

## The Subtlety of Sex-Atypicality

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*Memories of sex-atypical behavior and interests in childhood usually differ between homosexual and heterosexual people. However, variation within these broad groups has not previously been explored in detail, especially among women. We utilized data from a postal survey of a nationwide sample of Australian adult twins (n = 4,901, age range: 19–52 years). Among men, 15.2% reported homosexual behavior (ever), 11.5% said they had been sexually attracted to the same sex, and 6.4% said they were not heterosexual; the corresponding figures for women were 7.9, 10.6, and 3.5%. A continuous measure of childhood gender nonconformity (CGN) was sensitive to slight variations in homosexual attraction and behavior. In particular, among both men and women who identified as heterosexual, there were significant differences between “complete” heterosexuals and those who admitted to only one or a few same-sex behaviors but no homosexual attraction. Among men, CGN scores distinguished between heterosexuals who admitted to same-sex behavior only and those who admitted to some homosexual attraction. The sexual subgroups also differed on a measure of gender atypicality in adulthood. Implications for developmental theories of sexuality are discussed.*

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**KEY WORDS:** sexual orientation; attraction; childhood gender nonconformity.

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### INTRODUCTION

The link between sex-typicality in childhood play and interests, and sexual orientation in adolescence and later life, is a fascinating aspect of human sexual development. Although noted many times over the years, the strength of the

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association was illustrated most clearly by Bailey and Zucker (1995) in a meta-analysis of data from 41 studies. When retrospective reports of homosexual and heterosexual adults were compared, the average effect size across a range of childhood behaviors was substantial (1.19 standard deviation units). Prospective studies, although fewer in number and limited mainly to clinical samples of males, similarly suggest that sex-atypicality of childhood behavior is an important precursor of homosexual orientation (Green, 1987; Zucker, 1990).

This observation is a central element of Bem's developmental theory of sexual orientation ("Exotic Becomes Erotic," or EBE), where biologically mediated aspects of personality in childhood (temperament and sex-typical/atypical behavior) are thought to underlie feelings that the self is similar to, or different from, people of the same sex (Bem, 1996). According to Bem, those from whom we feel most different as children are "exotic," and subsequently become "eroticized" during early puberty. These attractions may be expressed in early sexual behaviors and stable sexual orientation in later life.

Enthusiasm for this model must be tempered by at least two serious questions. First, recalled childhood sex-typed behavior may vary more within, rather than between, individuals grouped on the basis of their sexual orientation, and hence the true predictive value of sex-atypical behavior in childhood for adult sexual orientation may be low. In Bailey and Zucker's meta-analysis, the great majority of retrospective individual studies had recruited people who self-identified as either homosexual or heterosexual (Bailey and Zucker, 1995). Within these broad groups, there was substantial variation in recalled childhood behaviors, and sexual orientation per se accounted for less than 40% of the variance in sex-atypicality. Bailey and Zucker (1995) suggested that the variance in childhood sex-atypicality within groups could reflect the existence of subtypes, and sex-atypicality may be etiologically important for only some of these.

To date, relatively few studies have explored childhood sex-typicality among people with different degrees of homosexual or heterosexual attractions, behavior, and orientation. Among 392 male Australian twins who rated themselves as heterosexual, McConaghy *et al.* (1994) found low but significant correlations between degree of adult homosexual attraction and dislike of rough-and-tumble play, outdoor and contact sports, and a childhood desire to be of the opposite sex. Also in Australia, Phillips and Over (1992) found bisexual men to be intermediate between gay and straight men on ten measures of childhood sex-typed behavior. In contrast, males in the USA interviewed by Bailey (1989; cited in Bailey and Zucker, 1995), female twins in the USA (Bailey *et al.*, 1993), and primarily heterosexual women interviewed in Australia by McConaghy and Silove (1991) did not show a continuous relationship between the degree of homosexual feelings and childhood sex-atypicality. There is clearly a need for more data, especially from women.

A second, important question in this type of research is whether the apparent association between childhood behavior and later orientation arises from intentional or unintentional distortion of recall; for example, heterosexuals might

underestimate the true level of sex-atypicality (Risman and Schwartz, 1988; Ross, 1980). This might arise if there are strong social expectancies for, or against, reporting childhood cross-gender interests and behaviors. On this basis, one might predict a difference in retrospective reports between polar opposites (such as gays and straights). However, what if there are significant differences between the recall of people who identify as heterosexual but who vary only slightly in their degree of homosexual attraction or experience? A social expectancy explanation would be less plausible.

In this study, we examine self-reports of sexual orientation, behaviors and attractions, and childhood sex-atypicality, from a nationwide sample of 4,901 Australian adult twins. More than 95% of these people could be placed in one of five groups: a nonheterosexual group (who said they were bisexual or gay/lesbian and who reported both homosexual attractions and behaviors), and four groups of people who said they were heterosexual, but who differed in their degree of homosexual attractions and behaviors. The primary aim of this paper was to examine the sensitivity of a retrospective measure of sex-atypicality before the age of 13 (childhood gender nonconformity, or CGN) to subtle variations in homosexual attraction and experience.

## METHODS

### Subjects

Participants were drawn from the Australian National Health and Medical Research Council Twin Register (ATR). The ATR is a volunteer register that was begun in 1978 and has about 25,000 twin pairs of zygosity types and all ages enrolled and in various stages of active contact. Participants for this sexuality study were recruited from two phases of a large twin-family study of alcohol use and abuse (Heath *et al.*, 1994). The twins were residing in eight states and territories of Australia. There is a disproportionate number of young women and people with higher than average levels of education (Baker *et al.*, 1996). In relation to psychological factors, comparisons with normative data indicate that participants are generally representative of the Australian population in terms of personality, depression, and alcohol consumption (Dunne *et al.*, 1997a). Diversity within this primary cohort in terms of religious affiliation, social attitudes, and age at first sexual intercourse has been documented elsewhere (Dunne *et al.*, 1997b,c; Martin *et al.*, 1986).

During 1992, we asked all ATR twins aged between 17 and 50 years who had completed a postal "Health and Lifestyle" survey between 1988 and 1990 ( $N = 9,112$ ) about their willingness to receive a questionnaire regarding sex. Specifically, they were asked: "We have applied for funding to carry out an *anonymous* study of sexual behavior and attitudes. Would you be willing to receive a questionnaire with explicit questions on these topics?" All those who said "Yes" were

mailed the sex questionnaire. When subjects received the sex questionnaire, they were asked to complete a consent form with their name, date of birth, and signature, which they had to return separately to indicate whether or not they had consented to complete the sex questionnaire. Anonymity was assured, and we asked cotwins privately to choose the same 10-digit identification number so that we could match their questionnaires. Approximately two weeks after initial mailing of the sex questionnaire, all twins were sent a reminder letter. Consent forms were logged as they were returned and subsequently all twins who had not returned a consent form were followed up once by telephone. Because we received many queries from twins asking whether they should complete the questionnaire if their cotwin had decided not to participate, we sent a further letter urging such "singles" to cooperate.

Twenty-eight percent explicitly refused to participate, and 54% (4,901) completed questionnaires. The remainder (18%) initially agreed to participate but did not respond when contacted (following one letter or one phone call). Our response rate was not substantially lower than that of other large-scale mail sex surveys, which have typically achieved responses from between 55 and 65% (Biggar and Melbye, 1992; Sundet *et al.*, 1992). In recent analyses, we have compared the individuals who returned the sex survey consent form with those who did not, on a range of psychological and behavioral characteristics derived from data collected in other thematically unrelated research interviews carried out with these twins between 1988 and 1995 (Dunne *et al.*, 1997a, 1998). There was some indication of a modest participation bias; people who returned consent forms and those who initially agreed to participate but could not subsequently be contacted had generally more liberal sexual attitudes, more novelty-seeking and less harm-avoidant personalities, had an earlier age of first sexual intercourse and a greater likelihood of childhood sexual abuse than people who explicitly refused to participate in the sex survey. However, the effect sizes were small, suggesting that the behavioral data in the mailed sex survey probably do not seriously misrepresent sexual activity and attitudes.

## Measures

### *Childhood Gender Nonconformity*

The male and female measures of CGN included items retrospectively assessing childhood sex-typed behavior (i.e., participation in sex-stereotypic games and activities) and gender identity (i.e., internal feelings of maleness or femaleness). Childhood was defined as being before the age of 12.

Our CGN measures were adapted from several published scales, by taking relevant items (e.g., those related to childhood rather than to adulthood) and in some cases, rewriting the items so that they were appropriate for Australian participants (e.g., "cricket" rather than "baseball"). For males, items were taken

from the Gender Identity Scale for Males (Freund *et al.*, 1977), the Childhood Play Activities Checklist (Grellert *et al.*, 1982), the Recalled Childhood Gender Behaviors Questionnaire (Mitchell and Zucker, 1992), and the Physical Aggressiveness Scale (Blanchard *et al.*, 1983). For females, items were taken from the Childhood Play Activities Checklist, the Recalled Childhood Gender Behaviors Questionnaire, and the Masculine Gender Identity Scale (Blanchard and Freund, 1983). All of these scales have been shown to differ reliably between homosexual and same-sex heterosexual individuals, as indeed have all scales of similar content (Bailey and Zucker, 1995).

Both the male and female questionnaires contained 24 items, but the items differed between the two versions, and therefore male and female scores are not comparable. Items varied in their response format, and included both dichotomously rated items and rating scales. Scree tests of the principal components suggested that for each sex, one general factor primarily accounted for the item intercorrelations. Items were standardized within sexes and summed to yield a total CGN score. Coefficient alpha was 0.79 for both male and female CGN.

### *Continuous Gender Identity (CGI)*

This scale consisted of seven items taken from Finn (1987). The items assessed participants' self-concepts as masculine or feminine (e.g., "In many ways I feel more similar to women/men than to men/women.") using 7-point rating scales. A subscale including these items (as well as some other items, primarily concerning childhood gender nonconformity) distinguished homosexual from same-sex heterosexual individuals (Finn, 1987). Separate scree tests for each sex were both consistent with a single factor underlying CGI item intercorrelations. Items were summed to yield total scores, and coefficient alpha was 0.52 for men and 0.57 for women.

### *Self-Identification of Sexual Orientation*

This was determined with the question "Do you consider yourself to be heterosexual (straight), bisexual, or homosexual (lesbian/gay)?" Respondents were asked to choose one option. We provided a definition, which stated (for females) "Heterosexual means that sexually, you desire contact only with men; bisexual means that you desire contact with both men and women; homosexual means that you desire contact only with women."

### *Sexual Attraction*

We used a Kinsey-type rating for the question "Which of the following best describes your sexual feelings at present?" There were seven response options,

ranging from (for women) "I am attracted to men only, never to women" (scored 0), "I am almost always attracted to men, but on rare occasions I am attracted to women" (scored 1), through to "I am attracted to women only, never to men" (scored 6). Following this, we asked

"Have you ever been <i>sexually</i> attracted to a female?"	Yes	No
"Have you ever been <i>sexually</i> attracted to a male?"	Yes	No

In this paper, we have considered a person as positive for same-sex attraction if he/she scored 1 or more for the Kinsey-type question about current attractions, and/or ever answered "Yes" to the single question about same-sex attractions.

### *Sexual Behavior*

Two questions were used to estimate numbers of same- and opposite-sex partners. For women, we asked "*During your entire life*, approximately how many *men* have you had sexual contact with?" Response options included none, 1 only, 2, 3–5, 6–10, 11–20, 21–50, over 50. This was followed by a question about female partners. Sexual contact was defined as "any activity which made you sexually excited and in which your genitals (for women, vagina) made contact with any part of the other person." Same-sex experience (ever) was scored positive if the person chose any except the first response option.

### *Openness and Accuracy of the Respondents' Self-Reports*

This survey raised many issues that may be particularly sensitive to response bias (Wiederman, 1993). It is conceivable, for instance, that people who identify as heterosexual but who have some same-sex feelings and behaviors may find it difficult to be completely open and accurate when answering questions about their sex lives, even within an anonymous questionnaire. This would introduce a serious bias in the present study if such people were less self-disclosing than "complete" heterosexuals or people who identified as gay or bisexual. We included two questions that may indicate willingness to self-disclose:

1. "To what extent do you feel you were able to be completely open in answering this questionnaire?"
2. "How accurately do you believe your answers to the above questions reflect your true feelings and behavior?"

For each question, the response options were "completely," "moderately," "not very," and "not at all."

RESULTS

Demographic Characteristics

There were 1,824 males (mean age: 30.5 years, range: 19–52 years) and 3,077 females (mean age: 31.1 years, range: 19–52 years). Among the males, 30% were married, 22% lived in de facto relationships, 30% were single, and 8% were divorced, separated, or widowed. Among women, 40% were married, 22% in de facto relationships, 27% were single, and 10% divorced, separated, or widowed. In comparison to average Australian adults, these volunteers were quite highly educated, with 31% of males and 24% of females having completed a university degree. Eighty-three percent of men and 69% of women were employed in a paid job. We have compared the volunteers for this sex survey with twins in the longitudinal Australian research registry who refused to participate in this particular study: there were no major differences in demographic background, although volunteers were slightly more likely to be female, married, employed, and highly educated (Dunne *et al.*, 1997a).

Sexual Diversity Within the Sample

Figure 1 shows the percentages of participants who considered themselves to be nonheterosexual, those who admitted to ever having been sexually attracted to someone of the same sex, and those who reported any sexual contact (which

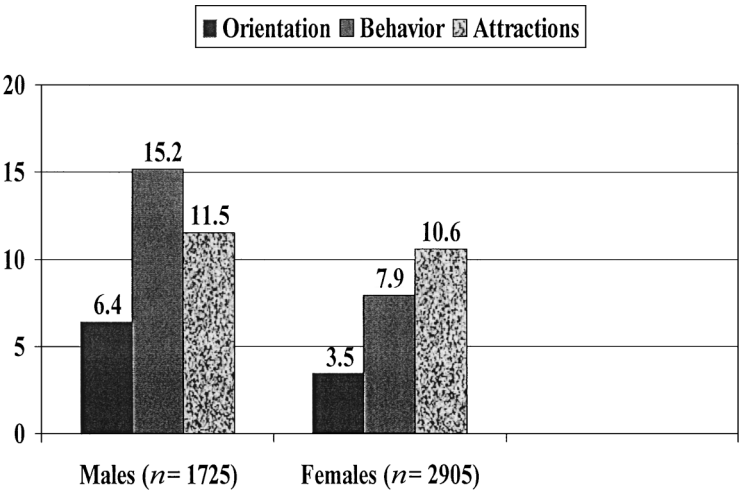


Fig. 1. Same-sex attractions, behaviors, and orientation.

**Table I.** Numbers of Opposite-Sex and Same-Sex Partners (Lifetime Estimates)

	0	1	2	3–5	6–10	11–20	21–50	50+
Males								
Opp-Sex (%)	5.1	12.6	8.4	21.6	18.2	17.5	12.6	3.9
Same-Sex (%)	84.7	6.9	2.0	2.2	1.1	1.0	0.9	1.3
Females								
Opp-Sex (%)	3.7	20.8	12.8	28.6	19.1	10.0	3.9	1.1
Same-Sex (%)	92.2	4.3	1.1	1.4	0.6	0.3	0.1	0.0

included sexual excitement and genital contact). It is clear that although the prevalence of homosexual attraction was similar among men and women, men were approximately twice as likely to have had any same-sex contact, and to consider themselves to be bisexual or gay. Of the 112 men who said that they were not heterosexual, 57 (50.9%) were bisexual whereas 55 (49.1%) were gay. Among 103 women who considered themselves nonheterosexual, 82 (79.6%) were bisexual whereas 21 (20.4%) were lesbian. The great majority of both men (97.2%) and women (96.3%) said that they had been sexually attracted to someone of the opposite sex at some time in their lives; this included 96.5% of bisexual men, 44.4% of gay men, 98.8% of bisexual women, and 71.4% of lesbians.

Respondents estimated the number of men and women with whom they had had sex during their lifetime. The figures in Table I show a predictable pattern, with men reporting a higher number of partners than women did. Interestingly, men and women had the same modal category for heterosexual partners (“3–5”), with the excess for men clearly evident in the “11–20” and “21–50” categories. Among both men and women who experienced any sexual behavior with the same sex, the modal number of partners was 1; this included 45.1% (121/268) of men and 54.1% (125/231) of women who reported same-sex contact.

### Classification of Sexual Subgroups

There was little evidence for true bipolarity in sexual orientation. For example, the majority of men (64.3%) and women (67.7%) who admitted to at least some sexual behavior with the same sex (defined by us to include sexual excitement as well as genital contact) identified as heterosexual. Similarly, large proportions of this sample of men (46.3%) and women (69.6%) who admitted to same-sex attraction (ever) also preferred to see themselves as heterosexual.

We grouped people on the basis of three variables: self-identification as heterosexual/nonheterosexual, the presence or absence of same-sex attractions, and the presence or absence of same-sex partners. This produced eight groups, as shown in Table II. Three of these groups (C, E, and G) contained few people (less than 1% of the sample).



Table II. Sexual Subgroups

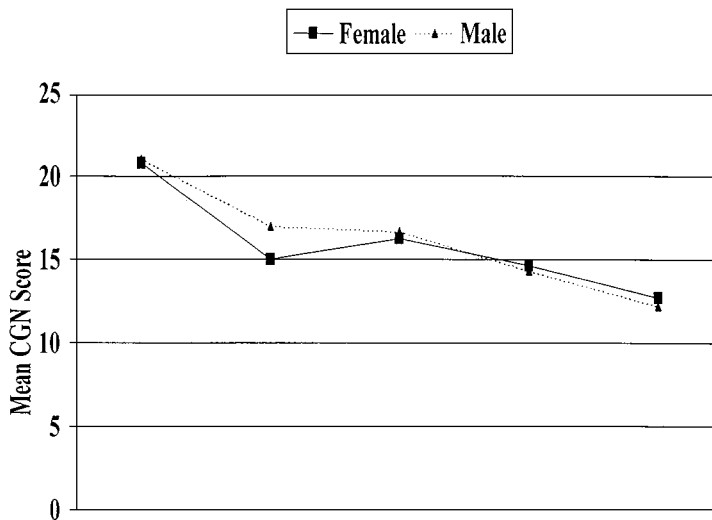
Group	Characteristics			Male		Female	
	Same-Sex attraction?	Non-Hetero identity?	Same-Sex behavior?				
				<i>n</i>	%	<i>n</i>	%
A	Yes	Yes	Yes	95	5.5	74	2.6
B	Yes	No	Yes	57	3.3	92	3.2
C	Yes	Yes	No	13	0.8	25	0.9
D	Yes	No	No	84	4.9	293	10.1
E	No	Yes	Yes	1	0.1	0	0.0
F	No	No	Yes	108	6.3	63	2.2
G	No	Yes	No	0	0.0	2	0.1
H	No	No	No	1363	79.2	2352	81.1

Approximately four in every five men and women appeared to be “completely” heterosexual; they self-identified as such and reported no same-sex attractions or behaviors. There was no sex difference in the prevalence of “complete” heterosexuality ( $p = 0.130$ ). However, self-identification as nonheterosexual was twice as common among men than it was among women ( $\chi^2 = 26.2, p < 0.0001$ ). Women who said that they had been sexually attracted to the same sex, but who identified as heterosexual and did not report same-sex behavior, were twice as common as men in this category (10.1% vs. 4.9%;  $\chi^2 = 38.6, p < 0.0001$ ). In contrast, same-sex behavior in the absence of same-sex attraction or nonheterosexual identification was significantly more common among men than women (6.3% vs. 2.2%;  $\chi^2 = 49.9; p < 0.0001$ ).

Childhood Gender Nonconformity (CGN)

The composition of our CGN measure is described in detail in the Methods section. Scores for men ranged from 0 to 37.5, with a mean of 13.3 (SD = 6.4); high scores indicate greater sex-atypicality in childhood. Among women, CGN scores ranged from 0.5 to 38.5, with a mean of 13.4 (SD = 6.6). Figure 2 summarizes data from men and women in each of five sexual subgroups (excluding groups C, E, and G because of small numbers).

There was a clear linear trend for greater childhood gender nonconformity as people moved away from “complete” heterosexuality. Two-way analysis of variance included sexual subgroup, age-category, and their interaction, with analyses conducted separately for men and women. Among men, the main effect of sexual subgroup was significant ( $F_{(4,1661)} = 65.98, p < 0.0001$ ), and there was an interesting pattern in the results of Duncan’s multiple range tests, with post hoc contrasts revealing significant differences between three of the four subgroups of men who identified as heterosexual and the one group who identified as bisexual/homosexual. The CGN measure appears to be sensitive to fairly subtle variations, which is evident in the significant difference between “complete”



Means	Self-identified bi/homosexual	Same-sex attraction plus behavior	Same-sex attraction only	Same-sex behavior only	Completely heterosexual
Female	20.8	15.01	16.26	14.64	12.73
Male	21.04	16.95	16.69	14.32	12.25

Fig. 2. Childhood gender nonconformity among five sexual subgroups.

heterosexual men and men who had some same-sex behavior but who otherwise identified as heterosexual and reported no same-sex attraction. In turn, this latter group had significantly lower CGN scores than did men who reported some same-sex attraction (with or without same-sex behaviour). Finally, all groups were significantly different from the men who identified as bisexual or homosexual.

A somewhat similar pattern occurred among women. The main effect of sexual subgroup was significant ( $F_{(4,2811)} = 47.12$ ;  $p < 0.0001$ ). Post hoc comparisons revealed that "complete" heterosexual women differed from women who reported some same-sex behavior but no homosexual attraction or orientation. In contrast to men, however, CGN scores did not differentiate between self-identifying heterosexual women with same-sex behavior who did, or did not, report any same-sex attraction. All four nominally heterosexual groups had significantly lower CGN scores than the bisexual/lesbian women had.

These findings should be seen in the context of reported numbers of partners. The great majority of Group "F" men (94/108, or 87%) and Group "F" women (46/63, or 73%) reported having had sex with only one or two people of the same sex in their lifetime. It seems, therefore, that CGN is able to differentiate between

“complete” heterosexuals and heterosexuals who (probably) engaged in either single or sporadic homosexual contact. Another interesting finding is that, among men and women who said they were heterosexual but who admitted to some same-sex attraction, CGN scores did not differentiate between those who had, or had not, experienced homosexual behavior.

In these analyses of variance, subjects were grouped in four age bands (19–24 years, 25–34 years, 35–44 years and 45–52 years). Among men, there was a significant main effect of age on CGN scores ( $F_{(3,1673)} = 4.57$ ;  $p = 0.0034$ ). Post hoc contrasts revealed that the lowest CGN scores were reported by the youngest-age group (mean = 12.59), and these were significantly lower than CGN scores reported by men aged 35–44 years (mean = 14.1). Among women, the main effect of age was also significant ( $F_{(3,2792)} = 8.81$ ;  $p < 0.0001$ ), although a different age-cohort effect emerged: it was the women from the youngest-age group who reported the most sex-atypicality in childhood (mean = 13.86), and this differed significantly from the those in the oldest-age group (mean = 12.34).

Importantly, there was no significant interaction between age and sexual subgroup for either men ( $p = 0.685$ ) or women ( $p = 0.355$ ), indicating that the magnitude of the association between childhood sex-atypicality and sexual subgroup was fairly constant across all ages.

Continuous Gender Identity (CGI)

The participants also rated how masculine or feminine they felt at the time of the study. Data for each of the five main sexual subgroups are shown in Table III. For both men and women, there were significant main effects of subgroup, reflecting greater femininity among males, or masculinity among females, with increasing distance from “complete” heterosexuality (males:  $F_{(4,1661)} = 44.71$ ,  $p < 0.0001$ ; females:  $F_{(4,2778)} = 74.45$ ,  $p < 0.0001$ ). Duncan’s post hoc comparison means revealed that “complete” heterosexuals (Group H) differed from all other subgroups,

Table III. Continuous Gender Identity

Group <sup>a</sup>	Male				Female			
	<i>n</i>	Mean	SD	Contrast <sup>b</sup>	<i>n</i>	Mean	SD	Contrast <sup>b</sup>
A	93	11.3	3.4	b,f,h	73	11.3	3.2	b,d,f,h
B	55	10.4	3.0	a,f,h	89	9.1	2.3	a,h
D	82	10.7	3.5	a,f,h	283	9.6	2.8	a,h
F	106	9.5	2.5	a,b,d	63	9.1	2.4	a,h
H	1326	8.7	2.0	a,b,d,f	2290	8.1	1.8	a,b,d,f

<sup>a</sup>Group A: Bisexual/homosexual attractions, identity and behavior; B: Hetero identity, with some same-sex attractions and same-sex behavior; D: Hetero identity, some same-sex attraction, but no same-sex behavior; F: Hetero identity, no same-sex attraction, but some same-sex behavior; H: Hetero identity, no same-sex attraction or behavior.

<sup>b</sup>Duncan’s multiple range post-hoc comparison significant at  $p < 0.05$ .

and that people who identified as bisexuals/homosexuals differed from each group. In general, the intermediate heterosexual groups did not differ significantly from each other on this measure.

The main effects of age on CGI scores were significant both for men ( $F_{(3,1642)} = 4.44$ ;  $p = 0.0041$ ) and women ( $F_{(3,2778)} = 10.83$ ;  $p < 0.0001$ ). Post hoc contrast revealed a fairly linear age-cohort effect, with the oldest men and women reporting the least gender nonconformity as adults. The interaction between age and sexual subgroup in CGI scores was not significant for men ( $p = 0.08$ ) and was modest for women ( $F_{(12,2778)} = 1.92$ ;  $p = 0.021$ ).

Openness and Accuracy of Self-Reports

The majority of respondents believed that they had been “completely open” in answering the questionnaire (see Table IV). In the case of men in the five different sexual subgroups, the percentage of men who said that they were completely open ranged from 83.5% of “complete” heterosexuals (Group H) to 87.7% of those who said that they were heterosexual but who reported some same-sex attraction and behavior. There was slightly more variance in this measure among the female subgroups, with the percentages of those who were completely open ranging from 81% in Group D to 90% in Group B.

Fewer people believed that their answers provided a “completely accurate” reflection of their true feelings and behaviors (see Table IV). Among males, there was little variance between sexual subgroups (ranging from 57% in Group C to 65% in Group B). The groups of women differed somewhat, from 51% of group F to 64% of Group B.

We assume that self-reports of heterosexuality are least sensitive to reporting biases. Using the “complete” heterosexual group (Group H) as a reference point in chi-square tests, we found that the percentages of respondents in each of the smaller subgroups who said that they were completely open, or that their answers

**Table IV.** Percentages Who Reported That They Had Been “Completely Open” and That Answers Were a “Completely Accurate” Reflection of True Feelings, by Sexual Subgroup

Group <sup>a</sup>	Males		Females	
	Open	Accurate	Open	Accurate
A	87.4	64.2	87.8	55.4
B	87.7	64.9	90.1	64.4
D	84.2	57.3	81.0	54.4
F	87.0	64.5	87.1	50.8
H	83.5	61.2	82.6	59.4

<sup>a</sup>Group A: Bisexual/homosexual attractions, identity and behavior; B: Hetero identity, with some same-sex attractions and same-sex behavior; D: Hetero identity, some same-sex attraction, but no same-sex behavior; F: Hetero identity, no same-sex attraction, but some same-sex behavior; H: Hetero identity, no same-sex attraction or behavior.

provided a completely accurate reflection of their true experiences, did not differ significantly from Group H on either measure for both males and females.

## DISCUSSION

Consistent with previous research, we found substantial differences between self-identifying homosexuals/bisexuals and heterosexuals in their recall of sex-atypical play and interests during childhood. This basic demarcation of two groups yielded the single largest difference in means (see Fig. 2). This is a robust finding, which seems entirely predictable (Bailey and Zucker, 1995; Bell *et al.*, 1981). In addition, though, we have found the measure of CGN to be very sensitive to subtle variations in distance away from “complete” heterosexuality. Variation within groups of people who identify as heterosexual has previously been observed among males (McConaghy and Silove, 1991; McConaghy *et al.*, 1994), but not among females.

Among both men and women, most notable was the observation that CGN scores differed significantly between “complete” heterosexuals and self-identifying heterosexuals who admitted no same-sex attractions but some homosexual behavior. Further, this effect was not limited to recollections of childhood. Self-rated adult feelings of masculinity and femininity also were sensitive to subtle variation in homosexual attractions and behaviors among people who identified as heterosexual.

Are these findings artefactual? Differences between homosexuals/bisexuals and heterosexuals in social norms for or against recall of gender atypicality could influence their inclination to report feelings truthfully. However, this seems an unlikely explanation for the relatively linear increase in CGN across the five sexual subgroups observed here: what social script could plausibly dictate, for example, greater willingness to report childhood feminine interest, friendships, and avoidance of rough-and-tumble play among men who have one or a few same-sex contacts ever, but who otherwise don’t classify themselves as bisexual or homosexual? Also, consider that we found very similar associations between CGN and sexuality in both men and women. Would we expect social norms to exert equivalent influence on recall of CGN in both sexes, when most social prescriptions regarding gender roles and stereotypes have quite different effects on men and women?

It remains possible that the difference in CGN between self-identifying heterosexual and homosexual/bisexual groups is real, but that the trend within the heterosexual group is artefactual, and arises simply because of greater openness among a minority of heterosexuals to talk about their true feelings. We examined this indirectly by gauging the extent to which respondents felt totally open and whether, on reflection, their answers provided an accurate picture. Assuming that people who identify as completely heterosexual have the least reason to dissimulate, we compared them to all other groups. On neither measure was there a

significant difference between “complete” heterosexuals and heterosexuals who admitted to some same-sex feelings or behavior.

### Implications for Developmental Theory

It is clear from this and other works (McConaghy *et al.*, 1994) that the majority of people who admit to ever having homosexual attractions or behavior also consider themselves to be heterosexual. This group is more than twice as large as the number of people who self-identify as bisexual or homosexual. At one level, it may be possible to dismiss the (perhaps) transient homosexual attraction and occasional behavioral experimentation by heterosexuals as being uninformative as far as essential impulses are concerned; variation within heterosexual groups could arise mainly because of social and interpersonal influences experienced by some individuals but not others. However, the apparent sensitivity of our measures of sex-atypicality to subtle variations in sexual experience suggests otherwise. Higher than average sex-atypicality among some heterosexuals could indicate that these people are more likely than most to reach one of the lower thresholds of a homosexual continuum. In terms of Bem’s EBE theory, slight sex-atypicality might engender slight homoeroticism, and this could explain why some heterosexual people respond to opportunities for homosexual experimentation, whereas most do not (Bem, 1996).

Unfortunately, variation within heterosexual groups has not been examined in most etiologic studies of homosexuality, such as family studies of genetic linkage and sibling sex ratios, which rely heavily on self-selected samples of overtly homosexual people (Bailey and Pillard, 1991; Bailey *et al.*, 1993; Blanchard and Bogaert, 1996; Hamer *et al.*, 1993). In a separate analysis of these twin data, we found substantial familial aggregation of homosexual orientation (defined in terms of Kinsey-type measures of sexual attractions and fantasy), but our confidence intervals for heritability estimates were so wide that we could not reject the null hypothesis of no genetic influence (Bailey *et al.*, 2000). Importantly, though, childhood gender nonconformity was significantly heritable for both men and women, which indicates that this precursor of homoeroticism may have a genetic basis (Bem, 1996).

Adequate empirical tests of etiologic theory must include data on multiple thresholds along a continuum of homosexuality. As Pattatucci (1998) recently said “Definitions set parameters and thus constrain possibilities” (p. 370). Estimates of the variance “explained” by genetic, hormonal, and other biological factors will always differ depending upon how narrowly the trait is defined. We suggest that future developmental studies should include measurement of sex-atypicality as part of multidimensional assessments of attractions, fantasies, and overt orientation. One final point which now seems justifiable to make is that apparently sporadic

homosexual behaviors should not be dismissed as uninformative, but rather should be seen as a potential signal of true psychosexual variation.

### Limitations

Despite the large size of this nationwide sample, and the relatively broad assessment of sexuality, this study has some significant limitations. It is based on a postal survey of twins in a longitudinal research cohort, and thus can't be seen as a true reflection of the population; indeed, there were some differences in sexual behaviors between the twins who volunteered and those who refused (Dunne *et al.*, 1997c, 1998). Although we have no reason to believe that the distribution of sexual experiences of twins is unusual (McConaghy *et al.*, 1994), we have no normative data on Australians against which to compare.

The use of a twin sample would probably minimize the total variance in the data if, as appears likely, there are significant correlations between twins in many aspects of sexuality (Bailey *et al.*, 1993, 2000; Dunne *et al.*, 1997b). One effect would be to minimize the denominator in the calculation of *F* statistics. It is uncertain, therefore, whether the statistically significant association between recalled childhood sex-atypicality and degree of homosexual orientation found here would emerge to the same degree in nontwin samples. Another possible complication is that the present sample is very large, and smaller studies might not have sufficient power to detect subtle effects. These patterns should be examined in future surveys with various groups, including random probability samples from otherwise unselected populations.

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