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Do East Asian and Euro-Canadian Women Differ in Sexual Psychophysiology Research Participation?

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Evidence from studies of ethnic differences in sexual conservativeness and Papanicolaou (Pap) testing behaviors suggests that there may be culture-linked differences in rates of participation in physically invasive sexuality studies, resulting in volunteer bias. The effects of ethnicity and acculturation on participation in female psychophysiological sexual arousal research were investigated in a sample of Euro-Canadian (n=50) and East Asian (n=58) women. Participants completed a battery of questionnaires and were given either course credits or \$10 for their participation. Participants were then informed about the opportunity to participate in a second phase of the study, which involved psychophysiological sexual arousal testing and which was completely optional. Contrary to expectations, the results showed that the East Asian women were more likely to participate in Phase 2 than the Euro-Canadian women. Among the East Asian women, greater heritage acculturation and lower mainstream acculturation predicted a lower likelihood of Phase 2 participation. The findings suggest the need to be wary of overgeneralizing female psychophysiological sexual arousal research results and may have implications for improving Pap testing behaviors in East Asian women.

Volunteer bias in human psychological research can seriously undermine the external validity of findings. Factors associated with the study methodology and factors associated with the participant population both influence such bias. The goal of this study was to explore possible interactions between these with a focus on sexuality research and East Asian culture.

Volunteer bias refers to the tendency for volunteers in research studies to differ systematically from those who choose not to volunteer (hereafter referred to as non-volunteers), thereby limiting the generalizability of the results. Although volunteer bias is likely to exist in most areas of psychological research because participation in studies occurs by self-selection (Barker & Perlman, 1975; Bauman, 1973; Bogaert, 1992, 1996; Farkas, Sine, & Evans, 1978; Gaither, Sellbom, & Meier, 2003; Kaats & Davis, 1971; Kenrick, Stringfield, Wagenhals, Dahl, & Ransdell, 1980; Morokoff, 1986; Nirenberg et al., 1991; Purdie, Dunne, Boyle, Cook, & Najman, 2002; Saunders,

Fisher, Hewitt, & Clayton, 1985; Senn & Desmarais, 2001; Strassberg & Lowe, 1995; Turner, 1999; Wiederman, 1993, 1999; Wolchik, Braver, & Jensen, 1985; Wolchik, Spencer, & Lisi, 1983), Rosenthal and Rosnow (1975) suggested that it may be greater in sex research because of the novelty and sensitivity of the topic.

To date, studies on volunteer bias in sex research can be grouped into two broad classes—those that have focused on differences in personality characteristics and those that have examined discrepancies in sexuality-related variables between volunteers and non-volunteers. In regard to the former, findings have been somewhat discordant, with some studies finding no differences on a number of personality characteristics (Barker & Perlman, 1975; Farkas et al., 1978; Saunders et al., 1985) and others finding that volunteers score higher on dimensions such as unconventionality (Bogaert, 1996), self-monitoring and interpersonal exploitiveness (Wiederman, 1999), and sensation seeking (Bogaert, 1996). With respect to studies that have investigated volunteer bias in sexuality-related variables, the findings have been more consistent, with volunteers reporting greater erotophilia and less sex guilt (Plaud, Gaither, Hegstad, Rowan, & Devitt, 1999; Strassberg & Lowe, 1995), a greater need for sexual sensation seeking (Wiederman, 1999), and more sexual partners and a

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broader range of sexual activities (Plaud et al., 1999; Wolchik et al., 1985) compared to non-volunteers.

Furthermore, some research suggests that volunteer bias is intimately linked to the invasiveness of the study procedures such that increasingly invasive studies tend to attract volunteers who are progressively more sexually liberal (Farkas et al., 1978; Morokoff, 1986; Plaud et al., 1999; Strassberg & Lowe, 1995; Wiederman, 1999; Wolchik et al., 1985; Wolchik et al., 1983). For example, in a multi-stage study by Strassberg and Lowe (1995), about 1,200 university students who were enrolled in an introductory psychology course participated in a “mass testing” session (Phase 1)—class time that is regularly set aside during the first week of classes for the administration of questionnaires that assess attitudinal and personality variables that are of interest to researchers in the department of psychology. The Sexual Opinion Survey (SOS; Fisher, Byrne, White, & Kelley, 1988), a general measure of sexuality-related attitudes, was completed by 1,063 of the 1,200 students. A sign-up sheet was appended to the SOS inviting participants to participate in an additional questionnaire-based study (Phase 2) on sexual attitudes, sexual knowledge, sexual experience, and personal general beliefs. Of the 1,063 participants who had completed Phase 1, 391 participated in Phase 2. As before, at the end of Phase 2, participants were given the opportunity to sign up for up to three more sexuality studies: an interview study, a study in which they would rate erotic videos, and a study involving measurement of psychophysiological sexual arousal. As the major goal of this research was to shed light on volunteer bias across different (more personal and invasive) techniques used in sexuality research, inclusion of the descriptions of the three final studies served to enable the researchers to analyze the differences among the volunteers for each study. Results revealed that those who volunteered for Phase 2 held more positive sexual attitudes, as measured by the SOS, compared to non-volunteers. In addition, among those who participated in Phase 2, volunteers for the final three studies reported significantly less sexual guilt and had more sexual experiences than non-volunteers, indicating mounting volunteer bias with increasing invasiveness of study procedures.

Among the techniques employed in female sexuality research, one of the most invasive is vaginal photoplethysmography (VPP). The VPP is the most commonly used and well-validated device to measure psychophysiological sexual arousal in women (Sintchak & Geer, 1975). This is a self-inserted, tampon-shaped probe inserted vaginally and made from clear acrylic plastic that measures vaginal blood flow. A light source in the VPP emits an infrared light that is reflected from the vaginal wall back to the VPP and detected by a photosensitive light detector embedded in the VPP. Changes in the degree of vaginal tissue engorgement are discerned by variations in the amount of

backscattered light that is received by the detector. The relative amount of light detected in the engorged compared to the unengorged state is construed as an indirect measure of vasocongestion and, by extension, psychophysiological sexual arousal (Laan & Everaerd, 1998).

Studies employing the VPP have made tremendous contributions to the understanding of female psychophysiological sexual arousal in the past three decades. Nonetheless, research into psychophysiological sexual arousal in women has been affected by some methodological shortcomings that limit the generalizability of findings. Specifically, volunteer bias has been cited as limiting the impact of sexual psychophysiological findings. A related, but discrete, issue—potential cultural differences in rates of participation in research utilizing the VPP—instead has been completely neglected. A survey of the literature revealed that potential cultural discrepancies in the context of participation rates in psychophysiological sexual arousal research have never been studied. The single study of volunteer bias in sex research that did take ethnicity into account was an interview-based study (Wiederman, 1993). Wiederman (1993) analyzed demographic differences between responders and non-responders to various questions about sexual experience in a national probability sample and found that a greater proportion of Caucasian and African American women responded to questions concerning the gender of sex partners and lifetime number of male sex partners compared to women in the “other” (unspecified) ethnic category.

The study by Wiederman (1993) represented a step in the right direction by recognizing that there may be cultural disparities in response rates to questions of a sexual nature, and by examining those differences. With individuals of East Asian descent (Chinese, Japanese, and Korean) comprising one of the fastest-growing ethnic groups in North America (Statistics Canada, 2006; U.S. Census Bureau, 2000), however, cognizance of culture-linked differences in designing all types of sex research, as well as in generalizing conclusions in sex research to members of this group, is becoming increasingly vital. Underscoring the importance of attending to the influence of East Asian culture in studying a topic as invasive as psychophysiological sexual arousal, recent research found that ethnicity was a significant predictor of whether a woman had ever had a Papanicolaou (Pap) test, such that European descent compared with East Asian ancestry was predictive of a higher likelihood of ever having had a Pap test (Woo, Brotto, & Gorzalka, in press). Because the Pap test allows for the detection of abnormal cells that can be treated before progression to cervical cancer, it is an indispensable tool in cervical cancer prevention when conducted on a regular basis. The study by Woo et al. on cultural differences in Pap testing rates may be pertinent to the present study of cultural influences on participation rates in

research using the VPP because measurement of psychophysiological sexual arousal via the VPP may be considered the research analogue to the Pap test. Although some differences exist between VPP use and the Pap test, such as that the Pap test is conducted by another person and is usually conducted on sexually active women, both are physically invasive and are necessarily proximal to intimate parts of the body. Moreover, the Pap test has gained sexual meaning via social attribution and individual learning (Fisher et al., 1988; Gagnon & Simon, 1973; Mosher & Cross, 1971). In addition, Woo et al. found that variables related to sexuality influenced whether East Asian women had received a Pap test or not.

In studying the effects of culture on Pap testing, Woo et al. (in press) went beyond merely studying ethnic group membership and examined how Pap testing was affected by acculturation. Acculturation is the process by which individuals who move from one culture to another integrate aspects of the new predominant (mainstream) culture into the self-identity developed in their culture of origin or upbringing (heritage culture). Mainstream acculturation refers to the extent to which an individual adopts the attitudes, values, and behaviors of mainstream (in this study, Canadian) culture. In the current context, heritage acculturation refers to the degree to which an individual continues to embrace the attitudes, values, and behaviors of East Asian culture (Berry, 1980). In analyzing the data for the East Asian women only, Woo et al. (in press) found that higher heritage acculturation predicted a lower likelihood that a woman had ever had a Pap test; that is, those women who continued to cherish the values, attitudes, and behaviors of their heritage culture were less likely to have ever had a Pap test, regardless of their degree of mainstream acculturation.

The goals of the present study were (a) to explore differences between Euro-Canadian and East Asian women in willingness to participate in sexual psychophysiological research based on demographic, psychological, and sexual variables; and (b) to explore the extent to which heritage and mainstream acculturation influenced East Asian women's acceptance to participate in sexual psychophysiology research. Based on prior findings that individuals of European descent are less sexually conservative than those of Asian ancestry (e.g., Brotto, Chik, Ryder, Gorzalka, & Seal, 2005; Higgins & Sun, 2007; Higgins, Zheng, Liu, & Sun, 2002; Meston, Trapnell, & Gorzalka, 1998), we hypothesized that Euro-Canadian women would be more likely to participate in sexual psychophysiological research. Based on the study by Woo et al. (in press) that found that East Asian ethnicity and higher affiliation with the heritage culture are predictors of poor Pap testing behaviors, we hypothesized that East Asian ethnicity and higher heritage acculturation would be predictive of lower participation rates in psychophysiological sexual arousal research.

Method

Participants

One hundred eight women between the ages of 19 and 50 participated in this study. All participants were recruited through two separate advertisements—one posted on the university's online human subject pool and the other posted in the community. Of the 127 women who contacted the laboratory in response to the community advertisement, 32 subjects participated; the remainder did not respond to attempts to schedule appointments. Seventy-six subjects were recruited through the university's human subject pool. Fifty percent of the subjects recruited from the community were East Asian, and 55% of those recruited from the university were East Asian, and these proportions did not differ significantly, $\chi^2(1, N = 108) = 0.25, p > .05$. The proportion of subjects recruited from these two different sources, who ultimately chose to continue to Phase 2, did not differ significantly, $\chi^2(1, N = 108) = 1.09, p > .05$.

A telephone screen was used to assess interested participants for eligibility. Specifically, inclusion criteria were that women be at least 19 years old, be heterosexual, and be of Euro-Canadian or East Asian descent. The latter corresponded to any woman who self-identified as being Chinese, Japanese, or Korean. Fifty women self-identified as Euro-Canadian, and 58 self-identified as East Asian.

The East Asian group consisted of 82.8% Chinese, 5.2% Japanese, and 12.1% Korean. The Euro-Canadian women ($M = 26.8, SD = 7.2$) were significantly older than the East Asian women ($M = 22.8, SD = 4.7$), $t(81.2) = 3.42, p = .001$. Therefore, age was included as a covariate in all statistical analyses. There was no significant difference in level of education between the groups, with 63% of the sample having some university education and 31.5% of the sample having completed their undergraduate degree. The East Asian women were moderately acculturated to both their heritage culture and the mainstream culture—scores were 67.91 and 67.40, respectively, on the Vancouver Index of Acculturation (VIA; Ryder, Alden, & Paulhus, 2000). The range of possible scores on each domain of the VIA is 0 to 90, with higher scores indicating greater acculturation in that domain. Demographic data are presented in Table 1.

Measures

Vancouver Index of Acculturation (VIA). The VIA (Ryder et al., 2000) is a self-report instrument that assesses bidimensional acculturation using heritage and mainstream culture as dimensions. "Heritage culture" is defined as the culture of birth or upbringing, whereas the predominant cultural environment is defined as "mainstream culture." The VIA consists of 20 items with 10 domains: cultural traditions, marriage partner, social

Table 1. Demographic Characteristics of Euro-Canadian ($n = 50$) and East Asian ($n = 58$) Participants

Variable	Euro-Canadian	East Asian
Mean age in years (<i>SD</i>)*	26.84 (7.25)	22.76 (4.65)
Place of birth (%)**		
Canada or United States	90.0	43.1
China, Hong Kong, Taiwan	0.0	44.8
Southeast Asia	0.0	1.7
Europe	8.0	0.0
Other	2.0	10.3
Years of residency in Canada (<i>SD</i>)**	23.70 (9.88)	14.99 (9.12)
Marital status (%)		
Unmarried	79.1	96.5
Married	18.8	3.5
Divorced	2.1	0.0
Mean acculturation score (<i>SD</i>)		
Mainstream	NA	67.40 (9.56)
Heritage	NA	67.91 (1.31)

* $p < .01$. ** $p < .001$.

activities, comfort in professional relationships, entertainment, behavior, maintenance or development of cultural practices, values, humor, and social relationships. Higher scores on the mainstream dimension reflect greater Westernization, and higher scores on the heritage dimension reflect maintenance of one's culture and traditions. Both dimensions were found to have good internal consistency in the East Asian validation sample (Cronbach's $\alpha = .92$ for heritage acculturation and $.85$ for mainstream acculturation).

Female Sexual Function Index (FSFI). The FSFI (Rosen et al., 2000) is a 19-item measure assessing six domains of sexual function: desire, subjective arousal, lubrication, orgasm, satisfaction, and pain during sexual activity over the past month. The total FSFI score is obtained by summing the scores from the individual domains. Higher scores on this measure indicate better levels of sexual functioning. The FSFI has been shown to be a valid measure for differentiating women with and without sexual arousal disorder (Rosen et al., 2000). Because of some conceptual and statistical problems identified by Meyer-Bahlburg and Dolezal (2007), adjustments were made to the scoring of the FSFI in this study in that any woman who had not engaged in sexual intercourse over the preceding four weeks was excluded from analyses of all subscales except sexual desire.

Sexual Beliefs and Information Questionnaire (SBIQ). The SBIQ (Adams et al., 1996) is a 25-item item inventory that assesses information and beliefs regarding sexuality. Participants select "true," "false," or "don't know" in response to each item, and the total score is computed by summing the number of items that

were answered correctly and reflects the accuracy of sexual knowledge. The SBIQ has good internal consistency (Cronbach's $\alpha = .82$) and test-retest reliability ($r = .82, p < .001$).

Beck Depression Inventory—Second Edition (BDI-II). The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item inventory that measures the degree of depressive symptoms, with items designed specifically to be consistent with criteria for major depressive disorder as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994). Each item is rated along a four-point scale from 0 to 3, with higher numbers reflecting increasing severity, and total BDI-II scores can range from 0 to 63.

Beck Anxiety Inventory (BAI). The BAI (Beck, Epstein, Brown, & Steer, 1988) is a widely used, 21-item, self-report measure of anxiety symptoms, with higher scores indicating more anxiety. Items are rated on a four-point scale ranging from 0 (*not at all*) to 3 (*severely*) and are summed to obtain the total score, which can range from 0 to 63.

Fear of Negative Evaluation (FNE). The FNE (Watson & Friend, 1969) is a 30-item, true-false questionnaire that was administered as a measure of social-evaluative anxiety and need for social approval or disapproval avoidance. The scale consists of 30 items, and participants are asked to indicate whether each item is true or false in describing how they usually feel. The FNE has been demonstrated to have adequate internal consistency and construct validity.

In addition, demographic and sexual frequency-related measures were developed by the authors and assessed sexual intercourse history and experience with a variety of different sexual activity types.

Procedure

Participants who responded to the university advertisement received course credit for participating. Women who responded to one of the community advertisements were compensated \$10. Following the telephone screen, where participants were told that the purpose of the study was to explore the relationship between ethnicity and sexual knowledge and activity, women were scheduled for a 90-min session at the Sexual Health Laboratory in the middle phase of their menstrual cycle. After written consent was obtained, women completed the battery of questionnaires, which took approximately 45 min in a private, locked room. After receiving their honorarium or documentation of course credit, they were then informed by the Euro-Canadian experimenter of the opportunity to

participate in a second phase of the study that involved sexual psychophysiological testing and which was completely optional. Women were told that Phase 2 would involve entering an internally locked testing room, being seated on a comfortable recliner, and watching a neutral and erotic film while having their genital arousal assessed. This would be assessed with a tampon-shaped, previously sterilized, acrylic probe that the woman would insert vaginally with the aid of diagrammed instructions. Participants were also told that they would complete a 33-item self-report assessment of their affective and sexual responses to the films. If the woman agreed to participate in Phase 2, she was provided with a new consent form to sign, and she was provided with a \$10 honorarium at the end of Phase 2. The data from Phase 2 are the subject of another manuscript by the authors, and all procedures were approved by our institution's Clinical Research Ethics Board.

Results

Sexual and Affective Characteristics of the Sample

There were no significant ethnic differences in the proportion of women currently in a relationship, $\chi^2(1, N=108)=0.37, p>.05$; nor in the likelihood of currently being sexually active in their relationship, $\chi^2(1, N=97)=2.59, p>.05$. There were no significant ethnic group differences in the proportion of women who had engaged in the following with their current partner: kissing, $\chi^2(1, N=77)=0.50, p>.05$; touching with clothing removed, $\chi^2(1, N=77)=3.26, p>.05$; touching a partner's genitals, $\chi^2(1, N=77)=2.37, p>.05$; having performed oral sex on partner, $\chi^2(1, N=77)=0.05, p>.05$; or having experienced intercourse, $\chi^2(1,$

$N=77)=0.84, p>.05$. However, Euro-Canadian women were more likely to have received oral sex, $\chi^2(1, N=77)=7.25, p<.01$. All proportions are presented in Table 2. Among women who had been sexually active in the past four weeks, there were no significant differences on any subscale of the FSFI (Table 3). Twenty subjects (four Euro-Canadian, 16 East Asian) had not engaged in sexual activity of any kind (either solitary or interpersonal) in the previous four weeks; for these women, only the desire subscale score of the FSFI was computed. Euro-Canadian women had significantly greater sexual knowledge than the East Asian women, $t(105)=4.93, p<.001$ (Table 3).

Scores from the BDI-II, BAI, and FNE were also compared between the ethnic groups, controlling for age. There were no significant ethnic group differences on any of these measures, indicating group equivalence in depression, anxiety, and fear of negative evaluation (Table 3).

Proportions and Characteristics of Women Completing Phase 2

Twenty-eight percent of Euro-Canadian women and 37.8% of East Asian women participated in Phase 2. A binary logistic regression was conducted on the full sample of participants to assess whether age, ethnicity, experience with intercourse, sexual knowledge, and fear of negative evaluation could predict whether the woman agreed to participate in Phase 2. The overall model was statistically significant, $\chi^2(5, N=77)=11.71, p<.05$, and revealed that age and self-reported ethnicity were both significantly associated with participating in Phase 2, such that increasing age and East Asian ancestry predicted a significantly higher likelihood of participation in Phase 2. Results of the full model are presented in Table 4.

A binary logistic regression was conducted on the East Asian women alone to assess whether age, experience with intercourse, sexual knowledge, fear of negative evaluation, and heritage and mainstream acculturation predicted participation in Phase 2. The overall model was significant, $\chi^2(6, N=41)=17.44, p<.01$, and showed that among the East Asian women, greater heritage acculturation was associated with less likelihood of participating in Phase 2 ($p<.05$), whereas greater mainstream acculturation was associated with a greater likelihood of participating in Phase 2 ($p<.05$). Results are presented in Table 5.

Next, *t* tests were conducted to examine whether volunteers and non-volunteers differed from each other within each ethnic group on demographic, sexual, and mood variables. Among the Euro-Canadian women, volunteers and non-volunteers did not differ in age, length of residency in Canada, sexual response, sexual knowledge, anxiety and depression symptoms, or fear of negative evaluation (all $ps>.05$). In contrast, among the East Asian women, volunteers had lived significantly

Table 2. Ethnic Group Differences on Relationship Status and Sexual Activity

Variable	Euro-Canadian (<i>n</i> = 50) (%)	East Asian (<i>n</i> = 58) (%)
Currently in a relationship	66.0	60.3
Sexually active in current relationship	83.3	69.1
Who have engaged in hugging, kissing, or holding hands in current relationship	94.4	97.6
Who have engaged in touching with clothing removed in current relationship	97.2	85.4
Who have touched their partner's genitals in current relationship	97.2	87.8
Who have performed oral sex on their partner in current relationship	77.8	75.6
Who have had oral sex performed on them by their partner in current relationship*	80.6	51.2
Who have engaged in vaginal-penile intercourse in current relationship	86.1	78.0

* $p<.01$.

Table 3. Ethnic Group Differences on Scores From the Female Sexual Function Index (FSFI), the Sexual Beliefs and Information Questionnaire (SBIQ), the Beck Depression Inventory–Second Edition (BDI–II), the Beck Anxiety Inventory (BAI), and the Fear of Negative Evaluation (FNE)

Variable	Euro-Canadian		East Asian		<i>t</i>	<i>df</i>	<i>P</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
FSFI desire ^a	3.66	1.11	3.56	1.40	0.42	105	<i>ns</i>
FSFI arousal ^b	4.73	1.29	4.52	1.12	0.82	86	<i>ns</i>
FSFI lubrication ^b	5.03	1.15	5.29	1.07	–1.12	86	<i>ns</i>
FSFI orgasm ^b	4.29	1.67	4.08	1.45	0.63	86	<i>ns</i>
FSFI satisfaction ^c	4.46	1.35	4.62	1.36	–0.49	75	<i>ns</i>
FSFI pain ^d	5.01	1.39	5.39	0.94	–1.32	68	<i>ns</i>
FSFI full scale score ^e	27.36	5.18	28.34	5.23	–0.77	66	<i>ns</i>
SBIQ ^a	19.59	2.41	17.16	2.66	4.93	105	< .001
BDI–II ^a	8.18	6.60	7.41	7.87	0.54	106	<i>ns</i>
BAI ^a	9.08	6.96	8.72	8.01	0.25	106	<i>ns</i>
FNE ^a	15.02	8.14	16.12	7.87	–0.71	106	<i>ns</i>

Note. Higher scores denote better sexual function (FSFI), more sexual knowledge (SBIQ), higher depressive symptoms (BDI–II), higher anxiety symptoms (BAI), and more fear of negative evaluation (FNE).

^aBased on *n* = 50 Euro-Canadians and *n* = 58 East Asians.

^bBased on *n* = 46 Euro-Canadians and *n* = 42 East Asians.

^cBased on *n* = 38 Euro-Canadians and *n* = 39 East Asians.

^dBased on *n* = 36 Euro-Canadians and *n* = 34 East Asians.

^eBased on *n* = 34 Euro-Canadians and *n* = 34 East Asians.

longer in Canada, $t(56) = -2.24$, $p < .05$; had significantly more accurate sexual knowledge, $t(56) = -2.16$, $p < .05$; and had significantly lower heritage acculturation, $t(56) = 2.98$, $p < .05$, compared to non-volunteers. East Asian volunteers and non-volunteers did not differ in age, sexual response, anxiety symptoms, depression symptoms, fear of negative evaluation, or mainstream acculturation.

Discussion

Culture and Sexuality

Chinese sexuality has been influenced by three main philosophical traditions, the most influential of which is Confucianism. Confucius himself viewed sex as being good as long as it did not lead to social instability or damage interpersonal relationships (Ng & Lau, 1990). Moreover, sexual intercourse was necessary for the

fulfillment of one's filial obligation to marry and bear children to perpetuate the family name (Ruan, 1991). However, Confucianism in its present form was heavily influenced by the Neo-Confucians of the Song Dynasty (960–1276 A.D.) who gave the Confucian classics strict interpretations. From this time on, Confucianism became sexually suppressive in that sexual behavior was to be reserved for marriage and was to serve a purely procreative role. This long history of sexual suppression appears to form the basis for the sexual conservativeness seen among Chinese individuals today (Ng & Lau, 1990). As Confucianism spread to Japan and Korea, both societies became patriarchal. Virtuous women were to be seen only by males in their families and the sexes were segregated after the age of seven in Korea (Frenier & Mancini, 1996).

A significant source of culture-linked messages about sexuality is the family of origin, and research has found significant ethnic differences in the extent to which

Table 4. Binary Logistic Regression Results Predicting Participation in Phase 2 Sexual Psychophysiological Testing Among the Full Sample of Women

Variable	<i>B</i>	<i>SE B</i>	Odds Ratio	<i>P</i>
Age	0.090	.046	1.094	.05
Ethnicity	1.562	.647	4.769	.016
Intercourse experience	0.091	.678	1.095	> .05
Sexual knowledge (Sexual Beliefs and Information Questionnaire)	0.194	.109	1.214	> .05
Fear of negative evaluation	–0.058	.035	0.943	> .05

Table 5. Binary Logistic Regression Results Predicting Participation in Phase 2 Sexual Psychophysiological Testing Among the East Asian Participants Only

Variable	<i>B</i>	<i>SE B</i>	Odds Ratio	<i>p</i>
Age	0.059	0.111	1.061	> .05
Intercourse experience	1.603	1.035	4.969	> .05
Sexual knowledge (Sexual Beliefs and Information Questionnaire)	–0.006	0.208	0.994	> .05
Fear of negative evaluation	–0.025	0.051	0.975	> .05
Heritage acculturation	–0.894	0.421	0.409	.034
Mainstream acculturation	1.218	0.605	3.379	.044

parents communicate sexual information to their children. To our knowledge, only a handful of studies to date have examined sexual communication in Asian families (Abramson, Moriuchi, Waite, & Perry, 1983; Chung et al., 2005; Harman & Johnson, 1995; Kim & Ward, 2007). Of these, the study by Kim and Ward found that Asian American youth were less likely than African American, Euro-American, and Latino youth to have received information about various sex-related topics (e.g., fertilization, birth control, sexually transmitted infections) from their parents. In the qualitative portion of the study, however, Kim and Ward found that, although Asian parents did not directly provide sexual information to their children, they did convey their sexual values, albeit through indirect means. Parents' exhortations that "romance is for marriage" or that "dating can wait until college" effectively communicated sexual values without explicitly referring to sexual activity. Asian cultures are considered "high context" in that messages are transmitted in indirect and implicit ways, sometimes via nonverbal means, and listeners are usually cognizant of underlying meanings. Thus, in East Asian culture, the sexual values embedded in comments such as "romance is for marriage" would be well-understood by listeners (Gudykunst, 2001).

Against this long history of sexual repression in East Asian culture, it is predictable that individuals of East Asian descent would hold more conservative sexual attitudes, possess less sexual knowledge, and be less sexually experienced than people of Euro-Canadian descent (Brotto et al., 2005; Brotto, Woo, & Ryder, 2007; Meston et al., 1998; Woo & Brotto, 2008).

Self-Identified Ethnic Group (East Asian Vs. Euro-Canadian) and Sexuality

Contrary to expectations and to prior research (Brotto et al., 2005; Cain et al., 2003; Woo & Brotto, 2008; Woo et al., in press), no significant differences were found between the two ethnic groups on sexual response (e.g., sexual desire, arousal, orgasm, satisfaction, and genital pain). A possible reason for the lack of significant differences on measures of sexual activity is that more sexually liberal East Asian women may have been more likely than less sexually liberal East Asian women to participate in a questionnaire study of sexuality—a different version of volunteer bias than the focus in this study. Another possibility is that our sample size was relatively small, thus limiting statistical power, given that prior studies exploring ethnic differences in sexuality measures tended to use sample sizes of much greater magnitude.

In comparisons between volunteers and non-volunteers within each ethnic group, it is interesting to note that, although Euro-Canadian volunteers and non-volunteers did not differ from each other on

demographic, sexual, and mood variables, East Asian volunteers had lived longer in Canada and were less acculturated to Asian culture compared to East Asian non-volunteers. It is possible that this contrast stems from the well-recognized sexual conservativeness among East Asian individuals such that some distancing from the heritage culture is necessary before a minimum level of comfort with the VPP can be achieved. Interestingly, this result corresponds with the finding by Brotto et al. (2005) that increasing mainstream acculturation predicted greater sexual openness if heritage acculturation was low. On the other hand, Brotto et al. (2005) found that if heritage acculturation remained high, greater mainstream acculturation did not precipitate greater sexual openness.

Self-Identified Ethnic Group (East Asian Vs. Euro-Canadian) and Participation in Psychophysiological Sexual Arousal Testing

Interestingly, and directly contrary to our hypothesis that Euro-Canadian women would be more likely to participate in psychophysiological sexual arousal testing, we found that East Asian ethnicity significantly predicted a greater likelihood of participation. Specifically, 28% of the Euro-Canadian and 37.8% of the East Asian women participated in the psychophysiological testing. There is a wealth of research showing that individuals of East Asian descent hold sexually conservative attitudes by Western norms (Gao, Lu, Shi, Sun, & Cai, 2001; Higgins & Sun, 2007; Higgins et al., 2002). This robust result, in conjunction with the well-documented finding that East Asian women are more reluctant than Euro-Canadian women to undergo Pap testing (Hislop, Teh, Lai, Labo, & Taylor, 2000; Hislop et al., 2004; Kagawa-Singer & Pourat, 2000), seems contradictory to this finding that the East Asian women were more likely to participate in a physically invasive research procedure.

A possible explanation for this unexpected finding is that the East Asian participants may have perceived the request to participate in Phase 2 as an obligation, and they wished to please the experimenter, an authority figure. On the other hand, the Euro-Canadian women may have perceived more freedom to decline participation. Research on cultural differences in communication styles and interpersonal sensitivity in interpreting the meanings of messages supports this interpretation (e.g., Gudykunst, 2001; Park & Kim, 2008). An alternative explanation for why the East Asians were significantly more likely than the Euro-Canadians to participate in Phase 2 could be that the East Asian women saw the psychophysiological sexual arousal testing as an opportunity to explore something that was sexual in nature, a novelty given that sex is a taboo topic in traditional East Asian families. Moreover, they could participate in this research

without their parents knowing. A third possible explanation for the counterintuitive finding concerns a feature of this study—the experimenter who interacted with all the participants and who requested that women consider participating in Phase 2—was a Euro-Canadian female. The East Asian women may have perceived this difference from themselves and may have felt additional pressure to comply with the request. Further research on cultural differences in responses to requests made may provide additional insight into the reasons for the surprising finding that the more sexually conservative group was more likely to participate in psychophysiological sexual arousal testing.

It is unlikely that differences in mood or affect or fear of being negatively evaluated accounted for the greater likelihood of East Asian women to participate given that there were no baseline group differences on these variables and they did not significantly predict participation in Phase 2.

Effects of Acculturation on Participation in Psychophysiological Sexual Arousal Testing (East Asian Women Only)

The results of the analyses of the East Asian women's data support our hypothesis that higher heritage acculturation would predict lower likelihood of participation in Phase 2 of the study. Given the recent findings that Asian women who continue to strongly embrace Asian culture have been found to possess less liberal sexual attitudes (Brotto et al., 2005), and that these women are also less likely to have ever had a Pap test (Woo et al., in press), this result is consistent with the existing limited literature on the effects of heritage acculturation on procedures that involve exposure of the genitals. The finding that greater mainstream acculturation predicted higher likelihood of participation in psychophysiological sexual arousal testing is also consistent with the current literature that shows that greater Westernization is linked to more liberal sexual attitudes (Brotto et al., 2005).

What do the results of this study tell us about volunteer bias and how it interacts with cultural attitudes toward sexuality to influence participation in physically invasive research? How generalizable are the results of psychophysiological sexual arousal studies to individuals who may be less sexually open by Western norms? These are important questions because of increasing diversity in North America (Statistics Canada, 2006; U.S. Census Bureau, 2000), as well as the importance of inclusiveness in research that implicitly purports to pertain to women in general. Moreover, the question of whether women of varying degrees of sexual openness are psychophysiological sexually aroused to the same degree is an interesting question in itself. The results of this study suggest that caution should be taken not to overgeneralize data from studies

using the VPP because the East Asian women who chose to participate in Phase 2 differed significantly from those who chose not to on both dimensions of acculturation. Specifically, studies that employ a physically invasive instrument like the VPP are likely to not attract both Asian women who continue to adhere strongly to their heritage culture and those who have not assimilated Western values into their self-identity, thereby limiting knowledge of the psychophysiological sexual arousal of these groups of women. On the other hand, variables related to sexuality were either less likely or not likely at all to influence participation in this psychophysiological testing.

This study has some limitations that need to be considered. The first relates to the ethnicity of the experimenter. Faced with a Euro-Canadian experimenter, the East Asian women may have felt undue pressure to oblige by taking part in an experiment that they otherwise would have preferred to refuse. The East Asian women may not have felt the same sense of pressure had the experimenter been of their same ethnicity. Further research using a similar design to this study but randomizing women from each ethnic group to a same-ethnicity or different ethnicity investigator could shed light on how much experimenter ethnicity affected the results of this study. Secondly, differences in socioeconomic status may have played a role in participants' decisions on whether to participate in Phase 2 for \$10. This second limitation may be mitigated in part by our recruiting many participants from a university population that is generally more affluent and educated than the general population. Moreover, there was no significant difference in the highest level of education attained between the participants recruited from the university and those recruited from the community.

In summary, the results of this study are consistent with a large body of literature on volunteer bias in sexuality research that has found significant differences between volunteers and non-volunteers (e.g., Saunders et al., 1985; Strassberg & Lowe, 1995). Importantly, this study also expands the understanding of volunteer bias by launching an examination of the impact of cultural variables on willingness to participate in psychophysiological sexual arousal research. Future research may benefit from exploration of the reasons that people give for participating and not participating in similar types of research.

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