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Development and Validation of the Pregnancy and Infant Orientation Questionnaire

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Abstract

The purpose of this current study was the construction, scaling, and scale validation of a self-report questionnaire assessing biographical information and motivation for pregnancy and infant care in men and women with disorders of sex development or other gender variations of potential clinical relevance. The overall design of the questionnaire and the initial item pool were derived from related clinical and research experience. Collection of pilot data and, where appropriate, scale construction (via principal components analyses) were based on Canadian convenience samples of heterosexual (HET) and non-HET men and women ($N=414$). A sample of gender-dysphoric (GDYS) men and women ($n=45$) was added for validity analysis. Validation of the resulting scales was based on the demonstration of expected scale differences between HET men and women, as well as between HET, non-HET, and GDYS men and between HET, non-HET, and GDYS women, and was successful with one exception. This study concludes that this new questionnaire, in addition to its descriptive sections, provides several distinct scales related to desires for child bearing and child rearing and has good psychometric properties.

Keywords

Gender Differences; Reliability and Validity of Measures; Special Populations / Gay; lesbian; Special Populations/Transgender

Maternal caregiving is essential for survival of the young in most mammalian species (Lonstein & Morrell, 2007; Pedersen, 2004), with variable contributions from fathers. Thus, parenting can be characterized as the “other reproductive behavior” (Lonstein, 2002) and would be expected, from an evolutionary perspective, to be highly regulated by complex biological

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mechanisms involving genes, hormones, and neural systems, similar to the regulation of other sex-dimorphic - especially reproductive - behaviors (Keverne, 2007; Kinsley & Lambert, 2006; Maestripieri, Lindell, & Higley, 2007; Numan, 2006). The initiation of maternal behavior with parturition has been the focus of research in non-primate female mammals, but some species are known to show sex differences (between non-pregnant females and males) in response to infant animals, even during the juvenile period. In humans, girls and women show more interest in, interaction with, and responsiveness to, infants than do boys and men, as has been shown with a variety of assessment methods (Blakemore, Liben, & Berenbaum, 2009, pp. 107-108; Melson & Fogel, 1982). Motherhood, and the potential for motherhood, plays a critical role in women's psychological lives (Boucai & Karniol, 2008). A qualitative study of women who had undergone premenopausal hysterectomy emphasized the importance of experiencing menstruation and having ovaries, a uterus, and the pregnancy potential for the identity of many women (Elson, 2002, 2003), and infertility can constitute significant stress (Gibson & Myers, 2002; Greil, 1997). These findings correspond well to the observations of clinicians among the present authors of the psychological challenges that many young women with disorders of sex development (DSD) experience, when they learn about impairments or deficiencies of their fertility-related organs and functions.

Although there is ample evidence for the contribution of social and cultural factors to the development of human sex differences, in general (Blakemore et al., 2009), there is also much evidence for a marked contribution of prenatal hormone effects to the development of gender-related behaviors (Hines, 2004; Meyer-Bahlburg, Dolezal, Baker, Ehrhardt, & New, 2006; Meyer-Bahlburg, Dolezal, Baker, & New, 2008), which corresponds to similar effects of prenatal and perinatal sex hormones in non-human mammals. Both social/cultural and biological influences are also likely to affect the development of pregnancy and infant orientation in humans. The role of social-cultural factors is well-illustrated by the findings and background literature presented by Boucai and Karniol (2008). The contribution of biological factors is supported by clinical case observations of reduced maternal interests in girls and women with a history of exposure to prenatal androgen excess due to congenital adrenal hyperplasia (CAH; Meyer-Bahlburg, 1999). Of four systematic studies of this issue in girls and women with CAH, three employed semi-structured interviews (with children and parents) focusing on the anticipation of wedding and marriage as well as of pregnancy and motherhood in play or imagery and on expressed interest in infant care: Ehrhardt, Epstein, and Money (1968; see also Money & Ehrhardt, 1972) on 15 girls with CAH aged 5 to 16 years; Ehrhardt and Baker (1974) on 17 girls with CAH aged 4 to 19 years; and Dittmann, Kappes, Kappes, Börger, Meyer-Bahlburg, et al. (1990) and Dittmann, Kappes, Kappes, Börger, Stenger, et al., (1990) on 34 girls or women with CAH aged 11 to 41 years. The fourth study used a written parent-administered questionnaire including 11 items indicating the child's experience with, or interest in, pregnancy, infant care, and the mother role: Leveroni and Berenbaum (1998) on 23 girls with CAH aged 3 to 12 years. Girls with the more severely androgenized variant of CAH showed the stronger reduction in maternal interest, in line with the dose-response findings in other domains of gender-related behavior (Meyer-Bahlburg et al., 2006, 2008). Such data have been cited as part of an explanation of the documented reduced fertility rate of women with CAH, which also varies with the degree of prenatal androgenization (Román, De Silva, Rumsby, & Conway, in press).

Variations of parenting motivation are not only of theoretical interest, but also clinically relevant for lifecourse-related (career and family) counseling of older adolescents and adults, especially those with DSD, who may be raised in either gender, depending on the degree of genital ambiguity and the locally prevailing policy of gender assignment, and those with significant gender variations in the absence of DSD, as illustrated by cases of "pregnant husbands" (e.g., Beatie, 2008). These are populations for whom gender assignment may be problematic and gender reassignment a consideration, while infertility or fertility limitations -

either endogenous or iatrogenic - and contemplations of childlessness or of alternative methods of parenthood are frequent. Given the relative low prevalence of such conditions, specialized clinics and research teams typically deal with patients who are highly heterogeneous with regard to age and other demographic variables, medical syndromes, pregnancy and impregnation history, and parenthood status. Work with such populations would be facilitated by a self-report screening questionnaire that is richer in detail than existing questionnaires, can be applied to both genders, and includes relevant biographic sections, items covering reasons for not having children (for adults), and items focusing on parenting motivation, including reported responsiveness to environmental cues of infant-care situations as described by such patients.

Most assessment instruments in this area for adolescents and adults have been developed for the general population and briefly assess overall attitudes and motivations for or against parenthood (e.g., Bell, Bancroft, & Philip, 1985; Boucai & Karniol, 2008; Gimenez Villarejo, 2004; Lang, 1992; Langdridge, Connolly, & Sheeran, 2000; Mathes, 2005; Rholes, Simpson, Blakely, Lanigan, & Allen, 1997; for older measures, see Beere, 1990), maternal responsiveness to their own infants (Drake, Humenick, Amankwaa, Younger, & Roux, 2007; Fowles & Horowitz, 2006; Lecuyer-Maus, 2000; Shin, Park, & Kim, 2006; Swain, Lorberbaum, Kose, & Strathearn, 2007), or parenting practices with older children (Barry, Frick, & Grafeman, 2008; Belsky & Jaffee, 2006).

The purpose of this study is the construction, scaling, and scale validation of a self-report questionnaire for men and women with DSD or other gender variants, as outlined earlier, which focuses primarily, but not exclusively, on orientation towards pregnancy and infant care in populations with low rates of fertility, to be used for both research and clinical purposes. Researchers working with rare clinical populations face significant logistic difficulties in assembling sizable samples for study purposes and obtaining sufficient study funds for method development. Thus, once the initial draft of this new questionnaire was completed by a group of experts in this clinical area, we decided to base the initial data collection and scale construction not on patients with DSD, but on comparatively easily accessible convenience samples of heterosexual and homosexual men and women from a university population. Homosexuals were included in order to increase the within-gender variability, because it is well-documented that homosexual men and women show increased rates of gender-atypical behavior in childhood and adulthood (Bailey & Zucker, 1995; Drummond, 2006; Lippa, 2002, 2008; Rieger, Linsenmeier, Gygax, & Bailey, 2008). Moreover, Phillips and Over (1995) documented markedly decreased intensity of the wish to become a mother for bisexual women and even more so for lesbians in comparison to HET women. Boucai and Karniol (2008) showed that motivation for motherhood was associated with femininity, which is lower in homosexual women as a group (Lippa 2002, 2008; Meyer-Bahlburg et al., 2008). For the purposes of scale validation, we took advantage of an opportunity to obtain access to a clinical population of GDYS individuals, who represent the extreme degree of gender atypicality (Zucker & Bradley, 1995).

Method

Participants

The data collection for this questionnaire was combined with that for several other new or newly modified questionnaires (see the following discussion). The sample of participants in this study is largely the same as the one described for the development of the Gender Identity/Dysphoria Questionnaire for Adolescents and Adults (Deogracias et al., 2007) and is briefly summarized here. The total sample for this analysis included 414 participants. Of these, 370 were university students (230 women, 140 men). The majority of university-based participants were recruited from a first-year undergraduate psychology course at one of the campuses of

the University of Toronto and not selected for gender identity or sexual orientation; the remaining participants were recruited through e-mail lists of lesbian, gay, bisexual, transgendered, and queer student groups from all three campuses of the university. These participants received either a research credit in their psychology course or a Canadian \$5 remuneration.

A demographic self-report questionnaire included six response options for sexual orientation (exclusively HET [straight], bisexual, exclusively homosexual [gay / lesbian, or queer], asexual, unlabeled [questioning or unsure], or other [with provision for comment]). On this basis, the sample was further subdivided into (exclusively) HET (198 women, 104 men) and non-HET (32 women, 36 men). The same questionnaire also included a question on gender identity, with four response options (man, woman, transgender, or other). Nine individuals (three males, six females) had answered “transgender” or “other” and were excluded from the analysis sample here (i.e., are not included in the previous sample figures) because these two subsamples were too small for statistical analysis.

An additional sample of participants consisted of 45 new adolescent or recently seen adult referrals to the gender identity programs of the Centre for Addiction and Mental Health in Toronto and included 32 male (to female) and 13 female (to male) clients. All met Diagnostic and Statistical Manual of Mental Disorders (4th ed.; American Psychiatric Association, 1994) criteria for gender identity disorder by clinician judgment, their cross-gender living status was variable, and none had undergone sex reassignment surgery. These two GDYS groups were not included in the scale development, but only in the validation part of the study. In line with the legal sex of these patients at clinic referral and in view of their variability in cross-gender status, they are referred to as GDYS men (males with gender dysphoria) and GDYS women (females with gender dysphoria), which also helps avoid confusion in understanding the logic and results of the validation procedure.

Measures and Procedures

The new Pregnancy and Infant Orientation Questionnaire (PIOQ) was initially developed by the Research Protocol Working Group of the North American Task Force on Intersexuality, which consisted of professionals providing clinical services or conducting research on intersexuality (Suzanne J. Kessler, Heino F. L. Meyer-Bahlburg, Justine M. Schober, & Kenneth J. Zucker) and was headed by the first author. The initial item pool was drafted largely on the basis of the members’ clinical and research experience with persons with DSD.

The PIOQ comprises 6 sections. Section A, “Your Pregnancy History/Fatherhood History”, and Section B, “Your Children”, ask for brief categorizations and counts of pregnancies and impregnations and of having biological and non-biological children in the participant’s history. Section C, “Your Personal Reasons for not Having Biological Children”, is a checklist (“yes,” “unsure,” or “no”) of 22 diverse common reasons (for males, 21 reasons), plus one write-in slot for additional reasons, why the participant does not have biological children (Table 1). Section D, “Your Experience of Having Children”, includes only one item regarding the enjoyment associated with having children, or lack of it, for those who do have children, with one of four response options to check. Section E, “Your Interest in Having Children in the Past 12 Months”, consists of 16 items (“yes,” “unsure,” or “no”) regarding felt maternal motivation and the contexts in which such feelings are triggered. Finally, Section F, “Your Maternal Interests During Childhood, Adolescence, Young Adulthood, and Recently”, asks the participant to rate (“not at all,” “a little,” “somewhat,” or “a lot”) their desires, fantasies, and (childhood only) pretend activities concerning being pregnant or caring for an infant, for the life stages of childhood, adolescence, young adulthood (19-25 years), and the past 12 months, and liking to babysit “for young children” for the latter three life periods.

The majority of the university students completed online, via SurveyMonkey (<http://www.surveymonkey.com>), a consent form, a demographic information form, and the PIOQ, along with two other questionnaires-- namely, the Recalled Childhood Gender Questionnaire-Revised (RCGQ-R; Singh et al., in press), using the scales developed by Meyer-Bahlburg et al. (2006b), and the Gender Identity/Gender Dysphoria Questionnaire for Adolescents and Adults (Deogracias et al., 2007). Following the completion of the study, a debriefing letter that described the purpose of the study was provided. The adolescent GDYS clients completed hard-copy questionnaires as part of their clinic assessment. The adult GDYS clients completed the materials online or received a hard copy in the mail, with a stamped, self-return envelope. The study was approved by the research ethics boards or institutional review boards of the participating institutions.

Data analysis

Data analysis included descriptive statistics, as well as standard statistical techniques of scale development and group comparisons. (Note that *ns* for individual variables varied somewhat due to missing values.) Analytic details are provided in the respective subsections of the following Results section. All statistical analyses were conducted using SPSS for Windows Release 15.01.

Results

Descriptive statistics

Table 2 provides the demographic characteristics of all six subsamples. The HET men and women were significantly younger on average than the non-HET and GDYS groups. The majority of participants were of European ethnic background, followed by a substantial percentage of East and South Asians, and smaller percentages of Black, First-Nations, Hispanic and Latino, or "other" ethnic backgrounds. A substantial minority grew up with a first language other than English. Also shown on Table 2 are the group means of the Gender scale of the RCGQ-R, which differed in the expected direction: HET men < non-HET men < GDYS men, HET women > non-HET women > GDYS women, and HET Women > HET men. All of these pair differences were highly significant ($p \leq .001$; controlling for age), and the respective effect sizes (d , based on pooled variances) were very large, ranging from 1.36 (non-HET men vs. GDYS men) to 5.12 (HET women vs. HET men).

Questionnaire sections A and B also elicited information on pregnancy and insemination history and on having children. Few participants had been pregnant or had inseminated someone, and the majority of these pregnancies did not end in live births. Very few participants were raising children. The rates were higher in the two (older) GDYS samples. Because of the low frequencies, no further statistical analyses of the descriptive Sections A and B were conducted.

The 23 items (22 in the male version) of section C ("Reasons Given for Not Having Biological Children") do not all equally apply to both sexes; some were obviously influenced by age, and their endorsement varied widely between the four subgroups. To examine whether there were stable clusters of items that could facilitate reporting of the data, we employed principal components analysis for HET men and women, separately as well as combined, and for the entire university-based sample including the non-HET participants. A number of items repeatedly turned up in the same components, especially items related to fear of doctors and hospitals, items indicating lack of support by others, and items indicating medical reasons for childlessness; but the number and kinds of other items in these clusters varied considerably between groups, and there was no general factor. Thus, for clinical and research purposes, analyses of individual items appear more appropriate.

The write-in option of the final item, “Other reasons, which:___”, was used by 76 participants across all four subgroups. The majority of write-ins constituted variations of item 1 (too young or too early). There were some new types of responses (e.g, “I hate kids”, “I have no desire to have intercourse with a woman”, “I would rather adopt”, “I don’t want to have kids because of the cruelty of this world”), but they were too rarely endorsed and therefore not considered for addition to the questionnaire at this time. This issue should be revisited, however, once much larger samples have been studied.

Those few participants who did have biological children were asked about that experience (Section D). All except one enjoyed having children, even if they had not wanted to become a parent (data not shown). Thus, no further analysis of these data was indicated.

Scale development

Each of the two multi-item Sections E and F underwent a principal components analysis on the combined total HET and non-HET sample, using pairwise deletion in the case of missing items. In preparing the decision on scale selection, we compared data sets limited to HET samples as well as combining HET and non-HET participants, examined both unrestricted and restricted solutions in regard to the number of components extracted and their interpretability, and also took into consideration scree plots, Cronbach’s α coefficients, and (corrected) item-total correlations.

Section E: “Your interest in having children in the past 12 months”—Suitability of the data for factor analysis was indicated by the size of the Kaiser-Meyer-Olkin measure of sampling adequacy (.87) and the significance ($p < .001$) of Bartlett’s test of sphericity, as recommended by Comrey (1978). An unrestricted principal-components analysis of the entire university-based sample yielded a five-component solution. Before rotation, the first component accounted for 31.5% of the variance (all 5 components combined for 60.1%). Of the 16 items, 14 loaded on this component with loadings ranging from .42 to .78, which can, therefore, be regarded a general component for these 14 items. (The remaining two items loaded positively, but $< .30$.) The respective scree plot (Figure 1) supports a one-component solution. The resulting Total Scale (E) includes 14 (unit-weighted) items (Table 3) and has an internal-consistency (Cronbach’s α) coefficient of .85. For exploratory purposes, we also performed a varimax rotation of the five-component solution, with Kaiser normalization (Table 4). The resulting five group components accounted for 17.9%, 15.1%, 11.2%, 8.0%, and 7.8% of the variance, respectively, or a total of 60.1%. The respective five subscales, including only (unit-weighted) items with loadings over .47 and labeled according to item content, are (a) wanting children: five items, Cronbach’s $\alpha = .82$; (b) child caring: five items, $\alpha = .72$; (c) breast feeding: two items, $\alpha = .68$; (d) responsiveness to young animals: two items, $\alpha = .41$; (e) desire intensity: two items, $\alpha = .25$. Subscales d and e are not acceptable on psychometric grounds.

Section F: “Your maternal interests during childhood, adolescence, young adulthood, and recently”—Again, the suitability of the data for factor analysis was indicated by the size of the Kaiser-Meyer-Olkin measure of sampling adequacy (.86) and the significance ($p < .001$) of Bartlett’s test of sphericity. An unrestricted principal-components analysis of the entire university-based sample yielded a four-component solution. Before rotation, the first component accounted for 49.7% of the variance (all four components combined accounted for 78.6% of the variance). All 19 items loaded on this component with loadings ranging from .54 to .79, which can, therefore, also be regarded a general component. Likewise, the respective scree plot (Figure 2) supports a one-component solution. The resulting Total Scale (F) includes all 19 (unit-weighted) items (Table 5) and has a Cronbach’s α coefficient of .93. Again, for exploratory purposes, we also performed a varimax rotation of the four-component solution, with Kaiser normalization (Table 6). The resulting four group

components accounted for 23.5%, 22.5%, 17.8%, and 14.8% of the variance, respectively, or a total of 78.6%. The respective four subscales, including only (unit-weighted) items with loadings over .60 and labeled according to item content, are (a) pregnancy desire: six items, Cronbach's $\alpha = .95$; (b) infant-care desire: six items, $\alpha = .94$; (c) childhood rehearsal: four items, $\alpha = .85$; and (d) baby-sitting enjoyment: three items, $\alpha = .91$.

Scale intercorrelations—Intercorrelations of scales within Section E and within Section F, as well as the intercorrelations of scales across both sections are presented in Table 7. All subscale intercorrelations (Pearson's r) ranged from .26 to .64, with, as expected, the intercorrelations of subscales with their respective Total Scales being somewhat higher. The Total Scales intercorrelate at .76. An exploratory principal-component analysis with varimax rotation of the two item sets combined did not result in joint group components, however (data not shown).

Validation

As pointed out in the introduction of this article, interest in pregnancy and in parenting young children is, here, conceptualized as one of the domains of behavioral differences between the genders. We, therefore, expected the five scales of Section E and the four scales of Section F to differentiate between HET, non-HET, and GDYS participants. These expectations were based on demonstrated differences between these groups in other gender domains, as illustrated by the data from our RCGQ-R Gender scale (Table 2): HET men < HET women, HET men < non-HET men < GDYS men, and HET women > non-HET women > GDYS women, which are in line with published data by others that demonstrate for either natal sex a (crude) continuum of gender typicality-atypicality from HETs, to homosexuals, to transsexuals (Blanchard & Freund, 1983; Freund, Nagler, Langevin, Zajac, & Steiner, 1974; Wallien & Cohen-Kettenis, 2008). (Note that the RCGQ-R robustly correlates with scales of current gender-related behavior for adults, as shown by Meyer-Bahlburg et al., 2006). Therefore, our respective group comparisons for the purpose of validation also included the GDYS participants. Most of the group differences in demographic variables are too small for meaningful analysis. Where they were of sufficient size, confounder control slightly modified the resulting significance levels, but did not change the overall results. In the analyses reported here, we, therefore, only controlled for age.

The results were mostly as expected. HET women were significantly ($p < .001$) more pregnancy- and infant-oriented than HET men on all nine PIOQ scales, with effect sizes (d) for gender ranging from 0.43 to 1.61 (Table 8). HET men were always less pregnancy- and infant-oriented than non-HET men, although the difference did not reach significance in three of the nine variables, and also less pregnancy- and infant-oriented than GDYS men, significantly so on seven of the nine variables (Table 9). Non-HET men were less pregnancy- and infant-oriented than GDYS men in eight of the nine scales, although the difference did not reach statistical significance on one of the eight variables and only marginal significance ($.05 < p \leq .10$) on another one. HET women were more pregnancy- and infant-oriented than GDYS women, although the difference did not reach significance on three of the nine variables (Table 10). Contrary to expectation, however, the non-HET women did not differ significantly from HET women (except for one marginally significant difference), despite statistical control for age, but were significantly higher than GDYS women in pregnancy- and infant orientation on eight of the nine scales.

Discussion

The PIOQ was designed as a self-report questionnaire for parenting-related biographical review and for assessing motivation for pregnancy and infant care, primarily in persons with DSD or

with non-DSD gender variations, but may also turn out to be useful for the study of other populations. Apart from its descriptive sections, the PIOQ provides two different approaches to the assessment of parenting motivation, one (Section F) using straightforward ratings of interest in several aspects of parenting during major phases of the life span, and the other (Section E) focusing on felt maternal-paternal motivation and the context of such feelings. Principal component analysis supported the existence of a general factor in either approach, which permitted the construction of two Total Scales, but also supported the construction of several distinct subscales highlighting several aspects of parenting motivation, all with good internal consistencies. The correlations of the scales of Section E with those of Section F, especially of the two Total Scales, as included in Table 7, can be interpreted as indicators of criterion validity.

Scale validation was conceptualized in the context of sexual differentiation of brain and behavior and was largely successful. Group differences between men and women, and -- despite modest sample sizes -- between HET, non-HET and GDYS men, and between HET, non-HET, and GDYS women were mostly as predicted. However, there was one major exception: Non-HET women did not differ significantly from HET women in maternal motivation -- in fact, if anything, they tended to be more pregnancy- and infant-oriented, although not significantly so. Several explanations need to be considered.

One possible explanation is the increased fluidity of the self-categorization in terms of sexual orientation in women when compared to men (Diamond, 2008). Perhaps our relatively young recent university sample was more fluid in this regard than a contemporary sample of older women or earlier cohorts of self-labeled homosexual women would have been.

Another possible explanation lies in the marked age difference between the HET and non-HET samples of women. The older non-HET sample might plausibly be expected to be more responsive to the “ticking of the biological clock” than the mostly college-age sample of HET women. For instance, in their study of university-based childless women, Boucai and Karniol (2008) found that the older women wanted to have a child sooner than the younger women. In our study, the age factor was statistically controlled for in the group comparisons, but perhaps not fully, given the limited overlap in age between the two groups. Note, however, that within-group correlations of age with the nine PIOQ scales did not indicate a strong overall influence of age: No correlation reached significance ($p < .05$) among the HET women, the non-HET women, and the GDYS men, and only one each among the GDYS women (pregnancy desire, positive) and the HET men (childhood rehearsal, negative), and four among non-HET men (child caring, Total Scale [E], infant care desire, and Total Scale [F], all negative).

A third explanation might be related to the “butch-femme” typology of non-HET women (James, 2005; Muscarella, Elias, & Szuchman, 2004). Perhaps our modest-sized sample included, by chance, an unusual high percentage of more traditionally feminine (“femme”) women. Although we did not employ a butch-femme measure in this study, we explored this issue by dividing the non-HET women sample by median split on the basis of the RCGQ-R Gender scale scores into relatively low- and high-femininity groups during childhood. However, we did not find any respective differences in the PIOQ scales (data not shown), although the same approach used in the non-HET men and, separately, in the GDYS men, showed the expected differences (data not shown).

A fourth explanation may have to do with another cohort effect. In recent years, motherhood among non-HET women -- by way of donor insemination or via adoption -- has been a growing trend with strong political undertones (American Psychological Association, 2008; Millbank, 2008; Sullivan, 2004). We do not know whether this issue has recently been a significant topic among non-HET women in the Toronto area and could, therefore, have influenced the

responses of women in our non-HET sample. Thus, studies of other larger, non-HET samples of women would be of interest.

Our methodological study has significant limitations. It is not based on a representative sample of the US population, but used convenience samples. The participants were mostly university based and of mostly relatively young age. The non-HET and GDYS subgroups were of relatively modest sample size. There were substantial demographic differences between some subgroups, especially in ethnicity and the related variable of English as a second language, and also in age, and in the rate of having had children. Larger sample sizes are needed for detailed analyses of potential effects of such factors. Thus, it is highly desirable that further studies of this questionnaire be conducted in larger samples including participants from demographic populations that would complement the ones used in this article.

Despite the aforementioned limitations, the results of the scale construction and of most of the validity findings presented here suggest to us that this questionnaire will prove to be robust in other populations, similar to the experience with measures of gender-related behaviors in general. We expect, therefore, that this new questionnaire will prove to be useful for work with the clinical groups, for which it is intended, as a component of a comprehensive psychological work-up.

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Figure 1.
Section E: Scree plot for the unrestricted principal components solution.

Figure 2.
Section F: Scree plot for the unrestricted principal components solution.

Table 1

Items (Female Version) from Section C. Your Personal Reasons for not Having Biological Children (by Pregnancy)

Item	Descriptor
C-1.	I am still too young; it's too early in my life
C-2.	I would like to have children, but don't have enough money
C-3.	I would like to, but haven't found an appropriate father for them
C-4.	I would like to, but haven't found a loving and willing partner
C-5.	I would like to, but don't have enough support from my family
C-6.	I would like to, but my work does not leave me enough time
C-7.	I would like to, but general health problems are in the way
C-8.	I would like to, but I have a medial condition or genetic disorder that I do not want to pass on to my children
C-9.	I have difficulty getting pregnant, but am still trying
C-10.	I have tried hard to get pregnant, without success, and have given up
C-11.	I would like to, but I have a medical condition that makes it impossible for me to have children
C-12.	I would like to, but my male partner is infertile
C-13.	I would like to, but I don't like hospitals
C-14.	I would like to, but I am afraid of doctors
C-15.	I would like to, but I don't like physicians to examine my private parts (genitals)
C-16.	I would like to, but I am afraid of having intercourse
C-17.	I would like to, but I don't like the idea of being pregnant
C-18.	I would like to, but I am afraid of giving birth
C-19.	I would like to adopt (or foster) a child, but have difficulty with finding the kind of child I want
C-20.	I am not the maternal / motherly type
C-21.	My career is more important to me than having children
C-22.	I got involved with someone who already has a child
C-23.	Other reasons, which: —

Note: The response scale for each item is Yes (1), Unsure (2), No (3).

Table 2
Demographic Characteristics and Recalled Gender-Related Behavior During Childhood

Demographics	University-based participants				GDYS sample	
	Men	HET (n = 104)	NonHET (n = 36)	Women	Men (n = 32)	Women (n = 13)
Age (in years)						
<i>M</i>		19.27	25.06	19.07	43.38	27.92
<i>SD</i>		1.32	6.26	2.08	11.19	9.40
Range		18-25	19-52	18-45	19-61	20-51
Ethnicity N (%)						
White (European)		44 (42.3)	29 (80.6)	102 (51.5)	29 (90.6)	7 (53.8)
East or South Asians		41 (39.5)	3 (8.4)	57 (28.8)	1 (3.1)	4 (30.8)
Other ^a		19 (18.3)	4 (11.1)	39 (19.7)	2 (6.2)	2 (15.4)
English First Language						
N (%)						
Yes		67 (64.4)	33 (91.7)	129 (65.2)	26 (81.2)	9 (69.2)
No		37 (35.6)	3 (8.3)	69 (34.8)	6 (18.8)	4 (30.8)
RCGO-R Gender ^b						
<i>M</i>		1.40	2.30	4.07	3.16	1.67
<i>SD</i>		0.33	0.80	0.59	0.94	0.33

HET = Heterosexual, NonHET = Nonheterosexual, GDYS = Gender-dysphoric.

^aIncluding Black, First Nations, Hispanic or Latino, Other.

^bAfter exclusion of scores on item 4, “Play with infant/baby dolls,” to avoid content overlap with the PLOQ scales; high scores = feminine.

Table 3

Section E. Your Interest in Having Children in the Past 12 Months: General Component and Total Scale

Item	Descriptor	Loading on unrotated component 1	Corrected item-total correlation for the 14-item Total Scale
E7	When you see a mother pushing a baby carriage or holding a baby, does it make you want to have a baby of your own?	.78	.70
E12	When you are around others with young children, does it make you want to have a child of your own?	.76	.67
E8	When you see an infant or young child on a television commercial, or in ads, does it make you want to have a baby of your own?	.71	.62
E3	Have you been interested in being around or taking care of infants or small children?	.65	.58
E4	When you see a mother breast-feed, do you have fantasies of having children?	.63	.53
E1	In the past 12 months, have you felt a desire to have children?	.58	.49
E14	When you see an infant or small child crying or in distress, do you feel a strong urge to soothe or comfort her/him?	.56	.49
E6	Have you had the desire of being affectionate with a young child?	.53	.45
E9	Have you felt that your life was not complete without having children of your own, or adopting them?	.51	.42
E10	Have you felt that you definitely are the motherly ^a type, that you are really cut out to be a mother ^b ?	.50	.43
E5	Have you had the desire to breast-feed or nurse a baby?	.50	.41
E13	Have you thought about taking a job, or actually enjoyed having a job that involves the care of infants or young children (for instance, being a nanny, nursery school teacher, pediatric nurse, or a pediatrician)?	.49	.41
E15	When you see a mother animal feeding or grooming her young, does it bring on maternal ^c feelings in you?	.49	.40
E2	In your sleep, have you had dreams about having children of your own?	.42	.35
E16	In the past 12 months, have you wished you could care for young animals (e.g., kittens or puppies) or enjoyed actually caring for them?	.28	N/A
E11	Have you felt so much of a desire to have a child that it hurts or upsets you?	.29	N/A

^a fatherly in the men's version.

^b father in the men's version.

^c paternal in the men's version.

Section E. Your Interest in Having Children in the Past 12 Months: Rotated Component Matrix After Principal Components Analysis

Table 4

Item	Descriptor	Component				
		1	2	3	4	5
E8	When you see an infant or young child on a television commercial, or in ads, does it make you want to have a baby of your own?	.83	.18	.10	.10	.01
E12	When you are around others with young children, does it make you want to have a child of your own?	.76	.26	.16	.14	.09
E7	When you see a mother pushing a baby carriage or holding a baby, does it make you want to have a baby of your own?	.74	.26	.29	.15	-.00
E9	Have you felt that your life was not complete without having children of your own, or adopting them?	.65	.10	.05	-.10	.13
E1	In the past 12 months, have you felt a desire to have children?	.51	.14	.24	.10	.26
E3	Have you been interested in being around or taking care of infants or small children?	.25	.73	.15	.07	.01
E14	When you see an infant or small child crying or in distress, do you feel a strong urge to soothe or comfort her/him?	.16	.69	.18	-.07	.11
E10	Have you felt that you definitely are the motherly ^b type, that you are really cut out to be a mother ^c ?	.18	.64	-.09	.03	.30
E13	Have you thought about taking a job, or actually enjoyed having a job that involves the care of infants or young children (for instance, being a nanny, nursery school teacher, pediatric nurse, or a pediatrician)?	.14	.63	.01	.26	-.05
E6	Have you had the desire of being affectionate with a young child?	.18	.52	.39	.06	-.22
E5	Have you had the desire to breast-feed or nurse a baby?	.16	.08	.81	-.02	.10
E4	When you see a mother breast-feed, do you have fantasies of having children?	.32	.11	.74	.12	.12
E16	In the past 12 months, have you wished you could care for young animals (e.g., kittens or puppies) or enjoyed actually caring for them?	.10	.03	.01	.87	-.01
E15	When you see a mother animal feeding or grooming her young, does it bring on maternal ^c feelings in you?	.03	.33	.39	.48	.12

Item	Descriptor	Component				
		1	2	3	4	5
E11	Have you felt so much of a desire to have a child that it hurts or upsets you?	.09	.01	.18	-.09	.83
E2	In your sleep, have you had dreams about having children of your own?	.23	.14	.01	.35	.52

^a fatherly in the men's version.

^b father in the men's version.

^c paternal in the men's version.

Table 5

Section F. Maternal Interests During Childhood, Adolescence, Young Adulthood (19-25 years), and During the Past 12 Months: General Component and Total Scale

Item	Descriptor	Loading on unrotated component 1	Corrected item-total correlation for the 19-item Total Scale
F11	I felt a desire of being pregnant (19-25 yrs)	.79	.69
F10	I had fantasies of being pregnant (19-25 yrs)	.79	.69
F12	I had fantasies of caring for an infant (19-25 yrs)	.79	.74
F17	I had fantasies of caring for an infant (past year)	.79	.72
F16	I felt a desire of being pregnant (past year)	.79	.70
F15	I had fantasies of being pregnant (past year)	.78	.67
F7	I had fantasies of caring for an infant (adolescence)	.78	.74
F8	I felt a desire of caring for an infant (adolescence)	.76	.72
F13	I felt a desire of caring for an infant (19-25 yrs)	.75	.71
F5	I had fantasies of being pregnant (adolescence)	.75	.67
F18	I felt a desire of caring for an infant (past year)	.75	.70
F6	I felt a desire of being pregnant (adolescence)	.74	.68
F4	I had fantasies of caring for an infant (childhood)	.67	.62
F1	I played pretending to be pregnant (childhood)	.59	.50
F3	I pretended to be a mom with a baby (childhood)	.59	.54
F2	I had fantasies of being pregnant (childhood)	.55	.47
F14	I liked babysitting for young children (19-25 yrs)	.54	.56
F19	I liked babysitting for young children (past year)	.55	.57
F9	I liked babysitting for young children (adolescence)	.54	.54

Section F. Maternal Interests During Childhood, Adolescence, Young Adulthood (19-25 years), and During the Past 12 Months: Rotated Component Matrix After Principal Components Analysis

Table 6

Item	Descriptor	Component			
		1	2	3	4
F16	I felt a desire of being pregnant (past year)	.88	.25	.19	.11
F15	I had fantasies of being pregnant (past year)	.86	.26	.25	.03
F11	I felt a desire of being pregnant (19-25 yrs)	.86	.29	.18	.10
F10	I had fantasies of being pregnant (19-25 yrs)	.86	.28	.18	.12
F6	I felt a desire of being pregnant (adolescence)	.64	.25	.41	.10
F5	I had fantasies of being pregnant (adolescence)	.61	.24	.51	.06
F13	I felt a desire of caring for an infant (19-25 yrs)	.25	.83	.04	.29
F12	I had fantasies of caring for an infant (19-25 yrs)	.32	.81	.14	.18
F18	I felt a desire of caring for an infant (past year)	.28	.81	.06	.26
F17	I had fantasies of caring for an infant (past year)	.38	.81	.12	.10
F7	I had fantasies of caring for an infant (adolescence)	.20	.68	.46	.17
F8	I felt a desire of caring for an infant (adolescence)	.17	.67	.39	.26
F1	I played pretending to be pregnant (childhood)	.21	.15	.81	.03
F2	I had fantasies of being pregnant (childhood)	.29	.05	.79	-.03
F4	I had fantasies of caring for an infant (childhood)	.18	.25	.76	.23
F3	I pretended to be a mom with a baby (childhood)	.19	.08	.69	.36
F19	I liked babysitting for young children (past year)	.08	.26	.11	.90
F14	I liked babysitting for young children (19-25 yrs)	.10	.28	.06	.88
F9	I liked babysitting for young children (adolescence)	.07	.20	.22	.84

Table 7

Scale Intercorrelations

Scale	1	2	3	4	5	6	7	8	9
1. Wanting children	–	.53	.48	.87	.48	.63	.38	.41	.63
2. Child caring		–	.36	.83	.34	.58	.39	.64	.62
3. Breast-feeding			–	.63	.56	.52	.38	.26	.57
4. Total Scale (E)				–	.55	.73	.48	.58	.76
5. Pregnancy desire					–	.63	.55	.30	.81
6. Infant-care desire						–	.49	.52	.89
7. Childhood rehearsal							–	.41	.74
8. Babysitting enjoyment								–	.68
9. Total Scale (F)									–

Table 8

Comparisons of HET Women (n = 198) and HET Men (n = 104)

		HET women	HET men	d ^a
Past 12 months				
Wanting children	M	1.81	1.50	0.50***
	SD	0.68	0.59	
Child caring	M	2.35	1.95	0.71***
	SD	0.56	0.59	
Breast-feeding	M	1.40	1.16	0.43***
	SD	0.63	0.38	
Total	M	1.92	1.60	0.70***
	SD	0.47	0.46	
Across life phases				
Pregnancy desire	M	1.50	1.00	0.82***
	SD	0.75	0.02	
Infant-care desire	M	1.96	1.42	0.65***
	SD	0.89	0.71	
Childhood rehearsal	M	2.16	1.10	1.61***
	SD	0.79	0.20	
Babysitting enjoyment	M	2.73	1.85	0.87***
	SD	1.01	1.02	
Total	M	1.97	1.29	1.20***
	SD	0.64	0.36	

HET = Heterosexual

^aEffect size adjusted for age. Regression or Weighted Least Squares Regression adjusted for age.***
p ≤ .001.

Table 9

Comparisons of HET (n = 104), NonHET (n = 36), and GDYS (n = 32) men

		d^a			
		HET men	NonHET men	GDYS men	HET v. NonHET GDYS
Past 12 months					
Wanting children	M	1.50	1.75	1.87	-0.67* -1.22* -0.77*
	SD	0.59	0.71	0.79	
Child caring	M	1.95	2.21	2.06	-0.68** -0.09 0.03
	SD	0.59	0.57	0.58	
Breast-feeding	M	1.16	1.25	1.97	-0.41 -1.50* -1.11***
	SD	0.38	0.54	0.87	
Total	M	1.60	1.82	1.93	-0.79** -0.91* -0.63
	SD	0.46	0.47	0.59	
Across life phases					
Pregnancy desire	M	1.00	1.06	1.87	-0.86 -3.02*** -1.73***
	SD	0.02	0.23	0.94	
Infant-care desire	M	1.42	1.69	2.13	-0.77*** -1.28* -0.99**
	SD	0.71	0.73	0.97	
Childhood rehearsal	M	1.10	1.31	1.76	-1.19*** -2.35*** -1.13**
	SD	0.20	0.53	0.84	
Babysitting enjoyment	M	1.85	1.94	2.26	-0.27 -0.39 -0.52
	SD	1.02	1.02	0.93	
Total	M	1.29	1.44	2.01	-0.87*** -2.08*** -1.42***
	SD	0.36	0.41	0.83	

HET = Heterosexual, NonHET = Nonheterosexual, GDYS = Gender dysphoric.

^aEffect size adjusted for age. Regression or Weighted Least Squares Regression adjusted for age.*
p ≤ .05

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.100 ≤

10 ≤ d
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Table 10

Comparisons of HET (n = 198), NonHET (n = 32), and GDYS (n = 13) women

		d ^a					
		HET women	NonHET women	GDYS women	HET v. NonHET GDYS	NonHET v. GDYS	
Past 12 months							
Wanting children	M	1.81	1.96	1.40	-0.23	0.54	0.83*
	SD	0.68	0.54	0.58			
Child caring	M	2.35	2.44	1.69	-0.06	0.79*	1.14***
	SD	0.56	0.56	0.64			
Breast-feeding	M	1.40	1.66	1.04	-0.33	0.62***	0.95***
	SD	0.63	0.75	0.14			
Total	M	1.92	2.07	1.41	-0.24	0.92*	1.40***
	SD	0.47	0.45	0.40			
Across life phases							
Pregnancy desire	M	1.50	1.80	1.05	-0.36	0.78***	1.17***
	SD	0.75	0.74	0.11			
Infant-care desire	M	1.96	2.16	1.49	-0.22	0.50	0.60
	SD	0.89	0.91	0.82			
Childhood rehearsal	M	2.16	2.22	1.17	-0.23	1.02***	1.10***
	SD	0.79	0.99	0.30			
Babysitting enjoyment	M	2.73	2.75	2.15	-0.01	0.34	0.33
	SD	1.01	1.02	1.15			
Total	M	1.97	2.14	1.40	-0.29	0.81***	0.95***
	SD	0.64	0.76	0.42			

HET = Heterosexual, NonHET = Nonheterosexual, GDYS = Gender dysphoric.

^aEffect size adjusted for age. Regression or Weighted Least Squares Regression adjusted for age.*
p < .05**
p < .01

< .001