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Comment on Udry, ASR, June 2000

WHAT IS GENDER?

IVY KENNELLY

George Washington University

SABINE N. MERZ

University of Massachusetts-Amherst

JUDITH LORBER

Brooklyn College and Graduate School, CUNY

SCIENTISTS HAVE long tried to determine how biology might affect behavior. One particular hotspot of research has fixated on two of the many steroid molecules more commonly referred to as hormones: testosterone and estrogen. These molecules have assumed a place in both scientific and general discourse as determining factors of "gendered behavior." In his article, "Biological Limits of Gender Construction," Udry (2000, henceforward Udry) reports on his study of the adult gendered behaviors that result from women's prenatal exposure to testosterone. In this comment, we critique Udry's guiding theoretical framework, his definition and operationalization of "gendered behavior," and the social and political implications of his findings.

UDRY'S CONCEPT OF "BIOSOCIAL"

Udry's project is centered on 163 white 27-to-30-year-old women from somewhat higher-than-average socioeconomic class backgrounds. When these women were fetuses—during the second trimester of their mothers' pregnancies—researchers measured the amount of testosterone and sex hormone binding globulin (SHBG) present in their mothers' blood. Since SHBG inhib-

Direct correspondence to Ivy Kennelly, George Washington University, Department of Sociology, Phillips 409, Washington DC 20052 (kennelly@gwu.edu). We greatly appreciate insights from Joya Misra, Cyrus F. Slaton, Wendy Simonds, Marina Karides, Carrie Yang Costello, Eleanor M. Miller, Barbara J. Risan, three anonymous reviewers, and the Editors of ASR.

its testosterone from being transmitted from a mother's to a daughter's bloodstream, a high level of SHBG in a mother's blood signifies to Udry that her daughter's brain will be less "organized" by testosterone than it would be if there were a low level of SHBG in the mother's blood. Using Ordinary Least Squares tests, Udry investigates whether the level of testosterone in these pregnant mothers' blood organized their female fetuses' brains in ways that created "predispositions" for certain types of gendered behaviors as adults.

Udry's use of testosterone as an independent variable is a manifestation of organizational-activational theory, which became popular with psychologists and neuroendocrinologists in the 1960s (Wijngaard 1997). This theory, extrapolated from research on animals to human beings, posits that exposure to prenatal hormones "hardwires" the brain in ways that generate either distinctly "masculine" behavior or distinctly "feminine" behavior. Research in this vein has been guided by the assumption that biological influences on behavior can be isolated from social influences, which has justified a preoccupation with determining which of the two is the "bedrock" source of gendered behavior. Such a quest has sometimes caused organizational-activational theorists to suppress evidence of social influences and made it impossible to theoretically explain the considerable behavioral overlaps in men and women.

In a critical response to this biological and sociological reductionism, more interactive models have emerged since the 1980s that spring from the work done in a developing sociology of the body. This work does not assume that biological and social factors act independently, but instead argues for a loop-back interchange of bodily, behavioral, environmental, interactive, and social structural factors (Birke 2000; Bordo 1993; Featherstone, Hepworth, and Turner 1991; Laqueur 1990; Martin [1987] 1992; Shilling 1993; Turner 1984; Wendell 1996). Interactive models recognize that hormonal input may indeed affect behavior but also demonstrate that the pathways are reciprocal since behavior has also been shown to affect hormone levels (Kemper 1990). In contrast, the linear connective pathways on which orga-

nizational-activational theories rely are merely speculative, as they have never been directly shown in any brain organization research (Fausto-Sterling 2000:195-232).

The debate about what causes behavior is thus much more complex than "nature versus nurture." "Nature" for human beings includes reproductive systems and secondary sex characteristics, the human genome, the evolution of human bodies, and the evolution of human psyches; for an individual it is a particular set of genes and hormones that result in a particular body and brain. "Nurture" includes life experiences, the social, economic, and political milieu of similarly located people, culture, and the physical environment in which the body and brain develop. What we are as material bodies is the result of all the "natural" and "nurtured" input working together and affecting each other interactively. Gendered behavior and its variations are the result of genetic and hormonal input, long-term evolutionary adaptations, lifetime experiences, and involvement in ongoing social situations. Interactive theorists would argue that there is no simple or single answer to the question of how human beings differ biologically or how women and men differ behaviorally. Therefore, there cannot be a simple or single way of determining how much behavior can vary or how much our social orders can be changed by new patterns of behavior.

Udry argues that he takes these interactive theories into account to create his "biosocial" model. Indeed, he does move beyond some of the weaknesses of a strictly unidirectional organizational-activational theory by introducing socialization as an intervening variable.¹ However, his model of gender development is not biosocial so much as it is biopsychological. In relying on participants' reports of parental socialization to account

¹ To measure socialization, Udry asks participants if their mothers (and he later says, "parents") encouraged them to have, for instance, an interest in mathematics, sewing, and home repair. Asking adult research participants to account for their own childhood socialization is an incomplete and limited way to operationalize this concept, especially in light of the wealth of studies that take special care to measure socialization with nuance and subtlety (e.g., Grant 1994; Thorne 1986).

for the entire "social" dimension, the model cannot account for the continual interactive experiences that mold and change children and adults throughout their lives, including experiences with educators, peers, and mass media along with adult participants' particular class, racial-ethnic group, religion, age, and place of residence. Thus, although Udry claims to examine biological *and* sociological factors together, his weak measures and his reliance on organizational-activational theory in guiding his research erode his ability to test a truly interactive, multidimensional model of gendered behavior.

UDRY'S DEFINITION OF "GENDERED BEHAVIOR"

Udry's primary hypothesis is that "the effect on women of their childhood gender socialization is constrained by the biological process that produces natural behavior predispositions" (p. 444). His research design hinges on his definition and operationalization of "masculine" and "feminine" behavior in women—his dependent variable. Although he grants that "[s]ex-dimorphic distributions usually have a large overlap" (p. 444), his concept of women's gendered behavior "refers to the degree to which a woman's behavior is more 'masculine' or more 'feminine' for those behaviors on which women and men typically differ" (p. 445).

Based on this definition, he constructs his dependent variable through questions and scales designed to elicit whether the women who participated in his research behave in ways that are either "feminine" or "masculine." This conceptualization of gendered behavior is individualistic, static, and rigidly bipolar, but it is necessitated by his research design.² To determine whether prenatal androgens or socialization have had the greater effect on adult women's gendered behavior, he has to measure androgen input, quantity and type of intervening socialization, and output levels of "masculinity" and "femininity" in adulthood. He could have used a con-

tinuous dependent variable (more or less "masculine"), but he chose to dichotomize his variable: Participants' behaviors could only be coded in one of two supposedly mutually exclusive ways.

Udry's definition of gendered behavior ignores contextual variations and overlaps in the behavior and attitudes of women and men. His dichotomous conceptualization of gender cannot account for its interactive and developmental aspects, its cultural and temporal contexts, and its reflection of institutional pressures and conventionalized assumptions.

In contrast, for 30 years a body of theory and research on gender, to which Udry makes almost no reference, analyzes gender's individual, group, organizational, cultural, and systemic aspects. In the social sciences, what we now call gender was originally conceptualized as "sex roles" (Komarovsky 1946, 1992; Lopata and Thorne 1978) (i.e., the social and cultural overlay that exaggerates and builds on presumed biological differences between males and females). As the concept of gender has developed in the social sciences, its definition has moved from an attribute of individuals to a major building block in the social order and an integral element in every aspect of social life (Ferree, Lorber, and Hess 1999). Over the last 20 years, gender has come to be viewed by social scientists as a socially constructed institutional arrangement, with gender divisions and roles built into all major social institutions such as the economy, the family, the state, culture, religion, and the law, that is, the gendered social order (Connell 1987; Lorber 1994). "Gendered behavior," in this conceptualization, refers to the ways people act based on their position within the gender structure and their interaction with others, rather than as a result of hormonal input or brain organization. We "do gender" (West and Zimmerman 1987) and participate in its construction, but it is also something that is done to us as members of a gendered social order (Moore 1994; Thorne 1986; Valian 1998). As social orders change, and as we participate in different social institutions and organizations, our gendered behavior changes.

This research has shown that gendered behavior varies with context and perception; it

² Fausto-Sterling (2000) notes that any researcher who pursues this kind of study must construct gender in such a way as to create a measurable dependent variable.

may be inconsistent and sometimes even contradictory in response to situational and interactive constraints (Epstein 1988). For example, one of the behaviors often associated with women in the United States because of their disproportionate responsibilities as mothers is "nurturance." Yet women have been active in the Ku Klux Klan (Blee 1996; Tavriss 1992), fought in wars (Elshtain 1987), and killed their children (McFadden 1999; McKittrick 1999). Likewise, depictions of battles often portray men who kneel down and tend to their wounded friends with extreme displays of care and nurturing, making those soldiers' last moments as gentle as possible (e.g., Ambrose 1997). The variation of behavior within different contexts is especially apparent in cross-cultural and historical research, such as Jensen's ([1977] 1990) study of the matrilineal Seneca society in which women historically controlled land and agriculture, thus occupying important economic positions over men (also see Amadiume 1987; Lepowsky 1993). These examples indicate that what may be thought of as universal "gendered behaviors" are very context-specific, relying more on setting and circumstances than on individual "predispositions" (Tavriss 1992).

UDRY'S OPERATIONALIZATION OF "FEMININITY"

Udry describes his dependent variable, gendered behavior, as "one on which *males* and *females* differ" (p. 448, emphasis added). This is an "explicitly bipolar concept of gender" (p. 448) that equates gender and sex-dimorphism, that is, social behavior and biological differentiation. Udry develops a single second-order factor, "gendered adult behavior" comprised of four primary factors: "importance of home," "feminine interests," "job status," and "masculinity-femininity" (see Table 1, p. 448). Although Udry's dependent variable is *behavior*, its measures are of attitudes, work status (which is not necessarily a matter of choice), and placement on a series of personality scales first used in 1978, 1981, and 1990.³ The four fac-

tors are derived from a questionnaire that characterizes 20 items as "feminine," such as being married and finding marriage important, having a high number of children and liking baby care, doing "women's work" in the home, placing little importance on a paid career, having low job status in a women-affiliated occupation, and refraining from driving a car or paying on a date. In addition to the questionnaire, interviewers also rated participants' "feminine demeanor," "facial attractiveness," use of jewelry, and use of cosmetics. This mixture of measures of a time-bound conventional version of "femininity" does not lend itself to generalizations about universal "gendered behavior" and its immutability.

Udry's operationalization is inconsistent with his own definition of gender as distinguishing between women and men. For example, Udry's questionnaire asks participants if children and marriage are important to them. Only if they answer affirmatively are women considered "feminine." This conceptualization clearly limits gender roles for women but also for men because it implicitly suggests that men whose children and marriages are important to them must be "feminine." Research on men and women across various social locations indicates that people may value marriage and children in different ways (Halle 1984; Holland and Eisenhart 1990; Kaplan 1997; Rubin 1994; South 1993). According to Udry's operationalization, working-class men who put importance on having children because they feel that fathering will enhance their "masculine" status (Seccombe 1991) would be classified as "feminine," simply because they feel children are important.

In a more glaring way, the inconsistency of the operationalization of gender is demonstrated in a question that asks research participants if they have ever been married to a man; a response of "yes" is coded as "feminine," "no" as "masculine." Presumably, if Udry were to administer this questionnaire to men he would expect their answers to fall into the "masculine" category.

³ Although extensive sociological research has established the severe limitations of using bipolar gender scales (Auster and Ohm 2000;

Benderley 1987; Collaer and Hines 1995; Constantinople 1973), Udry remarks in footnote 1 (p. 448) that he made the deliberate decision to disregard this scholarship.

Yet "marriage to a man" is not a measure on which men and women in the United States can empirically and legally differ.

The coding of the women subjects' responses to this question also fails to reflect demographic realities. The women in Udry's study were 27 to 30 years old; the median age of heterosexual first marriage in 1990 (the year when Udry's questionnaire was administered) was 24 and has since steadily risen (U.S. Census Bureau 1999). Coding only a "yes" answer to this question as "feminine" implies that women who are unmarried in their late 20s are "masculine." In addition, at a time when rates of cohabitation have increased, it recognizes only women in legally sanctioned heterosexual unions as "feminine." This is a stark view of "femininity" for which Udry does not cite any empirical or theoretical support.

Another problem with Udry's construction of gender is the lack of specificity of his coding procedures. One question to study participants refers to the number of children they have; he reports that a "high number" indicates "femininity." Udry does not reveal what this high number is (or give us any indication of whether this was measured continuously or discretely). Remarkably, motherhood, in itself, is not enough to qualify a woman for "femininity." She must have a "high number" of children by the time she is 30 for Udry to consider her anything but "masculine." His operationalization fails to take into account that the definition of a high number of children is socially constructed and may vary by race, age, religion, and class (Gerson 1985; Spain and Bianchi 1996). This question and most others on Udry's questionnaire demonstrate how inappropriate it is to represent the category "woman" with a sample solely comprised of 27-to-30-year-old white middle-class women.

Many of Udry's measures are not just imprecise but also impressionistic (e.g. "feminine demeanor, facial attractiveness, use-of-jewelry scale, use-of-cosmetics scale") (p. 448). These characteristics are rated in Udry's study by individual interviewers, yet the author provides no explanation of the criteria interviewers used to make such deeply culturally embedded judgments. More discussion on each of these measures is needed: What does "feminine demeanor"

mean? Would individuals like Mr. T, a popular television and movie actor in the United States around the time of Udry's study, be considered "feminine" based on his extensive "use of jewelry"? Are "unattractive" women or women who do not use makeup intrinsically "masculine"?

In sum, Udry's measures of gendered behavior ignore contextual variations and overlaps in the behavior and attitudes of women and men. His use of an all-white, middle-class subject group cannot represent the ways that women and men differ by class, racial group, education, age, and other status positions (Acker 1999; Collins 1990; Glenn 1999). His questionnaire items at best reflect a localized and time-bound version of gender conformity. The results, therefore, are not universally generalizable (Oyewùmí 1997).

SOCIAL AND POLITICAL IMPLICATIONS

Whether or not it is the overt intention of the research, the latent political implication of studies on the sources of gendered behavior is the possibility or practicality of change in behavior, and ultimately, in the social order. Udry argues that the level of prenatal exposure to testosterone has a vital organizing effect that will result in "masculine" or "feminine" behavior despite counteracting socialization. According to this argument, and consistent with organizational-activational theory, the power of historically situated, socially constructed, and institutionalized norms is not as important in influencing behavior as prenatal hormone levels, which sets rather rigid limits on how much individuals can alter their gendered behavior.

Udry claims that he takes a neutral stand on the efficacy of reducing gender differences and whether it could be done by masculinizing women or feminizing men, but he notes that the former would be easier than the latter because of the primacy of testosterone (p. 454). Presumably, even if women and men were equal, it would be easier to change women than men. However, Udry's construction of gendered behavior is such that "masculinity" and "femininity" are not equal statuses in the social order. His measures of "femininity" are measures of defer-

ence and subordination (letting a man drive, working at a low-status job), and they reflect a traditional view of what a woman should be (a heterosexual wife and a mother of many children). As contrasted with the variables used to constitute "femininity," "masculinity" would be constituted of assertiveness, commitment to work, and emotional distance. Thus, reducing sex differences would mean that men would trade dominating characteristics for warmth and intimacy; women would exchange motherhood for a chance to be dominant. Social change is set up as a Faustian bargain on either side.

However, Udry implies that men have more to lose than women from significant change in the gendered social order. Therefore we argue that Udry's stance on his "bio-social macro theory" is not neutral. The theory, as he states it, is: "Humans form their social structures around gender because males and females have different and biologically influenced behavioral dispositions. Gendered social structure is a universal accommodation to this biological fact" (p. 454). A neutral view on the effects of biological hardwiring might argue that the content of "biologically influenced behavioral dispositions" and the status positions in the "gendered social structure" could be anything—as long as males and females differed. Men and women could be equal; women could even be dominant. This does not appear to be Udry's view.

Udry says that his biosocial macro theory can encompass both cross-cultural similarities (presumably the result of biological brain organization) and cross-cultural variation due to "technological and ecological variation" (p. 454). Udry does not spell out what these cross-cultural similarities are, but the reader would be expected to equate them with the gendered status quo in Western post-industrial society, given the last sentence of his article: "It may be easier to degender society by changing female behavior to more closely coincide with *the present behavior of males* rather than the reverse" (p. 454, emphasis added). This shows that the issue is not biological hardwiring but the gendered status quo—a social order in which those who are "feminine" are subordinated.

Given the "underlying sex-dimorphism of biological predispositions," which presum-

ably have produced the current gendered social order, Udry concludes that it would take "a social engineering program to degender society . . . [with] continuous renewal of revolutionary resolve and a tolerance for conflict" (p. 454). We quite agree (cf. Lorber 2000), and recognize that the current gendered social order has required an equivalently broad social engineering program. Rather than seeing change in the given social order as generating "social malaise" (p. 454), however, we see it as highly liberating for men as well as women.

Whether gender equality goes against our biological predispositions to dominance and subordination or against the cultural lag of centuries of institutionalized oppression and control is not the most important issue in predictions of the difficulties and possibilities of deep social change. It may seem easier to modify gendered behavior if we are dealing with socially constructed gendered social orders than if we are dealing with biological predispositions, but the intensity and protractedness of the struggle for all kinds of equality—racial-ethnic, economic, and gendered—belies that theory. The important issue is the political implication of the argument over whether the continued subordination of women is due to brain organization or to unquestioned systemic gendered practices. Belief in theories of brain organization, no matter how tenuous the proof, is a belief in the inalterability of the gendered status quo and the continued dominance of men over women. The search for "first causes" and the concomitant distortion of gender is thus neither innocent nor morally neutral.

Ivy Kennelly is Assistant Professor of Sociology at George Washington University. Her article, "That Single Mother Element": How White Employers Typify Black Women" (Gender and Society, 1999, vol. 13, pp. 168–92), received the 2001 article award from the ASA Race, Gender, and Class Section. In her most recent research on the ways inequality is bound up in labor markets, she focuses on occupational segregation.

Sabine N. Merz is a Ph.D. candidate at the University of Massachusetts at Amherst. Her research interests include historical demography, social policy, and the intersection of gender and work. Her dissertation is a cross-national comparison of the gender-based division of household labor in Germany and the United States.

Judith Lorber is Professor Emerita of Sociology and Women's Studies at Brooklyn College and The Graduate School, City University of New York. She is author of *Gender Inequality: Feminist Theories and Politics* (Roxbury, 2d ed., 2001), *Gender and the Social Construction of Illness* (Sage 1997), *Paradoxes of Gender* (Yale 1994), and *Women Physicians: Careers, Status, and Power* (Tavistock 1984). She also is co-editor of *Revisioning Gender* (Sage 1999) and *The Social Construction of Gender* (Sage 1991). She was Founding Editor of *Gender and Society*, the official publication of *Sociologists for Women in Society*, and was Chair of the ASA Sex and Gender Section. She has received the ASA Jessie Bernard Career Award and held the Marie Jahoda International Visiting Professorship of Feminist Studies at Ruhr University, Bochum, Germany. She is currently working on a new book, *Breaking the Bowls: Gender Theory and Social Change* (Norton, forthcoming).

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Comment on Udry, ASR, June 2000

CALLING THE BLUFF OF VALUE-FREE SCIENCE

BARBARA J. RISMAN

North Carolina State University

ONCE IN A WHILE an article is published that challenges currently held notions within a scientific paradigm. It is usually the case—and should be the case—

Direct correspondence to: Barbara J. Risman, Department of Sociology North Carolina State University, Raleigh, NC 27695-8107 (Barbara_Risman@ncsu.edu). I thank my graduate students in Sociology of Gender for the lively discussions which helped to generate the ideas for this response. I also thank Judith Howard, Kecia Johnson, Myra Marx Ferree, Joey Sprague, Donald Tomaskovic-Devey, Patricia Warren, the anonymous reviewers at the ASR, and the authors of the two other critiques published in this issue for their helpful comments on early versions of this article.

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