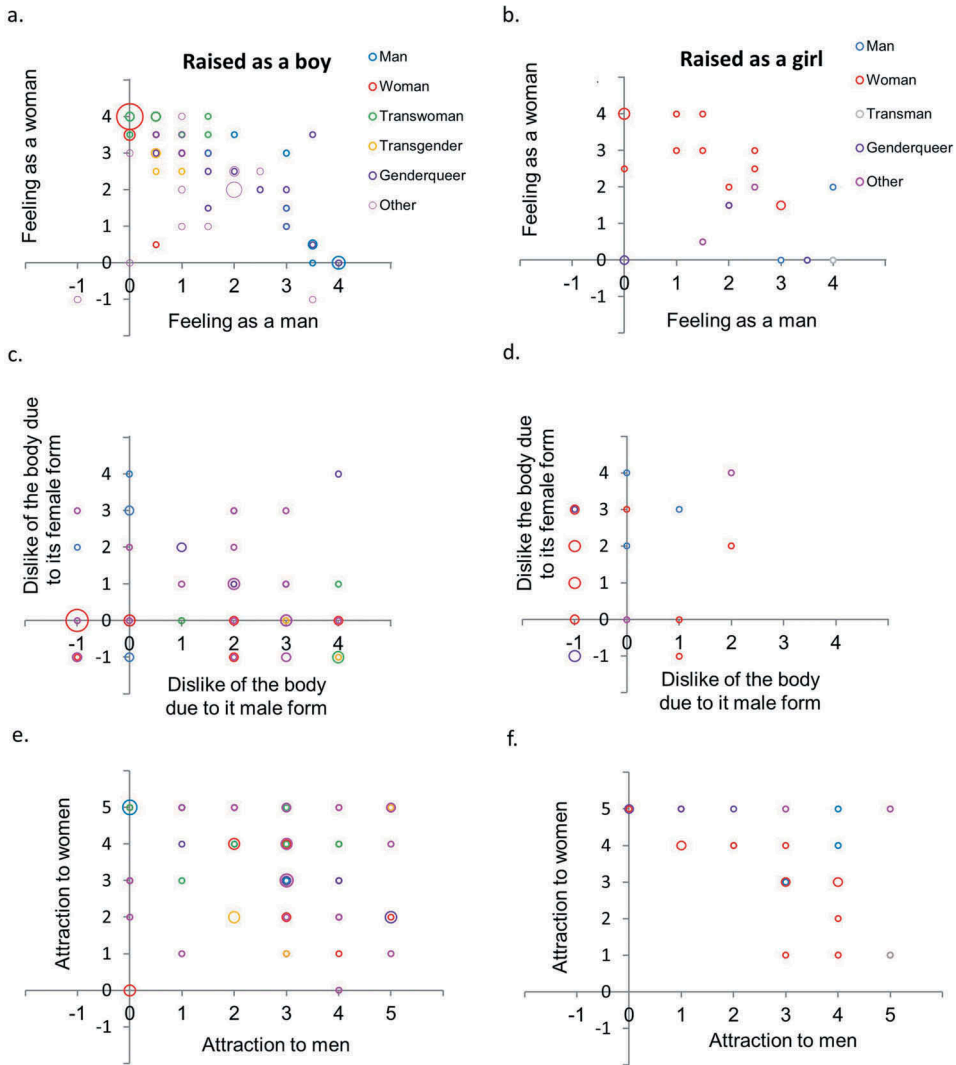


Figure 1. (a-b) Scatter plots of feeling as a man (X axis) and feeling as a woman (Y axis) in individuals raised as boys (a) or as girls (b). (c-d) Scatter plots of dislike of the body due to its male form (X axis) and dislike of the body due to its female form (Y axis) in individuals raised as boys (c) or as girls (d). (e-f) Scatter plots of attraction to men (X axis) and attraction to women (Y axis) in individuals raised as boys (e) or as girls (f). Data are presented according to self-reported gender identity (marked in different colours). The size of each circle is proportional to the percent of individuals from a given gender category who had an identical score on the two measures. A score of -1 represents the answer 'Not relevant' or the absence of an answer.

(wishing to be the 'other' gender, Figure S1(c,d)), or 'queer-like' feelings (feeling at times as both genders or in-between genders, Figure S1(a,b)).

Figure 1(e,f) presents the scores of attraction to men (X-axis) and to women (Y-axis) for intersex individuals who were raised as boys (1e) or as girls (1f). Also here there was a large variability within each group and large overlap across both current self-labelled gender identities and the sex assigned at birth. The correlation between attraction to men and attraction to women was low over the entire sample ($r = -.18$, $p = .07$) as well as over the group of people who were raised as boys ($r = -.06$, $p = .59$)

Figure 2(a) presents the extent of deviation from a binary gender experience (Y-axis) in three sex-gender configuration groups (cisgender, transgender or gender-diverse) of intersex individuals or

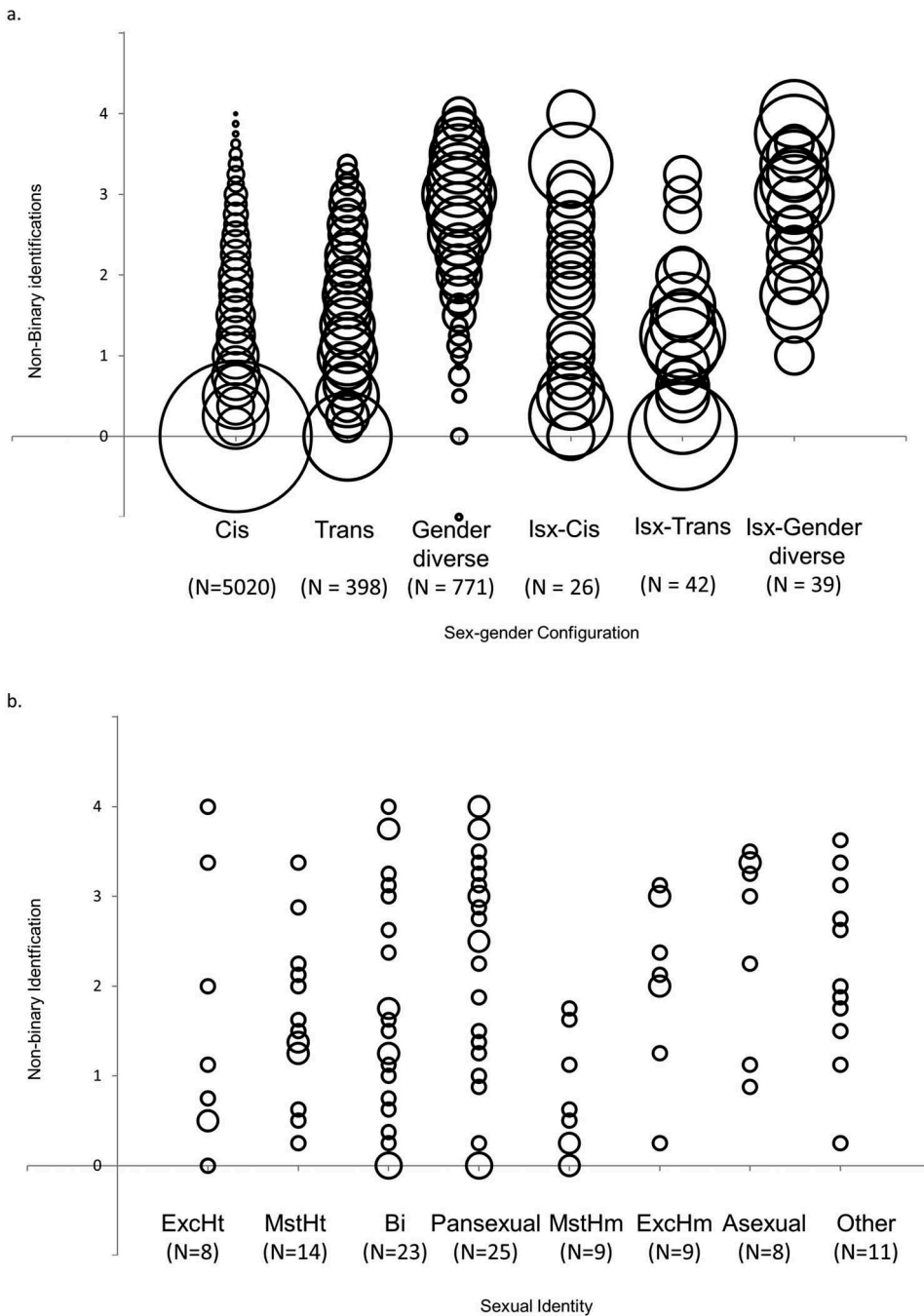


Figure 2. (a) Scatter plots of the non-binary score in intersex and TSD cisgender, transgender and gender-diverse individuals. The size of each circle is proportional to the percent of individuals from a given category with an identical score. (b) Scatter plots of the non-binary score in the eight sexual orientation groups. The size of each circle is proportional to the percent of individuals with an identical score out of the entire sample.

individuals with typical sex development (TSD) (X-axis) (note that data on the TSD individuals have been reported in Jacobson & Joel, 2018a, 2018b). The extent of deviation from a binary gender experience was highly variable within the six groups and overlapping between the different groups.

In the TSD groups, transgender or gender-diverse self-identification was associated with more non-binary feelings compared to a cisgender self-identification. This was also seen in the corresponding intersex-identified groups. Specifically, the gender-diverse TSD and intersex-identified groups had very few participants with a totally binary score, whereas this was the most frequent score in the TSD and intersex transgender groups. However, whereas the distribution of scores in the TSD cisgender group was highly skewed towards a binary experience, in the intersex-identified group the scores were almost evenly distributed.

Figure 2(b) presents a scatterplot of the deviation from a binary gender experience of intersex-identified individuals with different self-reported sexual identity. In general, individuals in all self-labelling sexuality groups reported gender identity experiences ranging from completely binary to highly non-binary. Thus, the frequency and distribution of non-binary feelings in non-heterosexual sexuality groups was similar to that of the heterosexual sexuality groups. In line with this observation, the correlation between the deviation from a binary gender experience and the deviation from 'normative' sexuality was negligible ($r = .06$).

The relation between body dysphoria and other aspects of gender identity and sexuality

Table 3 presents the correlations of dislike-of-the-body-due-to-its-male-form and dislike-of-the-body-due-to-its-female-form with all other aspects of gender identity and sexuality. The correlations of body dysphoria with sexual attraction were small ($r_s < 0.2$) and statistically non-significant. Regarding the relations between body dysphoria and gender identity – in general, the greater one felt as one gender, the more they were dissatisfied with their body due to its gender-'atypical' characteristics and the less they were dissatisfied with their body due to its gender-'typical' characteristics. Thus, greater dislike-of-the-body-due-to-its-female-form was associated with stronger feeling as a man, wishing to be a man and feeling as a 'real' man, on the one hand, and weaker feeling as a woman, wishing to be a woman and feeling as a 'real' woman on the other hand. Similar relations, although typically weaker, were observed between dislike-of-the-body-due-to-its-male-form and the corresponding variables. Dislike-of-the-body-due-to-its-female-form also had a medium-sized correlation with feeling as neither gender in the entire sample, and with deviation from a binary perception of gender in participants assigned as boys.

Discussion

The present study investigated aspects of gender identity, sexuality and the relations between the two in an online sample of intersex-identified individuals. Our main observations are that most of the participants reported non-normative gender and sexual identities and non-binary gender experience and sexual attraction, and that there were no relations between aspects of gender identity and sexuality. While the latter is consistent with the lack of such relations in individuals with typical sex development (Jacobson & Joel, 2018a, 2018b; Joel et al., 2013), the former differs greatly from previous studies of intersex individuals, which typically report that most individuals maintain the gender identity they were originally assigned and develop a heterosexual orientation (Berenbaum & Meyer-Bahlburg, 2015; Callens et al., 2016; Cohen-Kettenis, 2010; DeVries et al., 2007; Sobel & Imperato-McGinley, 2004; Zucker, 2006; for a review see Bakula et al., 2017).

As we detailed in the Introduction, our sampling method most likely resulted in a sample with unique characteristics compared with previous studies. Specifically, participants in previous studies were mainly recruited by their physicians as part of their medical treatment or follow-up or consented to an invitation from a medical research centre. As such, they under-represent intersex individuals who did not retain contact with their physicians or refused the invitation, for whatever reason. Intersex individuals who participated in the present study most likely include an over-representation of intersex activists and/or individuals with a non-normative gender identity or sexuality, because many of the invitations to participate in our study were posted in LGBT and

Table 3. Correlations between dislike of the body due to its male/female form and aspects of gender identity and sexuality.

	Deviation from a binary gender identity	Attraction		Feeling as a man	Feeling as a woman	Sometimes feeling as a man and some-times as a woman	Feeling between a man and a woman	Feeling as neither gender	Wish to be a man	Wish to be a woman	Feeling as a 'real' man	Feeling as a 'real' woman
		to men	to women									
Dislike of the body due to its male form	Entire sample	.10	-.18	-.19	-.30	.13	.14	.11	-.20	-.41*	-.27	.16
	N	72	72	72	71	71	71	71	50	59	71	71
Dislike of the body due to its female form	Male-assigned	.09	-.16	-.18	-.21	.15	.14	.07	-.05	.33	-.18	.10
	N	63	63	63	62	62	62	62	44	52	62	62
Dislike of the body due to its female form	Entire sample	.26	-.01	.12	.64*	.21	.12	.30*	.65*	-.47*	.47*	-.40*
	N	84	84	84	84	83	83	83	65	64	84	83
Dislike of the body due to its female form	Male-assigned	.32*	-.02	.09	.63*	.40*	.21	.19	.71*	-.31	.40*	-.28
	N	63	63	63	63	62	62	62	50	51	63	63

*p < .01

intersex websites. We would also like to note that because we did not assess the intersex condition of the participants, we could not relate specific conditions with specific gender experiences and sexuality. We therefore see our results more as reflecting a range of experiences usually not represented in the DSD literature than a re-representation of the intersex community as a whole.

Scores on all measures of gender identity and sexuality were highly varied within and overlapping between gender identity groups and rearing gender groups. Feelings related to gender identity ranged from highly binary (i.e. feeling as only one gender) to highly non-binary (i.e. feeling as both genders or as neither), and from highly cis-like (e.g. a self-identified man scoring high on feeling as a 'real' man) to highly trans-like (e.g. wishing to be the 'other' gender). The range of non-binary scores in each of the sex-gender configuration groups of the intersex sample were similar to the ones we previously reported for TSD samples (Jacobson & Joel, 2018b; Joel et al., 2013). High variability in gender identity, including nonbinary gender-identification, among intersex individuals was previously reported by Schweizer, Brunner, Handford, and Richter-Appelt (2014). In their study such identifications were found with different rates across different DSD conditions, including Partial Androgen Insensitivity Syndrome and androgen biosynthesis deficiencies.

Scores on sexual attraction to men and to women were also highly variable and were characterised by multiple combinations of attraction to men and to women, stretching from exclusive attraction to one sex, through bisexual attraction to no attraction. The correlation between attraction to men and attraction to women was negligible, as we have previously observed in a group of female-assigned gender-diverse TSD individuals (Jacobson & Joel, 2018b).

There was no relation between gender identity as a man or a woman (measured as the difference between feeling as a man and feeling as a woman) and attraction to women versus men (measured as the difference between attraction to women and attraction to men). This finding is consistent with the weak relation between sexuality and gender identity in cisgender, transgender and gender-diverse individuals (Jacobson & Joel, 2018a, 2018b; Joel et al., 2013).

We cannot determine whether the gender and sexual atypicality of many of our participants reflects the unconventional and unrepresentative nature of our sample or is a result of their intersex condition, as expected by the assumption that atypical sex development would lead to atypical development of gender identity and sexuality (Brunner, Prochnow, Schweizer, & Richter-Appelt, 2012; Jordan-Young & Rumati, 2012; Ponce, 1978; Preves, 2003; Richardson, 2007). Bodily experiences have been found to have a developmental influence on a person's psychological makeup and experience (Schweizer, Brunner, Handford, & Richter-Appelt, 2014). The idea that an intersex body experience is likely to be associated with an atypical gender identity development is reflected in descriptions of people with intersex bodies (Diamond, 1997; Stoller, 1968) and in qualitative research (e.g. Preves, 2003). In their study of gender identity in individuals with different DSD conditions, Schweizer, Brunner, Handford and Richter-Appelt (2014) concluded that the binary categories of identity fail to capture the experiences of their participants. We would like to note that even if atypical sex development does lead to atypical development of gender identity and sexuality, it would be impossible to determine whether atypical gender identity and sexuality reflect atypical physiological parameters (e.g. hormone levels during pregnancy or later in life) or atypical psychological and experiential parameters (e.g. repeated testing from a young age, genital surgery, etc.) (Lossie & Green, 2015).

It is important to emphasise, however, that even in this highly atypical sample, gender identity and sexuality were not related, which is out of line with the assumption that the latter two variables are strongly determined by the intersex condition, but is in line with the observations from studies of individuals with typical sex development (Auer et al., 2014; Deogracias et al., 2007; Hines, 2007; Jacobson & Joel, 2018a, 2018b; Joel et al., 2013; Kuper, Nussbaum, & Mustanski, 2012; Meier, Pardo, Labuski, & Babcock, 2013; Rowniak & Chesla, 2013).

Finally, we found that the more one identifies with one gender, the more they dislike their body due to its sex characteristics which are atypical for this gender. This association most likely reflects

the normative association between sex and gender in which body characteristics are expected to align with the assigned gender.

Conclusions

The current study adds to a growing body of literature that challenges either/or conceptualisations of gender and sexuality as well as the assumption that these two constructs are highly related. Most descriptions of intersex-identified and DSD participants, to date, hold that they mostly develop in a 'normative' fashion, according to the sex they were assigned. The present study, which may represent a large number of intersex individuals who do not usually participate in clinic-based studies, reveals highly non-normative gender identities and sexualities in this group, the range of which parallels that observed in TSD individuals. Together, these studies call for a change in the binary perception of gender. A more flexible conception of gender identity and lesser demand that it aligns with physical appearance would give more room for human diversity and increase personal choice regarding body modification for both DSD and TSD individuals.

Notes

1. The International Consensus Conference (2006) has coined the term DSD meaning Disorders of Sex Development. Here we adopt the term – Differences of Sex Development – used by Wiesemann et al. (2010) to avoid the use of the word 'Disorders'.
2. We use 'atypical' in a statistical sense, to convey its low frequency in the population.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Roi Jacobson received his PhD in psychology in Tel Aviv University. He is a clinical psychologist working in both the public sector and private practice. His clinical and research interests focus on variability in gender identity and sexuality and on differences of sex development.

Daphna Joel is a professor of psychology and neuroscience in Tel Aviv University. She is currently the head of the graduate program at the School of Psychological Sciences and a member of the Sagol School of Neuroscience. In the past decade she has been combining her expertise as a neuroscientist with her interest in gender studies to study the relations between sex, brain and gender. Joel uses various analytical methods to analyze diverse datasets, from large collections of brain scans to information obtained with self-report questionnaires. She is the author of *Gender Mosaic: Beyond the Myth of the Male and Female Brain* (Little, Brown).

References

- Auer, M. K., Fuss, J., Höhne, N., Stalla, G. K., Sievers, C., & Coleman, M. J. (2014). Transgender transitioning and change of self-reported sexual orientation. *PLoS One*, *9*, 1–11.
- Bakula, D. M., Mullins, A. J., Sharkey, C. M., Wolfe-Christensen, C., Mullins, L. L., & Wisniewski, A. B. (2017). Gender identity outcomes in children with disorders/differences of sex development: Predictive factors. *Seminars in Perinatology*, *41*, 214–217.
- Berenbaum, S. A., & Meyer-Bahlburg, H. F. L. (2015). Gender development and sexuality in disorders of sex development. *Hormone and Metabolic Research*, *47*, 361–366.
- Bockting, W. O., & Coleman, E. (2007). Developmental stages of the transgender coming out process: Toward an integrated identity. In R. Ettner, S. Monstrey, & E. Eyler (Eds.), *Principles of transgender medicine and surgery* (pp. 185–208). New York, NY: The Haworth Press.
- Brunner, F., Prochnow, C., Schweizer, K., & Richter-Appelt, H. (2012). Körper- und geschlechtererleben bei personen mit kompletter androgeninsensitivität [Body and gender experience in persons with complete androgen insensitivity syndrome]. *Zeitschrift Für Sexuallforschung*, *25*, 26–48.

- Callens, N., Van Kuyk, M., van Kuppenveld, J. H., Drop, S. L., Cohen-Kettenis, P. T., & Dessens, A. B.; Dutch Study Group on DSD. (2016). Recalled and current gender role behavior, gender identity and sexual orientation in adults with disorders/differences of sex development. *Hormones and Behavior*, *86*, 8–20.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155–159.
- Cohen-Kettenis, P. (2005). Gender change in 46,XY persons with 5 α -reductase-2 deficiency and 17 β -hydroxysteroid dehydrogenase-3 deficiency. *Archives of Sexual Behavior*, *34*, 399–410.
- Cohen-Kettenis, P. T. (2010). Psychosocial and psychosexual aspects of disorders of sex development. *Best Practice & Research Clinical Endocrinology & Metabolism*, *24*, 325–334.
- Deogracias, J. J., Johnson, L. L., Meyer-Bahlburg, H. F., Kessler, S. J., Schober, J. M., & Zucker, K. J. (2007). The gender identity/gender dysphoria questionnaire for adolescents and adults. *Journal of Sex Research*, *44*, 370–379.
- DeVries, A. L., Doreleijers, T. A., & Cohen-Kettenis, P. T. (2007). Disorders of sex development and gender identity outcome in adolescence and adulthood: Understanding gender identity development and its clinical implications. *Pediatric Endocrinology Reviews*, *4*, 343–351.
- Diamond, L. M., & Butterworth, M. (2008). Questioning gender and sexual identity: Dynamic links over time. *Sex Roles*, *59*, 365–376.
- Diamond, L. M., Pardo, S. T., & Butterworth, M. R. (2011). Transgender experience and identity. In S. J. Schwartz, K. Luyckx, & V. L. Vignoles (Eds.), *Handbook of identity theory and research* (Vol. 2, pp. 629–647). New York, NY: Springer.
- Diamond, M. (1997). Sexual identity and sexual orientation in children with traumatized or ambiguous genitalia. *Journal of Sex Research*, *34*, 199–211.
- Dreger, A. D., & Herndon, A. M. (2009). Progress and politics in the intersex rights movement: Feminist theory in action. *GLQ: A Journal of Lesbian and Gay Studies*, *15*, 199–224.
- Girchick, L. B. (2008). *Transgender voices: Beyond women and men*. Lebanon, NH: University Press of New England.
- Hines, M. (2011). Prenatal endocrine influences on sexual orientation and on sexually differentiated childhood behavior. *Frontiers in Neuroendocrinology*, *32*, 170–182.
- Hines, S. (2007). *TransForming gender: Transgender practices of identity, intimacy and care*. Bristol, England: Policy Press.
- Jacobson, R., & Joel, D. (2018a). An exploration of the relations between self-reported gender identity and sexual orientation in an online sample of cisgender individuals. *Archives of Sexual Behavior*, *47*, 2407–2426.
- Jacobson, R., & Joel, D. (2018b). Self-reported gender identity and sexuality in an online sample of cisgender, transgender, and gender-diverse individuals: An exploratory study. *The Journal of Sex Research*, *56*, 249–263.
- Joel, D., Tarrasch, R., Berman, Z., Mukamel, M., & Ziv, E. (2013). Queering gender: Studying gender identity in 'normative' individuals. *Psychology & Sexuality*, *5*, 291–321.
- Jordan-Young, R., & Rumiati, R. I. (2012). Hardwired for sexism? Approaches to sex/gender in neuroscience. *Neuroethics*, *5*, 305–315.
- Jürgensen, M., Kleinemeier, E., Lux, A., Steensma, T. D., Cohen-Kettenis, P., Hiort, O., ... Köhler, B. (2013). Psychosexual development in adolescents and adults with disorders of sex Development-Results from the German clinical evaluation study. *The Journal of Sexual Medicine*, *10*, 2703–2714.
- Khorashad, B. S., Aghili, Z., Kreukels, B. P., Hiraifar, M., Roshan, G. M., Afkhamizadeh, M., ... Cohen-Kettenis, P. T. (2016). Psychosexual outcome among Iranian individuals with 5 α -reductase deficiency type 2 and its relationship with parental sexism. *The Journal of Sexual Medicine*, *13*, 1629–1641.
- Kreukels, B. P., Köhler, B., Nordenström, A., Roehle, R., Thyen, U., Bouvattier, C., ... Arlt, W. (2018). Gender dysphoria and gender change in disorders of sex development/intersex conditions: Results from the dsd-LIFE study. *The Journal of Sexual Medicine*, *15*, 777–785.
- Kuper, L. E., Nussbaum, R., & Mustanski, B. (2012). Exploring the diversity of gender and sexual orientation identities in an online sample of transgender individuals. *Journal of Sex Research*, *49*, 244–254.
- Lossie, A. C., & Green, J. (2015). Building trust: The history and ongoing relationships amongst DSD clinicians, researchers, and patient advocacy groups. *Hormone and Metabolic Research*, *47*, 344–350.
- Martin, C. L., Andrews, N. C., England, D. E., Zosuls, K., & Ruble, D. N. (2017). A dual identity approach for conceptualizing and measuring children's gender identity. *Child Development*, *88*, 167–182.
- Matsuno, E., & Budge, S. L. (2017). Non-binary/genderqueer identities: A critical review of the literature. *Current Sexual Health Reports*, *9*, 116–120.
- Meier, S. C., Pardo, S. T., Labuski, C., & Babcock, J. (2013). Measures of clinical health among female-to-male transgender persons as a function of sexual orientation. *Archives of Sexual Behavior*, *42*, 463–474.
- Meyer-Bahlburg, H. F. (2005). Introduction: Gender dysphoria and gender change in persons with intersexuality. *Archives of Sexual Behavior*, *34*, 371–373.
- Meyer-Bahlburg, H. F., Dolezal, C., Baker, S. W., & New, M. I. (2008). Sexual orientation in women with classical or non-classical congenital adrenal hyperplasia as a function of degree of prenatal androgen excess. *Archives of Sexual Behavior*, *37*, 85–99.
- Ponson, B. (1978). *Identities in the lesbian world: The social construction of self*. Westport, CT: Greenwood Press.
- Praveen, E., Desai, A. K., Khurana, M., Philip, J., Eunice, M., Khadgawat, R., ... Ammini, A. C. (2008). Gender identity of children and young adults with 5 α -reductase deficiency. *Journal of Pediatric Endocrinology and Metabolism*, *21*, 173–180.

- Preves, S. E. (2003). *Intersex and identity: The contested self*. New Brunswick, NJ: Rutgers University Press.
- Preves, S. E. (2005). Out of the OR and into the streets: Exploring the impact of the intersex media activism. *Cardozo Journal of Law & Gender*, 12, 247.
- Richards, C., Bouman, W. P., Seal, L., Barker, M. J., Nieder, T. O., & T'Sjoen, G. (2016). Non-binary or genderqueer genders. *International Review of Psychiatry*, 28, 95–102.
- Richardson, D. (2007). Patterned fluidities: (Re)imagining the relationship between gender and sexuality. *Sociology*, 41, 457–474.
- Röhle, R., Gehrmann, K., Szarras-Czapnik, M., Claahsen-van der Grinten, H., Pienkowski, C., Bouvattier, C., ... Köhler, B. (2017). Participation of adults with disorders/differences of sex development (DSD) in the clinical study dsd-LIFE: Design, methodology, recruitment, data quality and study population. *BMC Endocrine Disorders*, 17, 1–26.
- Rowniak, S., & Chesla, C. (2013). Coming out for a third time: Transmen, sexual orientation, and identity. *Archives of Sexual Behavior*, 42, 449–461.
- Savin-Williams, R. C. (2016). Sexual orientation: Categories or continuum? Commentary on Bailey et al. *Psychological Science in the Public Interest*, 17, 37–44.
- Schönbucher, V., Schweizer, K., Rustige, L., Schützmann, K., Brunner, F., & Richter-Appelt, H. (2012). Sexual quality of life of individuals with 46, XY disorders of sex development. *The Journal of Sexual Medicine*, 9, 3154–3170.
- Schweizer, K., Brunner, F., Handford, C., & Richter-Appelt, H. (2014). Gender experience and satisfaction with gender allocation in adults with diverse intersex conditions (divergences of sex development, DSD). *Psychology & Sexuality*, 5, 56–82.
- Sharpe, D. (2015). Your chi-square test is statistically significant: Now what? *Practical Assessment, Research & Evaluation*, 20, 2–10.
- Sobel, V., & Imperato-McGinley, J. (2004). Gender identity in XY intersexuality. *Child and Adolescent Psychiatric Clinics of North America*, 13, 609–622.
- Stoller, R. (1968). *Sex and gender. On the development of masculinity and femininity*. London: Hogarth Press.
- Wiesemann, C., Ude-Koeller, S., Sinnecker, G. H., & Thyen, U. (2010). Ethical principles and recommendations for the medical management of differences of sex development (DSD)/intersex in children and adolescents. *European Journal of Pediatrics*, 169, 671–679.
- Wilson, M. (2002). 'I am the Prince of pain, for I am a princess in the brain': Liminal transgender identities, narratives and the elimination of ambiguities. *Sexualities*, 5, 425–448.
- Zucker, K. J. (2006). Gender identity and intersexuality. In S. E. Sytsma (Ed.), *Ethics and intersex* (pp. 165–182). DeKalb, IL: Springer.