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## The politics of lesbian "nature": A feminist critique of scientific knowledge and practice

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**THE POLITICS OF LESBIAN "NATURE": A  
FEMINIST CRITIQUE OF SCIENTIFIC  
KNOWLEDGE AND PRACTICE**

by

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**A dissertation submitted in partial fulfillment  
of the requirements for the**

**Doctor of Philosophy Degree  
Department of Sociology  
College of Liberal Arts**

**Graduate College  
University of Nevada, Las Vegas  
December 2001**

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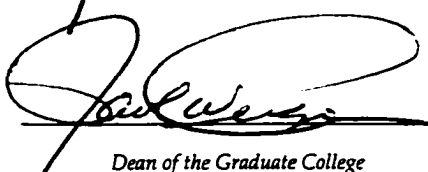
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Knowledge and Practice

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## **ABSTRACT**

### **The Politics of Lesbian “Nature”: A Feminist Critique of Scientific Knowledge and Practice**

by

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This dissertation is a feminist analysis of scientific articles published from 1990-2000 reporting findings from research on biological origins of lesbian and bisexual orientations in women. Informed by feminist standpoint epistemologies and the theories and empirical research of the interdisciplinary field of feminist science studies, I assert that scientific efforts to locate biological origins of lesbian and bisexual orientations in women are likely to be infused with culturally-based assumptions and beliefs regarding sex, gender, sexual orientation, and race. To the extent that these assumptions and beliefs go unacknowledged in the science, they place limitations on the knowledge claims that can be made from the scientific research.

Based on prior, related analyses conducted by scholars in feminist science studies and in gay and lesbian studies, I utilize two distinct yet overlapping research methods to analyze the scientific research: methodological critique and discourse analysis. The

methodological critique analyzes scientific flaws and limitations in the explanatory framework, the sampling procedures, and the interpretations and conclusions drawn from the data. The discourse analysis analyzes the contextual meanings associated with the language used in discussing sex, gender, sexual orientation, and race. Both analyses provide evidence for the influence of culturally-based assumptions and beliefs on the scientific research.

By integrating the results of the two methods I show how they work together to place constraints on the scientific knowledge claims made in the body of research analyzed. I argue for the necessity for researchers to situate their research within the social, political, historical, and cultural contexts in which it arises, as well as within the context of the background assumptions that shape it. Only in this way can we evaluate the validity of scientific claims about the “nature” of lesbian orientation.

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## CHAPTER 1

### INTRODUCTION

The most important development in science in the next 30 years will be the sequencing of the human genome. By the 60<sup>th</sup> anniversary of *The Advocate*, we will have a complete picture of every single one of the 100,000 or so genes that determine all our inherited characteristics, including how we look, the way we think, even whom we sleep with.

- Geneticist Dean Hamer, in the gay and lesbian magazine *The Advocate*, 1997.

What is clear is that we are riding another wave of biological determinism. Scientists suggest that everything from human sexuality, criminality, and alcoholism to thrill-seeking by jumping off planes and our society's definition of beauty is in our genes. Consequently, it is essential that feminist scholars continue to monitor science's claims and continue to refute and challenge them where necessary.

- Feminist science scholar Banu Subramaniam, in the feminist magazine *Sojourner*, 1997.

### Background

The past decade has seen an enormous surge in public and scientific discussion of the possibility of finding biological origins of homosexuality in humans (Fausto-Sterling 2000; Stein 1999). De Cecco and Parker (1995) trace this increased momentum slightly further back, to the 1980s, citing the growing influence of the American Psychological Association's removal of homosexuality from classification as a mental illness (1995:2). Two main factors make the 1990s the pinnacle of the discourse on scientific explanations for homosexuality: the scientific advances that have made studying the human genome a

reality (Hamer and Copeland 1998; Keller 2000), and the “media feeding frenzy” touched off by the 1991 publication of researcher Simon LeVay’s study asserting a distinction in brain structure between homosexual and heterosexual men (Fausto-Sterling 1992b:256).

Recent claims from the realm of genetic research have given rise to popular beliefs that all human characteristics can be explained by genes. Nelkin and Lindee (1995) write: “Increasingly in the 1990s, differences between men and women and between racial groups are appearing in popular culture as genetically driven” (387). Many feel that sexual orientation differences, too, will be explained through genetic research (Hamer and Copeland 1998). That belief, combined with LeVay’s controversial 1991 study, gives us the current scientific, media, and public fascination with biological origins of homosexuality. According to Web of Science,<sup>1</sup> through December 2000, 266 articles from the natural and social sciences had cited LeVay’s 1991 article as a reference. A related article published one year earlier (Swaab and Hofman 1990), by contrast, has been cited 103 times. These numbers do not necessarily illuminate the importance of the respective studies to the scientific community, of course, as some citations come from the social sciences and some are critiques of the work. Still, the number of citations of LeVay’s article speaks to the influence this single study has had on the discourse of the biology of homosexuality, and the contrast with the earlier article helps demonstrate the immense growth in discussion that has occurred since LeVay published his work.

This work has not gone unnoticed by feminist science scholars and those working in gay and lesbian studies, who argue that categories of human sexuality (as well as

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<sup>1</sup> A database of scholarly science articles published by the Institute for Scientific Information.

categories of sex and gender, on which they depend) have been socially constructed and that such scientific endeavors as LeVay's are examples of reductionism and biological determinism (Spanier 1995a; Stein 1999). They have challenged the premises on which the science is based, the methodologies and design of the research itself, and the interpretations of findings as being influenced by cultural norms and beliefs regarding gender and sexuality. They charge that the science, which makes claims to objectivity and value-freedom, is in fact infused with values that stem from hegemonic ideologies.

As of yet, however, the research done in recent years specifically on origins of sexual orientation in women has received little attention compared to the research done on men. I propose to help fill this gap in the literature by critically analyzing the recent body of research on origins of lesbian and bisexual orientations in women. Informed by feminist standpoint epistemologies and previous work in feminist science studies, this research project seeks to answer the following questions: What assumptions and beliefs regarding sex, gender, sexual orientation, and race inform the scientific research? Whose interests are served by the way in which the research is conceptualized, conducted, and interpreted? Last, how is the scientific knowledge produced by these research projects impacted by the assumptions and beliefs that inform it? These questions guide this research by taking up Subramaniam's (1997, quoted above) challenge for feminist scholars to "monitor science's claims" and "refute and challenge them where necessary" (5).

Previous analyses have addressed these questions with regard to specific studies or bodies of research on biological origins of sexuality and have found two general ways in which cultural bias has influenced the research (Bleier 1988b; Byne 1995; De Cecco

and Parker 1995; Spanier 1995a; Stein 1999). First is the methodological or empirical adequacy of the research, which refers to the degree to which the design, conduct, and interpretation of scientific research reflect thoroughness and carefulness in the study. Problems noted include the failure to consider alternative approaches or interpretations, poor sampling procedures, and overstatement of findings when drawing conclusions (Bleier 1988b; Byne 1995; Fausto-Sterling 1992b, 2000; Spanier 1995a). The second way in which cultural bias has been found to impact scientific research is in the language (or discourse) used in conceptualizing and reporting research, and in constructing the knowledge claims. Examples of this issue include language used in ways that reflect androcentric, heterosexist, Western, and racist biases (Cohn 1996; Keller 1992; Martin 1991; Stepan 1996).

I assert that the research questions I posed above can be answered by conducting the types of critiques just described. Specifically, I propose a dual-method study that makes use of both methodological and discursive analyses. In this way the limitations of each method can be minimized and the interdependencies of the discourse and the methodologies can be highlighted. I will sample research articles on biological origins of lesbian and bisexual orientations in women from 1990-2000 and conduct a methodological critique that examines a) the explanatory framework for what I call the “masculinization hypothesis,” b) the sample in terms of how subjects are recruited, how they are placed into categories of sexual orientation, and the diversity of the sample in terms of demographic characteristics, and c) the interpretations of the findings and conclusions drawn, in terms of whether sample limitations are considered and whether there is any overstatement of findings or their significance. I argue that by uncovering

patterns of methodological limitations in the articles, underlying assumptions can be made visible.

Next, I will conduct a discursive analysis of the scientific articles in terms of the language they use in discussing sex, gender, sexuality, and race. I will identify words and phrases in the articles that I interpret as referring to one or more of the concepts just mentioned, and analyze their meanings from the contexts of their use. Then, I will identify patterns or themes of meanings related to sex, gender, sexuality, and race in the scientific articles. The themes will be examined and interpreted for ways in which they may illuminate underlying assumptions in the research. The methodological and discursive analyses will be integrated in discussing the implications of the findings in terms of how the underlying assumptions may result in limitations on what the scientific research can say about lesbian and bisexual orientations in women.

### Significance of the Study

This research will analyze a sample of scientific research articles published from 1990-2000 on biological origins of lesbian and bisexual orientations in women, utilizing elements of both feminist critiques of methodological inadequacies and principles of discourse analysis and integrating them to demonstrate how they intersect. My project fits into a body of literature critiquing current scientific efforts to locate origins of sexual orientation categories in the body. While scientific efforts to “explain” homosexuality have been analyzed already, the majority of the critiques have not focused on the current scientific research being done on lesbian and bisexual orientations in women, looking instead at the higher-profile research done primarily on gay men. As a result, little



attention has been paid to how lesbians and bisexual women might be considered and treated in ways different from gay men in these scientific endeavors. Also, the ways in which race might intersect with gender and sexuality in the science have not been analyzed. Given that women and men of color in our society have not had the same relationship to the medical and scientific establishments as have white men, particularly around issues of sexuality and reproduction, these intersections deserve consideration (Harding 1986; Hubbard 1991; Martin 1987).

In terms of the scope of the study, this project adds to the current body of literature by attempting to characterize the scientific discourse of the entire time period of the 1990s, rather than of a few, selected studies or a single type of research. In this project careful efforts are made to identify the body of research in question so that a reasonably representative sample could be analyzed, in order to make findings relevant to the entire body of research and the discourse it constructs. This project does not single out particularly “bad” studies or offensive lines of inquiry from this time period for critique, but rather systematically samples from the population of published research articles so that the results may be said to be reflective of the discourse.

In addition, this study adds to the scope of empirical critiques by conducting a discursive analysis, and attempting to integrate the empirical and discursive analyses such that their intersectionalities and interdependencies are illuminated. In this way I hope that the relatively limited nature of my methodological critique will be expanded upon and made more useful.

This project takes seriously the urgings of feminist science scholars positioned within the natural sciences, who have called for feminist scholars from other disciplines

to engage more directly with scientific research and writing (Fausto-Sterling 1992a, Spanier 1995a). The scrutiny of scientific methodology conducted as part of the current project is of the sort typically performed by feminist scholars trained in the natural sciences. While I have some science background, my primary training is in sociology; thus I have no illusions that my critique is likely to be as thorough as what a feminist scholar working in the natural sciences could produce. However, I believe the methodological critique in this project is sound and could potentially serve as a model for other scholars trained in the social sciences or humanities.

### Situating the Assumptions that Inform this Study

Feminist standpoint theorists and science scholars have suggested that knowledge claims and the researchers who make them be situated in terms of social positioning and background assumptions that may inform the work (Haraway 1991; Harding 1991; Longino 1990). Because my assumptions and beliefs influence the way I approach topics of study, what I see, and what I can say about them, such influences should, as much as possible, be self-reflexively acknowledged and brought to the surface. Being forthright about assumptions and beliefs allows for findings to be situated and evaluated within the context of the positioning that informs them.

To situate my own social positioning, I should point out that I am a woman, I am white, I am 31 years old, of a middle-class background, and currently able-bodied. My gender presentation usually does not seriously conflict with the expectations for my sex, though I often find those norms very constraining. In addition, I do not identify as heterosexual, though beyond that, I do not have a fixed statement of sexual orientation. I

have at times identified as bisexual and at times as lesbian. I both do and do not experience my sexual orientation as something that was “always there.” It would be naïve to think that my personal (and political) dissatisfaction with the options for gender presentation and sexual self-identification within my cultural and historical context does not influence my assumptions and beliefs about the biological research on sexual orientation.

In terms of education and training, it should probably be noted that while I have most recently been educated as a sociologist and feminist scholar, my education and employment prior to that were in the field of audiology—the science of hearing and its disorders. I feel this background bears upon not only my interest in science, but also some of my basis for evaluating it. Also, my social-science training influences my writing insofar as encouraging (or at least not discouraging) the tendency to write in a traditional, “removed” manner. Though I later will critique this writing style as helping to erase the people behind the knowledge claims, it must be acknowledged that the expectations of a dissertation in the social sciences create some hurdles to overcoming the “distant” writing style. I hope that by reiterating my commitment not to be removed from my research I might overcome the appearance of value-freedom, complete authority, and total objectivity that such a writing style helps create. I am not certain in what other ways my educational background informs the way I approach, conduct, or interpret my study, but feel it needs to be acknowledged nonetheless.

Politically speaking I am a feminist with a commitment to ending systems of oppression, particularly concerning gender and all that intersects with gender. Because of my personal positioning, I am especially aware of and opposed to the inequalities faced

by lesbian women, gay men, and bisexuals of any gender. These personal and political commitments inform my sociological research in many ways, possibly the most important of which is in my desire to analyze the ways in which systems of knowledge and other hegemonic discourses reproduce social inequalities, so that they might be changed.

Finally, regarding biological approaches to understanding gender and sexual orientation, I believe that biologically reductionistic and deterministic approaches are not likely to be the best way to understand those concepts and identities, given the evidence for the ways in which they have been constructed specific to social, historical, political, and social contexts. I believe, based on my feminist theoretical framework and positioning, that biological reductionism and determinism in understanding gender and sexual orientation are in fact likely to be detrimental to feminist goals of ending systems of oppression. This is not to say that all scientific claims to knowledge about gender and sexual orientation always are or must be reductionistic and deterministic, however.

### Overview of the Remaining Chapters

Chapter 2 consists of a review of the literature relevant to this project. The interdisciplinary nature of the current research leads to its being informed by different but related bodies of work. Discussed in the literature review are works in the areas of feminist standpoint epistemologies, feminist science studies, and lesbian and gay studies' analyses of medical and scientific efforts to explain homosexuality.

Feminist standpoint epistemologies serve as the major theoretical frame of this research project. Derived initially from Marxist thought regarding the privileged

standpoint accorded to the proletariat, feminist standpoint suggests that the knowledge that comes to be accepted as “Truth” tends to be that which serves powerful groups in society, including men, heterosexuals, white people, and the upper class. The knowledge produced from these positions is necessarily partial and serves to uphold the dominance of those powerful groups (Harding 1986, Hartsock 1983). By recognizing the situatedness of all knowledge claims and the ideological nature of knowledge that is asserted to be universally valid, it is possible to produce knowledge that is “more accountable” and thus less likely to reproduce oppressive social relations (Haraway 1991). For this project, feminist standpoint theories help provide the basis for analyzing the scientific effort to explain lesbian and bisexual orientations in women through biology as being based in knowledge that is produced from privileged positions and that serves to maintain them.

Relatedly, work in feminist science studies also informs this project, both epistemologically and empirically. Feminist science studies is an interdisciplinary field that seeks to apply feminist insights about categories such as gender, race, sexuality, and social class to critiquing modern, Western science’s claims to objectivity and universality, and to provide grounds for science that is less oppressive to people and the natural world (Keller and Longino 1996; Mayberry, Subramaniam, and Weasel 2001). Work in feminist science studies has contextualized the production of scientific “facts,” particularly the efforts of researchers to define differences between women and men, as arising from and perpetuating a specific set of gendered social relations. Feminist science scholars have critiqued science both on its own terms, by analyzing its empirical validity for methodological flaws, and exposed its ideological influences by demonstrating how

cases in which “science is not held up to its own standards” (Spanier 1995a) tend to coincide with beliefs that uphold gendered inequalities. They have also analyzed discursive aspects of scientific writing, including images, metaphors, and oppositions of concepts to understand the underlying gendered and raced themes in the textual production of scientific “Truth” (Keller 1985, 1993). The current study utilizes the insights of feminist science studies in framing its approach, and the methods of feminist science studies in conducting its analysis.

The last body of work discussed in the literature review chapter is research located in the interdisciplinary field of lesbian and gay studies that has critiqued the medical and scientific efforts to construct theories and “explanations” for homosexuality. The findings of such critiques inform the current project. Historical sexological studies of lesbians from the late 1800s to the middle of the 20<sup>th</sup> century have been analyzed by scholars such as Gibson (1997, 1998) and Terry (1990, 1995, 1999). They have demonstrated the ways in which these studies of lesbian “nature” have been tied up with efforts to maintain social inequalities of gender and race. Also, more recent scientific research has been critiqued, as in work in feminist science studies, not only for empirical issues such as poorly designed research, methodological flaws, and conclusions not well founded by the data, but also for the ideological structuring of the view of the issue and the concepts used (Allen 1997; Byne 1995; Spanier 1995a; Stein 1999; Zicklin 1997). The current project is situated within this body of research by sharing its concerns and methodologies, and builds upon current work by extending analysis to the current scientific discourse on origins of lesbian and bisexual orientations in women.

The research methods used in this project are discussed in Chapter 3. They are necessarily divided into two general sections describing the related but different types of analysis—methodological and discursive. In addition, I describe how the research sample is chosen and implications of that selection for my analysis. First, however, building from the discussion in Chapter 2 of work in feminist science studies, I describe in greater detail some of the specific empirical precedents that have guided my methods in constructing a feminist analysis of the scientific research that is the subject of my study. Because the sort of research project this is remains somewhat atypical in sociology and even women's studies, such further explanation of the methods is necessary. The heavy influence on this project of feminist science scholars such as Bleier (1984, 1986), Fausto-Sterling (1992, 2000), and Spanier (1995a and 1995b) is discussed, especially their exemplary work in critiquing scientific studies based on issues that speak to validity of findings. Also described are some of the feminist science studies that have analyzed the roles of cultural narratives, images, and metaphors in the scientific constructions of reality, including those of Birke (2000), Fox Keller (1985, 1992), and Schiebinger (1993), as the methods employed in these analyses very much influence the current project as well.

Chapters 4 and 5 are those in which the actual analyses and their results are described. Chapter 4 discusses the empirical critique, which focuses on three main areas: the explanatory framework of the research articles, the sample construction procedures, and the interpretation of findings. Each of these aspects of the scientific articles in the study sample is critiqued on the basis of empirical adequacy and methodological limitations, using analyses informed by the work of, for example, Bleier 1984; Byne

1995; Doell 1995; Fausto-Sterling 1992, 2000; and Spanier 1995a and 1995b. My analyses reveal the influence of ideological assumptions and biases on the conduct of scientific research and the results obtained from it. In Chapter 5, I subject my sample of articles to discursive analysis, informed by the work of feminist science scholars such as Birke 2000; Cohn 1996; Keller 1992; Martin 1991; Schiebinger 1993; and Stepan 1996. This analysis focuses on words, phrases, and other language in the articles related to concepts of gender, sexuality, and race, interpreting the textual meanings given them from the contexts of their use. These meanings are then problematized with regard to hegemonic ideologies expressed and perpetuated by their use, when applicable.

In Chapter 6, the results of the two different analyses are integrated in the discussion of implications of the findings for assessing the scientific research. The integration is done in an effort to overcome the limitations of each form of analysis and to demonstrate the interactions of scientific knowledge and practice (Collins 1999; Laslett, Kohlstedt, and Longino et al. 1996; Longino 1990). The research implications are described in terms of how the findings from the analyses bear upon what the science can and cannot say about biological origins of lesbian and bisexual orientations in women. In addition, recommendations are provided for how the science might be transformed to serve feminist goals better. The final chapter summarizes the research, its major findings and conclusions, and discusses recommendations for directions for further research.

### Summary

Informed by feminist standpoint theories and feminist science studies, I assert that the scientific study of biological origins of lesbian and bisexual orientations in women is



a discourse infused with cultural norms and beliefs regarding gender and sexuality. My goal is to uncover these norms and beliefs and to gain an understanding of how they operate in constructing the scientific knowledge claims. I propose to do this by using close, critical readings of the scientific texts as a means to construct a feminist critique of the scientific discourse. These critical readings will draw on feminist science studies' applications of both evaluations of scientific methodologies and principles of discourse analysis. The results of these analyses will be integrated in the discussion of implications of the findings, in order to highlight the intersections and interdependencies of scientific knowledge and practice. Recommendations for doing feminist science will be provided.

This research is a contribution to bodies of work in both feminist science studies and lesbian and gay studies that critique the ideological functions of scientific efforts to locate biological origins of homosexuality. My project adds to this literature in terms of form, by utilizing and integrating two different methods of analysis; in terms of content, by analyzing the research of the period 1990 to 2000 on women's sexual orientations specifically; and in terms of use, by applying results to inform suggestions for less oppressive knowledges and practices in scientific research on women's sexuality.

## **CHAPTER 2**

### **REVIEW OF RELATED LITERATURE**

In this chapter I will discuss previous scholarly work that most strongly informs the current project, both in terms of theoretical framework and empirical research. Different but related areas of thought and research have helped lay the groundwork for this feminist analysis of scientific discourse on the origins of lesbian and bisexual orientations in women. Primary among these are feminist standpoint theories, feminist science studies, and previous critiques of science similar to this study, in the field of lesbian and gay studies. This research is dependent upon theories that can explain how knowledge is different when produced from different social positions with regard to gender and its interactions with race, class, and sexuality, and feminist standpoint epistemologies provide those analytical tools. In addition, in analyzing science as a specific type of knowledge production, this study is very much informed by previous work of the same sort, done in the field of feminist science studies. An important aspect of feminist science studies carries the epistemological framework developed in feminist standpoint theories into the study of science, expanding and improving non-feminist science studies by integrating the analysis of gender. Thus the connections between standpoint theories and feminist science studies are clear, yet because feminist science studies is a field which reaches across disciplines, there is more to be gained from it than from only applying feminist epistemologies to the realm of science.

Additionally an understanding of science is brought into feminist work, strengthening analyses of categories of identity in which science has had input. In this way too is this project informed by feminist science studies. Last, previous analyses of scientific attempts to “explain” homosexuality done in the interdisciplinary field of lesbian and gay studies are also related to the two areas of work just discussed, and inform the current study. Such analyses are related epistemologically to both feminist standpoint theories and feminist science studies in their assertion that contexts of social power relations influence the types of knowledge claims that are made. In addition, they are clearly related to feminist science studies in applying this analytical framework to the privileged claims of the natural sciences. Work in lesbian and gay studies, however, makes central the analysis of the deployment of sexual orientation categories. Such work, like that in feminist science studies, has informed the current project by providing insights from which new analyses can be built and demonstrating methods that can be usefully applied to conducting such analyses. I will divide the review of the literature by first discussing the relation of feminist standpoint theories to this project, followed by a discussion of the relevant theoretical and empirical work in feminist science studies, and concluding with a discussion of related research that has been conducted in the interdisciplinary field of lesbian and gay studies.

### Feminist Standpoint Epistemologies

In this project, I intend to conduct an analysis of the discourse of scientific research into biological bases for lesbian and bisexual orientations in women. The goal of this research study is to uncover cultural norms and beliefs embedded in the

epistemology that underlies the science. My approach to this subject is informed by feminist standpoint theory (or epistemology), a body of work developed over the past two decades that theorizes a relationship between gender, power, and knowledge. While several different theorists have formulated and continue to develop slightly different accounts (see Collins 1990; Harding 1986, 1991; Hartsock 1983, 1998; Smith 1987), my understanding of feminist standpoint epistemology is that it makes the following fundamental assertions: 1) that all knowledge is produced from a standpoint, or position, within a social framework and is structured by that context; 2) that due to power imbalances, some standpoints may produce knowledge that is more or less likely to obscure social inequalities; 3) that the standpoints of those with greater social power are most likely to become hegemonic ideologies, marginalizing knowledges produced from other standpoints; and 4) that the knowledges available from the standpoints of the socially oppressed are less likely to obscure inequality, but can be achieved only through struggle.

It is from socialist feminism that feminist standpoint theory clearly derives many of its basic tenets (Jaggar 1983). Socialist feminism is a branch of feminist theory that combines elements of Marxist and radical feminisms. Traditional Marxist feminism relies on a strict interpretation of Marxist theory to end women's oppression, asserting that the economic system of capitalism is fundamentally unjust and inhumane and that its demise will be the end of women's oppression as well. Radical feminism holds that women are oppressed simply as women, under any sort of economic system, due to the system of male domination known as patriarchy. Recognizing the limitations of each, socialist feminism asserts that both capitalism and patriarchy are oppressive systems that

can work together and therefore both must be ended in order to facilitate equality (Jaggar 1983).

The basic ideas of feminist standpoint theory come directly from Marxist thought and have been modified to make gender rather than social class the central category of analysis. Sandra Harding (1993) writes that

the intellectual history of feminist standpoint theory is conventionally traced to Hegel's reflections on what can be known about the master/slave relationship from the standpoint of the slave's life versus that of the master's life and to the way Marx, Engels, and Lukacs subsequently developed this insight into the "standpoint of the proletariat" from which have been produced marxist [sic] theories of how class society operates. (1993: 53-54)

Especially in early standpoint writings (Hartsock 1983; Rose 1983; Smith 1987), the rationale given for the different standpoints available to women and men is based on labor. It is asserted that women and men tend to do or are expected to do different sorts of work because of the gendered division of labor; then, the different material conditions resulting from labor create different sets of understandings of social relations. This is an expansion upon Marxist explanations of oppression based upon relationship to the means of production, as it proposes additional within-class oppression based on gender. For example, whereas Marx believed that the dominant class controlled the mental labor and created the hierarchy of mental over manual work, early standpoint theorists suggested that because of housework and childcare expectations, women tend to do the bodily work that men would rather not do.

The control over capital that structures society such that a dominant group has the power to determine the labor activities of other groups also makes possible the ability to make this power imbalance less visible. The oppression of women and others through

the structuring of labor practices is obscured through ideology. That is to say that, as explicated by Marx, dominant ideology serves the needs of the ruling class. This concept of ideology explains how it is that the perspective of the dominant group becomes popularly accepted. As Jaggar (1983) states, "In a society where the production of knowledge is controlled by a certain class, the knowledge produced will reflect the interests and values of that class" (370). People's assumptions and understandings regarding "how things are," about what is a "given," or what is "natural" are all shaped by this dominant ideology through our social institutions. This is accomplished because the economically powerful have the means to shape what we know about the world. Additionally, while ideology arises from the dominant class through relations of production, understanding its manifestations and effects helps explain how the implications of holding a standpoint can extend far beyond the actual laboring practices of an individual or group.

Thus it is that a standpoint from the view of the oppressed might be more likely to recognize the injustice caused by the power differences. For the powerful, actual life and dominant ideology are in greater coherence with one another than for the oppressed, providing less opportunity to see the injustices concealed by that ideology. For example, it is less likely that men (specifically, socially dominant men) would challenge the ideology that views women as being the natural ones to care for children, as they may benefit economically from making it harder for women to advance in the workforce. The oppressed have less investment in maintaining that ideology than those who benefit directly from it, although active, engaged thinking is necessary to recognize dominant ideology. The standpoint of the oppressed is a position of privilege in terms of the ability

to view social relations as they “really” are (a “truth” challenged in later standpoint writings), as opposed to the distorted view available to the oppressor. One’s very knowledge of the world and social relations is so structured by ideology that it is an achievement to see otherwise. Feminist standpoint theory is an example of such an achieved understanding.

In Hartsock’s foundational work on feminist standpoint theory, it was stated that “[a] standpoint carries with it the contention that there are some perspectives on society from which, however well-intentioned one may be, the real relations of humans with each other and with the natural world are not visible” (Hartsock 1998 [1983]:107). Hartsock has engendered some controversy and confusion by her use of the concept of “reality,” as in “the *real* relations of humans with each other...” (italics mine). It seems clear to me that this concept of “reality” involves assumptions and value commitments that underlie socialist feminism and other critical theories and are not held by everyone, and that the failure to make these commitments explicit is partially responsible for some of the debates over standpoint. Among these assumptions are that people are in fact oppressed by gender, race, and class and that these oppressive social relations should be ended. I believe this understanding of “reality” is necessarily implied by Hartsock’s statement. In a 1997 article, Hartsock states that “[s]tandpoint theories are technical theoretical devices that can allow for the creation of accounts of society that can be used to work for more satisfactory social relations” (370). An ethical judgment grounded in socialist feminism is made in that statement as to what constitutes “more satisfactory social relations.” Hartsock is reiterating that the project of feminist standpoint theory is based largely on the project of Marxism, which sought social change. She is proposing the feminist

standpoint as a means to achieve knowledge that has been distorted through ideology. As with Marxism, achieving this knowledge is not the sole end in itself, but rather is a means to ending oppression.

In my mind, the theory would be better stated as proposing that a feminist standpoint provides a view from which *relations of domination* may be seen more clearly. As Collins (1997) states, standpoint theory is “an interpretive framework dedicated to explicating how knowledge remains central to maintaining and changing unjust systems of power” (375). Feminist standpoint has epistemological concerns but is, I think, primarily a critical social theory. It provides a point of entry from which to disrupt dominant ideology. Hartsock makes this point well:

Fundamentally, I argue that the criteria for privileging some knowledges over others are ethical and political rather than purely “epistemology.” The quotation marks here are to indicate that I see ethical and political concepts such as power as involving epistemological claims on the one hand and ideas of what is to count as knowledge involving profoundly important political and ethical stakes on the other. (Hartsock 1997:373)

There are and must be “better” standpoints than others, if the theory is to have any meaning whatsoever. But they cannot be said to be better in terms of representing an abstract reality as how it “really” exists. Rather than being characterized as truer, some perspectives on society may make a more useful contribution toward making oppressive relations visible. I would call this the pragmatic element of feminist standpoint. A standpoint should be judged less on its abstract “truth” and more on its usefulness for analyzing systematic oppression. To do this, we must recognize the interactions of oppressions based on not only gender but also, for example, race and class.

An inevitable confusion arises over the notion of a “standpoint of women.” The first task is to separate the concept of a feminist standpoint from that of a standpoint of



women. They are not the same. To my understanding, a feminist standpoint is not a standpoint at all, in the sense of being a social position or perspective. Rather, it is more like a paradigm of thought; it is a way of understanding the world. It represents an attempt to explain some of the impacts of social power relations on knowledge using critical feminist theoretical approaches. The notion of a standpoint of women, on the other hand, gets at the idea of social positioning. Oppressed groups occupy places in the social structure that help give rise to a standpoint that is different from the dominant view. This has been referred to as an “oppositional consciousness” (Haraway 1990). It is tempting to abandon the notion of a standpoint of women altogether because of the confusion it creates. However, it is this oppositional consciousness that leads to the possibility and necessity for a feminist standpoint. The concept of a standpoint of women is necessary in order to ensure that the focus on gender as a social category does not become obscured.

Clearly though, one must use this concept with caution due to the possibility of the presumption of one standpoint of women. One of the primary debates regarding a standpoint of women is whether it universalizes women’s diverse experiences. Certainly all women do not share a singular standpoint, and occupying the social position of “woman” has different effects depending on other factors. I would argue that the diversity of women was not always made clear in standpoint writings. For example, Hartsock’s original work (1983) makes only a fleeting reference to “the danger of making invisible the experience of lesbians or women of color” (1998 [1983]:112). Jaggar notes that differences between women are erased by the presumption of a singular “standpoint of women” (1983:385). Work by Anzaldúa (1987), Collins (1989; 1990), and Harding

(1986), for example, helped rectify this shortcoming of standpoint.

Anzaldúa (1987) made clear with her writings on the “new mestiza” that one can occupy different standpoints based on different aspects of identity, and that the very act of occupying these different spaces and moving amongst them creates an even different standpoint. She writes: “From this racial, ideological, cultural and biological cross-pollinization, an ‘alien’ consciousness is presently in the making—a new mestiza consciousness, *una conciencia de mujer*. It is a consciousness of the Borderlands” (77). While she never discusses standpoint theory per se or engages in dialogue with theorists, her work is considered to have contributed to a less modernist vision for standpoint theory, one of mutable identities based on the concept of the new mestiza. “The new mestiza copes by developing a tolerance for contradictions, a tolerance for ambiguity. ... She has a plural personality, she operates in pluralistic mode...” (1987:79). What is recognized in Anzaldúa’s work is the lack of a stable identity from which to derive a singular standpoint, an important step in the development of feminist standpoint epistemologies in that a postmodern understanding of the subject is theorized. In addition, because of the subject position of the new mestiza, Anzaldúa helps construct a relationship between postcolonial feminism and feminist standpoint.

Another controversy over the notion of a standpoint of women focuses on whether it essentializes “woman” as a natural category. This too is a complicated issue, because while some writings in standpoint theory seem to rely on essentialist conceptions of woman, others do not, and my belief is that it *can* be essentialist but does not *have* to be. It is important once again to make the distinction between a standpoint of women and a feminist standpoint. If one accepts the definition of feminist standpoint provided above, I

think it is clear that there is nothing essentialist about it. Likewise, I think it is possible to conceptualize “woman” as a socially constructed category that has real, material effects on the people so categorized. The definitions of this category vary across time and culture and, due to other areas of diversity, within time and culture. But it is an undeniably important social grouping, with effects that cannot be ignored.

Beyond the concerns about standpoint theory as essentializing and universalizing women’s experiences, one of the most important debates seems to revolve around the issue of “truth.” This debate additionally manifests itself in discussions of partiality/ impartiality, objectivity, and reality. These are complex debates that are likely never to be resolved completely.<sup>1</sup> They result from standpoint’s focus on how power relations affect what we know and can know. Additionally, the area of standpoint theory that focuses on science studies is faced with the tension of combining “situated knowledges” with “a no-nonsense commitment to faithful accounts of a ‘real’ world” (Haraway 1991 [1988]:187). Truth is reconstructed in standpoint theory as truths, based on knowledge that is situated and self-reflexive. Harding states that “there are as many interrelated and smoothly connected realities as there are kinds of oppositional consciousness. By giving up the goal of telling ‘one true story,’ we embrace instead the permanent partiality of feminist inquiry” (1986:194).

Collins states that “standpoint theory was never designed to be argued as a theory of truth” (1997:375). By this I think she means that standpoint theorists are more interested in exposing how what we think of as truth is determined by control of those

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<sup>1</sup> Published debates over the effectiveness of feminist standpoint epistemologies, as well as their relevance to science, can be found in two separate issues of *Signs: Journal of Women in Culture and Society* – one in 1997, vol. 22, no. 2; the other, 2001, vol. 26, no. 2.

institutions that “discover” and disseminate it. I see a parallel to Foucault’s work in the relationship between power and knowledge, about which he writes, “Since Nietzsche this question of truth has been transformed. It is no longer, ‘What is the surest path to Truth?’, but, ‘What is the hazardous career that Truth has followed?’” (1980:66). In other words, the issue of concern is not what “Truth” is or how to achieve it, but rather what are the effects of “Truth’s” “employment.” Standpoint theory makes its epistemological claims based in part on the idea that the work of “Truth” is not best understood by those who profit most from its labor.

One of the primary claims of standpoint is that truth cannot be produced from “nowhere,” the traditional claim of scientific objectivity. Rather, knowledge claims must be evaluated in their social context. In this way we can have truths based in what Harding calls “strong objectivity.” Strong objectivity “requires that the subject of knowledge be placed on the same critical, causal plane as the objects of knowledge” (1993:69). It is a concept with similarities to Haraway’s “situated knowledge” or “positioned rationality,” as well as Collins’ “ethic of personal accountability,” in which “people are expected to be accountable for their knowledge claims” (1990:217-218). Thus feminist standpoint theory argues a very different model for objectivity from that of traditional science.

In summary, I argue that feminist standpoint theory provides a useful theoretical framework from which to build a critical examination of the scientific study of biological origins of lesbian and bisexual orientations in women. By suggesting that relations of power in society in part determine what gets accepted as truth, feminist standpoint theory provides a rationale and purpose for analyzing the scientific “truths” being produced. As

Harding (1998) states, “[s]tandpoint theories direct us to identify whose questions a knowledge project is asking and whose problems it has been designed to resolve” (100).

### **Feminist Science Studies**

In this section I will identify and discuss some of the ways in which the current project is theoretically and empirically informed by previous work in feminist science studies, a field that follows epistemologically (though not exclusively so) from feminist standpoint theories. “Feminist science studies” is the name of the interdisciplinary effort to apply and integrate feminist insights about gendered social power relations with that system of knowledge production we call science. It has been defined, for example, in the following ways:

1. A field under construction. 1. A body of work that applies feminist analyses to scientific ideas and practices to explore the relationship between feminism and science and what each can learn from the other.
3. A field that explores the intersectionalities between race, class, gender, and science and technology. 4. The effort to work out the implications of ‘situated knowledges’ (knowledge seen as a social activity embedded in a certain culture and world view). (Mayberry, Subramaniam, and Weasel 2001:5-6)

Feminist science studies as a field has developed over the course of the past twenty years across academic disciplinary boundaries, with work originating from the humanities, the social sciences, and the natural sciences. Its differing origins are at least in part a result of the different kinds of problems noticed and addressed by scholars from various fields. Scientists who were feminists, frustrated with the masculinist bias in science, conducted critiques of such bias by pointing out, for example, the ways in which the scientific work was not being conducted nor interpreted in an objective manner. Feminist critiques of empirical inadequacies in the biological sciences, particularly in

research on women and on sex differences, were conducted by scientists including Ruth Bleier (1984, 1988b), Anne Fausto-Sterling (1985), and Ruth Hubbard (1983).

Simultaneously, feminist scholars in the humanities and social sciences studying science recognized the absence of analyses of gender in existing science studies work.

Philosophical and epistemological critiques were developed by feminist scholars including Evelyn Fox Keller (1985), Sandra Harding (1986, 1991), and Donna Haraway (1988, 1989). There was (and still is) a great deal of overlap between these categories, as should be expected in such a interdisciplinary field. In fact the crossing of academic borders to conduct feminist science studies has been encouraged, especially by those in the natural sciences who have struggled with the lack of “scientific literacy” on the part of their feminist peers from the humanities and social sciences (Fausto-Sterling 1992a; Spanier 1995a). Thus feminist science studies is a transdisciplinary field committed to improving and integrating both feminist analyses and the natural sciences.

In feminist science studies, science is analyzed both as an institution and as a specific, highly-valued form of knowledge production (Harding 1986). While analyses such as those described have gone on for some time under other headings, including philosophy and sociology of science, sociology of scientific knowledge (SSK), and the inclusive “science studies” (see for example Knorr-Cetina and Mulkay 1983; Latour and Woolgar 1983), only feminist science studies is particularly concerned with understanding the role of gendered social relations in the ways science operates and in the knowledge it produces. As an institution, science is analyzed by feminist science studies for the ways in which the networks and hierarchies in scientific education and occupations have tended to exclude or marginalize white women and people of color (see

Rosser 1990; Davis, Ginorio, and Hollenshead *et al.* 1996): “the science which is dignified as such and passed on in academic and industrial circles is primarily done and taught by [white] men” (Lennon 1998:187). As a system of knowledge, modern Western science is critiqued for its claims to universality and objectivity (Lloyd 1996; Longino 1990). As stated by one sociologist: “there is no novelty to the suggestion that scientific theories have often been shaped by prevailing cultural values. Over the past 2 decades, however, feminist theorists have demonstrated that many theories are permeated specifically by androcentric biases missed entirely by earlier investigators” (Carroll 1998:739).

While it is scientific knowledge rather than the institutional structure and practices of science studies that most directly applies to the current project, and on which I will focus my discussion, it must be acknowledged that the two issues are not completely separable. Feminist science studies argues that the characteristics of modern scientific knowledge are at least partly a consequence of who has been included and who has been systematically excluded from participation as knowers (Harding 1991; Collins 1999). It is most clearly on this point that feminist science studies is influenced by the insights of feminist standpoint epistemologies. The earliest work in this area carried over standpoint theory’s original, Marxist-derived emphasis on the gendered division of labor as being that which influenced science’s particular viewpoint. According to this argument, the existence of gendered labor suggests that women might have unique knowledges based on the work traditionally assigned to them, knowledges that have been excluded from the production of science. For example, Rose (1983, 1986) suggested that

the relative absence of women, traditionally assigned “caring” and “bodily” labor, contributed to the absence from science of knowledge grounded in such work.

This emphasis on gendered labor soon broadened to incorporate an analysis of how different experiences in general that result from occupying different positionalities within social structures affect one’s perspectives; thus science’s dominance by a particular positionality – white, middle- to upper-class, heterosexual men – has tended to create knowledge that reflects the experiences of the intersection of those identities (Collins 1999; Harding 1997b). This peculiarity of scientific knowledge production is accomplished by the failure to recognize the influence of standpoint on the assumptions and understandings that inform the production of scientific knowledge. In particular, assumptions are made based on historically and culturally situated understandings of social categories such as gender, which are not recognized or acknowledged as influencing the direction of scientific research. In some cases, “cultural values and beliefs that shape the predominating explanatory frameworks in science hold sway over the scientific evidence” (Spanier 1995a:56).

Unacknowledged assumptions regarding gender are particularly problematic when science is used to prove the “naturalness” of gender differences by asserting their cause to reside in biological sex differences. Scientific research on “sex differences” often examines differences between men and women that feminists argue are actually a result, when they exist at all, of gendered social arrangements (Fausto-Sterling 1992b). The result of such research is to reinforce the belief in the biological origins of what we consider “masculine” and “feminine” characteristics of human beings. Lennon (1998) points out that “science itself yields some of the major texts informing our conceptions of



masculinity and femininity” (188). Thus beliefs about gender inform scientific research by way of assumptions, the research “proves” what is “natural” for women and men, and the results become cultural texts that reinforce the beliefs that informed their production.

Feminist science studies scholars also engage in critiquing scientific research on sex differences with regard not only to its assumptions but also its methodological flaws and limitations. Feminist scientists such as Anne Fausto-Sterling (1992b) and Bonnie Spanier (1995a) contend that particularly in culturally-charged issues such as the basis of gendered characteristics, one cannot count on the “rigor” of the scientific process to catch “bad science.” Sometimes such research has been published and received much positive attention even when it contained many flaws and limitations. In addition, good science is not always given recognition when it does not support the notion of essential differences between women and men. Spanier (1995a) notes that “[t]he field of sex[-]differences research is framed as an interest in *differences*. Studies with ‘null findings,’ results showing no effect or no difference, are inherently of less interest, while even questionable studies showing difference are accorded a place of scientific respect” (57, *italics in original*).

In addition, a fundamental assertion of feminist science studies is that gender is a construct that overlays our understandings of other things. Harding (1986) notes that within a feminist framework of analysis

gender is a fundamental category within which meaning and value are assigned to everything in the world, a way of organizing human social relations. If we regarded science as a totally social activity, we could begin to understand the myriad ways in which it, too, is structured by expressions of gender. (1986:57)

Feminist science scholars have shown that the gendering of concepts ultimately has effects on how we come to understand the world through science. Evelyn Fox Keller was among the first to demonstrate that scientific approaches to obtaining knowledge about nature have built within them the conceptual hierarchical binary of masculine/feminine (1985). The devaluing of those things gendered feminine in science has implications for how research is conducted and thereby what is ultimately “discovered.” For example, Keller notes that in biology, “hierarchical” theories, associated with masculinity, are often preferred as an explanatory framework over “interactionist” theories, which are associated with a “feminine” emphasis on relationships and interactions (1992). Similarly, Bonnie Shulman (1994) elucidates the association contained within the primacy placed on rationality in science, the devaluing of other modes of understanding, and the gendered conceptions of each. In addition, she points out that the belief in rationality as the “best” way to produce knowledge about the natural world is not inevitable, but has come to be seen as such:

It is the privileging of the rational mode over, say, the empathetic mode of obtaining knowledge, and the power relations implied in the assumption of the superiority of reason (gendered as male) over feeling (gendered as female) that must be challenged. There is an underlying assumption in claiming that we can know the world through rational inquiry that is so “natural” that it goes unnoticed: that is, that the world we seek to know and understand is itself rational and orderly, and that human reason alone can discover principles and laws that govern the behavior of things. We forget that it takes a *leap of faith* to believe this. (1994:3)

Feminist science studies is committed to exposing these “leaps of faith,” demonstrating the effects they have had on how science is done and what knowledge is produced, and suggesting ways in which science might actually be improved by acknowledging its standpoints. Doing this requires redefining traditional scientific objectivity. Haraway

(1991) describes this goal as “an epistemology and politics of engaged, accountable positioning ... The science question in feminism is about objectivity as positioned rationality” (196). The feminist version of scientific objectivity, then, requires contextualizing knowledge claims in the social conditions of their production. In this way “truths” can be produced, while at the same time not presuming a claim to a universal “truth”; according to Haraway, “feminist objectivity means quite simply situated knowledges” (1991:188).

A goal of the current project is to uncover the assumptions inherent to the standpoints from which the scientific efforts to explain lesbian and bisexual orientations in women through biology are produced. Feminist science studies provides the theoretical framework through which this can be accomplished. In addition, feminist science studies inform this study in terms of the methods of analysis, those involved both in exposing bias in scientific methodologies and in uncovering the role of gendered associations in “objective” science. Thus the current study is associated with the field of feminist science studies at every level, yet the focus on sexual orientation requires positioning this research within the body of similar work in the field of lesbian and gay studies. I turn now to discussing the influences on this study of such previous work.

### Historical Medical and Scientific Explanations for Lesbian Identity, and Their Critiques

It is important to locate the current scientific research that seeks to explain lesbian and bisexual orientations in women as biologically based in terms of its historical positioning within such scientific research, in order to understand better the development

of the current paradigms of thought. In addition, critiques of these historical projects have created important insights into the social influences upon the scientific theories about homosexuality and the ideological functions served by them. These critiques inform the current project's effort to situate socially the modern scientific effort to find biological explanations for lesbian and bisexual orientations in women. In this section I will provide an overview of ideas put forth in texts from the modern (beginning in the 19<sup>th</sup> century) medical/scientific effort to explain homosexuality, focusing on the discussions about women, as well as some insights from critiques of these projects. This discussion will help position the scientific research that I will analyze as well as my own critiques of it.

### Historical Lesbian Sexology

It is first important to recognize that "sexuality" and "sexual orientation" as we may think of them today were not always conceptualized as such. According to the French theorist and historian Michel Foucault in his *The History of Sexuality Vol. 1* (1978), the construction of "sexuality" into a domain of knowledge and practice occurred in the nineteenth century. It occurred through the development of what Foucault calls a "*scientia sexualis*," a science that is concerned with "the task of producing true discourses concerning sex, and this by adapting – not without difficulty – the ancient procedure of confession to the rules of scientific discourse" (1978:67-68). Confession, according to Foucault, has been established in Western societies for many hundreds of years "as one of the main rituals we rely upon for the production of truth" (1978:58), one which has become a procedural aspect of many social institutions, and the power of its

truth-producing effects ingrained into our understandings of ourselves and others. Of the confession, Foucault notes that it

is a ritual of discourse in which the speaking subject is also the subject of the statement; it is also a ritual that unfolds within a power relationship, for one does not confess without the presence (or virtual presence) of a partner who is not simply the interlocutor but the authority who requires the confession... (1978: 61)

The obligatory nature of the confession in regard to sex has become disguised, according to Foucault, such that we see the act of confessing as liberating and its constraint as oppressive. The *scientia sexualis* “connects the ancient injunction of confession to clinical listening methods”, which enabled medical/scientific authorities to construct “something called ‘sexuality’ to embody the truth of sex and its pleasures” (1978:68).

Not surprisingly, “sexuality” became a realm in which physicians and scientists held the role of the one to whom “confession” was expected and by whom its meanings were interpreted and judged. Also not surprisingly, “sexuality was defined as being ‘by nature’: a domain susceptible to pathological processes, and hence one calling for therapeutic or normalizing interventions...” (1978:68). In this way, according to Foucault, Western societies in the 1800s “set out to formulate the uniform truth of sex” (1978:69).

Part of constructing this uniform truth involved “the setting apart of the ‘unnatural’ as a specific dimension in the field of sexuality” (1978:39). “Perverted” sexualities came to be identified and located in the body: “In the course of the century they successively bore the stamp of ‘moral folly,’ ‘genital neurosis,’ ‘aberration of the genetic instinct,’ ‘degenerescence,’ or ‘physical imbalance’” (1978:40). Importantly, in this period “perversions” that had previously been merely actions came to be reflective of

types of people. This leads us to Foucault's well-known contribution to understanding modern Western society's understanding of homosexuality; he writes that "[t]he nineteenth-century homosexual became a personage, a past, a case history, and a childhood, in addition to being a type of life, a life form, and a morphology, with an indiscreet anatomy and possibly a mysterious physiology" (1978:43). During the late 1800's, "homosexuality" came to represent a medical category in which types of people – primarily men – could be placed by the nature of their perversion, which actually was "less by a type of sexual relations than by a certain quality of sexual sensibility, a certain way of inverting the masculine and feminine in oneself" (1978:43). Of course the transition was not perfectly clear-cut; as Fausto-Sterling writes, "[m]erely coining a new term did not magically create twentieth-century categories of sexuality, but the moment does seem to mark the beginning of their gradual emergence" (2000:13). However, in Foucault's famous words: "Homosexuality appeared as one of the forms of sexuality when it was transposed from the practice of sodomy onto a kind of interior androgyny, a hermaphrodism of the soul. The sodomite had been a temporary aberration; the homosexual was now a species" (1978:43).

Slightly pre-dating Foucault's chronological location of the creation of the "homosexual" as a type of person was the work of Karl Heinrich Ulrichs, a German man who was not a scientist or a physician, but who in 1864 began publishing his own writing on the "natural" categories of people who loved those of their own sex (Mondimore 1996). Ulrichs, himself homosexual, wrote his theories about the naturalness of the existence of a "third sex" to explain homosexuality, in an effort to promote tolerance. While Ulrich's theories were largely rejected by many in the medical community of that

time period (see discussion of Krafft-Ebing, below), Ulrichs holds a distinctive status: he “was the first to come up with a scientific theory of homosexuality” (Terry 1999:43). His work influenced the thinking of medical researchers even if they rejected his theories; Terry states that “[h]is writings gave rise to the paradigm of sexual inversion which structured most nineteenth-century scientific theories of homosexuality” (43). While not all of his theories came to be accepted, “his idea of a homosexual identity did” (Mondimore 1996:32).

The next major text concerning homosexuality produced by the new field known as “sexology” was Richard von Krafft-Ebing’s *Psychopathia Sexualis*, the first edition of which was published in 1886 (Mondimore 1996). Krafft-Ebing was a German neurologist who compiled case studies of over 200 persons with various forms of “psychopathological manifestations of sexual life” (Mondimore 1996:35). In a way that sounds similar to Ulrichs’ writings, Krafft-Ebing defined the homosexual as “sexually inverted;” however, as implied by his book’s title, Krafft-Ebing rejected the idea that homosexuality might be a natural condition of sexuality. Krafft-Ebing proposed that “inversion” could be “congenital” or “acquired,” and defined “congenital inversion” in the following way: “The essential feature of this strange manifestation of sexual life is the want of sexual sensibility for the opposite sex, even to the extent of horror, while sexual inclination and impulse toward the same sex are present” (in Storr 1998:18). Storr (1998) critiques Krafft-Ebing’s categories and gradations of categories, noting that they are applied in ways that are at times contradictory or indistinct from one another. According to Storr, “Krafft-Ebing is deploying a category – ‘congenital inversion’ – which covers a multitude of perversions and reduces the diversity of desires and practices to a single

clinical entity” (1998:19). Thus although Krafft-Ebing asserted that individual cases of homosexuality could be placed into the taxonomy he created, in fact his definitions and distinguishing characteristics did not adequately describe the cases he discussed nor reliably separate them from one another.

The inclusion of lesbians (though not called by that name) in the *Psychopathia Sexualis* offers evidence that homosexuality or “inversion” in women did not escape scrutiny from early sexologists. Storr (1998) notes that Krafft-Ebing “acknowledges the paucity of data on inversion in women, but insists that despite the relative invisibility of female homosexuality, as many women as men are congenitally inverted” (19). However, Krafft-Ebing’s categorization scheme apparently suffers due to this paucity of data, as the distinction between congenital and acquired inversion is even less clear for women (Storr 1998: 20). According to Storr:

Here we again find Krafft-Ebing applying distinct categories to material which exceeds their boundaries. Not only are the gradations which constitute congenital and acquired inversion woefully inadequate to the case histories they present as evidence, particularly when faced with subjects who doggedly desire and engage sexually with both women and men, but the very distinction between the congenital and acquired itself is thoroughly unstable. (1998:20)

In addition to critiquing the limitations imposed by the ideologies underlying Krafft-Ebing’s work, Storr critiques the methodological limitations, due to the impreciseness of the categories and the inability to handle cases that did not fit established criteria.

Krafft-Ebing also did not limit himself to describing and categorizing types of “inversion;” causes and cures were suggested as well. According to Mondimore (1996):

Despite Krafft-Ebing’s statement that his goal is simply to ‘record’ the varieties of human sexual expression, he does not hesitate to propose a theory of causation for homosexuality. He states that, without exception, ‘this anomaly of psychosexual feeling may be called, clinically, a



functional sign of degeneration.’ (36)

In Krafft-Ebing’s diagnosis of the etiology of inversion, “degeneration” referred to what has been called “degeneracy theory,” used by the medical and scientific communities in the late 1800s-early 1900s to describe people who were inherently “of lesser stock” and considered to blame for many social problems (Mondimore 1996:36-37). As Gibson (1997) notes:

The medical literature of the late nineteenth century indicates an ever-present awareness of evolutionary theory which served as an especially versatile, scientific, objective model for rationalizing sexual and social values that had previously been regulated by religion and the law. Degeneration, or the slide down the evolutionary ladder, was a common explanation for mental disease in general, and sexual perversion in particular. (115)

Degeneracy theory was applied in ways, not surprisingly, that upheld dominant beliefs about the superiority of certain classes – for the most part white, upper-class, heterosexual men. Certain groups were “determined” to have features that marked their evolutionary regression or degeneration, in contrast to the normal features attributed to those who were considered to represent the pinnacle of human evolution. For example, in her analysis of primarily American physicians’ writings on “female inverts” during the late 1800’s, Gibson points out a seeming fascination with certain bodily manifestations of the women’s “masculine” natures, most notably the attribution of large clitorises (1997). The descriptions of the lesbians’ “hypertrophied” genitalia drew upon an already-present discourse of the physical superiority of the white race. As Somerville writes: “One of the most consistent medical characterizations of the anatomy of both African American women and lesbians was the myth of an unusually large clitoris” (2000:27). “Too much” interest in sex or physical arousal noted by researchers was similarly attributed to both

lesbians and African Americans and deemed evidence of evolutionary regression to a less civilized and more animalistic state (Gibson 1997). These pronouncements about lesbians and women of African descent served to reinforce each other and the “superiority” of whites and heterosexuals.

The next sexological work to achieve great importance after Krafft-Ebing's *Psychopathia Sexualis* was the 1897 English-language publication of *Sexual Inversion*, written by British physician Havelock Ellis (with contributions by literary figure John Addington Symonds) (Mondimore 1996). Like Ulrichs, “Ellis sought to reform what he thought were archaic attitudes toward sexuality, and he advocated what he believed was an enlightened approach to homosexuality” (Terry 1999:50). According to Mondimore, Ellis suggested that “except for their sexual partners, homosexuals are not terribly different from everybody else,” and that he “dispensed with ‘degeneracy theory’” (Terry 1999:49). Terry, however, argues that although Ellis “generally argued against the association of homosexuality with degeneracy and pathology, [he] discussed the subject in terms that often defied this claim” (1999:53). Homosexuality was associated with weakness and was, according to Ellis, more likely to be triggered in the “lower races and classes” because of their undesirable living environments (Terry 1999:52-53). Thus Ellis utilized already-present beliefs in other groups’ “inferiority” in the construction of his theories about homosexuality. As stated by Somerville (2000), *Sexual Inversion* “illustrates the ways in which the development of new sexual categories was mediated by methodologies and conclusions borrowed from previous studies of racial difference” (10).

While a contemporary of Ellis, German physician Magnus Hirschfeld, is widely known in sexological literature for his advocacy of the medical view of homosexuality as a “natural variation,” this positive perspective “was overshadowed by a consensus among most physicians that inversion and homosexuality were, by definition, troublesome disorders” (Terry 1999:55). Ellis’s main theory of homosexuality was one of “innate biological predispositions acted upon by environmental influences and experiences,” much like many modern theories today (Mondimore 1996:50). However, also resembling some current lines of thought, Ellis’s work reinforced the idea of homosexuality as an undesirable condition, as his case studies seemed to suggest that homosexuality could have been avoided “if congenitally predisposed children were protected from unhealthy conditions” (Terry 1999:51).

In addition, regarding Ellis’s relatively respectful view of his male case studies, Terry notes that “Ellis did not extend the same charitable understanding to lesbians. To the contrary, he emphasized their mannishness and their tendencies toward predation, while criticizing their feminist beliefs as pathological” (1999:51). The connection between Ellis’ apparently negative perceptions of lesbians and his dislike of “their feminist beliefs” is an interesting one, in that it suggests the inter-relatedness of the regulation of lesbian sexuality (and the lesbian body) and of women’s roles in society in general at that time. In her study of the history of lesbian identity, Martha Vicinus writes the following of Krafft-Ebing and Ellis:

However revolutionary these men may have thought their descriptions to be, both were simply confirming the long-standing representation of women’s social transgression as both the symptom and the cause of their sexual transgression. The incipient biologism of an earlier generation of medical men now moved to the forefront. These theorists all insisted upon the primacy of the body as the definer of public, social behavior.

(1993:443)

With the body as “definer” of behaviors deemed unacceptable, the body was then itself described and defined in ways that reinforced notions of innate deviance from an assumed norm: As Gibson (1997) notes:

the medical concern over clitoral hypertrophy highlighted a variety of social and metaphorical fears and issues. ‘Hypertrophy’ was applied to both the body and behavior – Havelock Ellis described ‘hypertrophied friendship’ in his treatise on female sexual inversion (1895, 147), suggesting that these women’s relationships and their bodies revealed a pathological expansion that threatened to overwhelm the physical and social body. (111)

While “clitoral hypertrophy” certainly received a great deal of attention, other anatomical features also were deemed “too large” or “unattractive” compared to those of “normal” (upper-class, heterosexual, white) women (Gibson 1997). One could say that the co-construction of lesbian and African women’s bodies (and “lesser” natures) in this way was in part a mechanism to keep “proper” women constrained, socially and spatially, from “pathological expansion” (for further discussion of the construction of the “difference” of African women’s bodies in this time period, see Fausto-Sterling 1995; Gilman 1985; and Stepan 1996).

It is also important to note that during this time period, even privileged women were considered to be naturally intellectually inferior to men. The white male brain had been determined to be larger in general and more developed in crucial regions than the brains of women and “lesser races” (Gibson 1998). Thus the designation of lesbians, in particular the lesbian brain, as both “masculine” and “lesser” posed a contradiction. This problem was circumvented in part, according to Gibson (1998), by the association of the lesbian brain with that not of white men, but “inferior” men of other races:

**By connecting female homosexuals' brains to other races, doctors could undermine any connotations of superiority that surrounded their intellectual masculinity. This strategy points to a multiplicity of masculinities that could be called upon in the construction of a lesbian intellect. The diversity of masculinities that were created by differences such as class and race was expanded upon through the creation of the lesbian herself. (1998:86)**

Concomitantly, intelligence in a woman was constructed as a sign of underlying "degeneracy," and "the specter of an intelligent, sexually deviant woman became a threat to the status of any ambitious woman" (Gibson 1998:87). With education suggested to be a mechanism by which bodily and behavioral "femininity" could be destroyed, many women could be effectively kept away from intellectual pursuits, and the pathology of the lesbian's "masculine intellect" was reinforced (Gibson 1998). Thus have analyses of the scientific discourse regarding lesbians in the late 1800s demonstrated its ideological functions in maintaining gendered social arrangements.

As Terry (1990,1995,1999) recognizes, the interrelationships between medical pronouncements about lesbian bodies and ideological beliefs about women's roles continued into the 20<sup>th</sup> century. Notably, in the United States during the 1930s, the Committee for the Study of Sex Variants began the search for physical features capable of distinguishing heterosexuals from homosexuals, with a special interest in lesbians (Terry 1995:139). Forty lesbians agreed to participate, and among other forms of examination the study included an intense inspection of the women's genitals. Terry writes:

**Regardless of the absence of a heterosexual control group, ten typical characteristics of lesbians were established that supposedly distinguished their genitals from those of 'normal women.' The typical female sex variant had a larger than average vulva, longer labia majora, protruding labia minora, a large and wrinkled prepuce, a 'notably erectile' clitoris, an elastic and insensitive hymen, a distensible vagina, a small uterus,**

and erectile nipples. The list bore a remarkable resemblance to that assembled by Havelock Ellis several decades earlier, suggesting that a standard had been set for what counted as a lesbian body. (1995:143)

Terry, then, conducts a methodological critique of the Sex Variant Study (lack of adequate controls and other issues) in addition to pointing out its ideological nature. In addition to the noted continuity of these descriptions with those of Ellis, there was a consistency in the racist emphasis on the abnormal degree of “masculinity” noted in African-American women. Terry writes:

Some gynecological sketches noted the race of the subject (‘negress’) next to what was seen to be an unusually long clitoris, recalling the lesbian counterpart to the stereotypical savage with an unusually long penis. Here, as in other representations combining racial difference and sexual deviance, we find a link in the white medical imagination between blackness and hypersexuality, this time through a clinical reading of lesbian masculinity in female genitals. (1995:144)

Thus the late 19<sup>th</sup> century co-construction of the large-clitorised, masculine African-American and lesbian continued on in research conducted in the 1930s and early 1940s. The bodies of African-Americans and lesbians were still understood in masculine terms, such as having denser musculo-skeletal structures; but in addition to the body itself were the attributions of masculinity to behaviors such as “mannerisms and postures self-confidence and determination” – all forbidden attributes of “proper” women (1990:317). It can be seen from this analysis that the construction of the “variant” still in this era was intertwined with the maintenance of the “natural” superiority, and resulting social dominance, of white men.

Yet while it appears the vast majority of sexological literature defined lesbians as pathological and in need of explanation, Carlston (1997) challenges the notion that it was universally so. While the pathologizing of lesbian identity by the scientific and medical

communities certainly existed, it was not the only approach. Her historical analysis of medical literature in the US from 1926-1940 demonstrates competing explanatory paradigms: “In fact, the medical discourse on homosexuality was never uniform: while there were many who characterized homosexuality as a disease, there were others who emphatically did not” (1997:177). In addition to dissenting views, Carlston notes that even negative representations of lesbians were taken up and recast by those so pathologized in order to enact resistance, in what could be described as a “reverse discourse” in Foucauldian terms. Foucault writes:

There is no question that the appearance in nineteenth-century psychiatry, jurisprudence, and literature of a whole series of discourses on the species and subspecies of homosexuality ... made possible a strong advance of social controls into this area of ‘perversity’; but it also made possible the formation of a ‘reverse’ discourse: homosexuality began to speak in its own behalf, to demand that its legitimacy or ‘naturalness’ be acknowledged, often in the same vocabulary, using the same categories by which it was medically disqualified. (1978:101)

It is important to note the existence of dissenting views because understanding the full context of the medical discourse provides for a better critical analysis of the apparent hegemony of the pathologizing views. Also, however, as Carlston points out, it should be understood that lesbians were not completely victimized by the medical and scientific discourse; rather, they were actively engaged in constructing “strategies of resistance” (1997:193).

Interestingly, the Sex Variant study, according to Terry, ended up concluding that these bodily manifestations of lesbianism were actually the result of such an identity (rather than a sign of congenital aberrance), specifically the result of the type of “sex play” in which lesbians presumably engaged. The markers were insufficiently reliable to distinguish sex variants from normals, and the psyche was determined to be the locus of

homosexual origins (1995:151-152). This idea drew upon contemporary models, inspired by the work of Sigmund Freud, of the psychogenesis of homosexual orientations. As such, the Sex Variant study itself shed little light on explanations for the “variance” it studied. The scientific climate in terms of confidence in the ability to locate bodily distinctions between homosexuals and heterosexuals began to change in this era, in part as a result of this study. In addition, the publication of Alfred Kinsey’s research (in 1948 and 1953) helped put forth the idea that sexual orientation exists along a continuum, which suggested absolute biological distinctions between heterosexuals and homosexuals could not be found because they did not, in fact, exist (Terry 1995:154-156). Terry writes:

Looking back over this history, we can say that, for an anxious moment, the homosexual body vanished not only because of methodological contradictions in such projects as the Sex Variant study, but also because rigorously conducted empirical science revealed that perhaps homosexuality was in every body. Indeed, following the Sex Variant study and Kinsey’s research, constitutional studies were for the most part discontinued; but the quest for finding homosexuality in the body was far from exhausted, taking new forms which focused on the vicissitudes of the hormonal system and on patterns of sexual response. (1995:160)

It is here in part that we find the current era of the scientific search for biological explanations for lesbian and bisexual orientations in women, as hypotheses focusing, for example, on the effects of hormones are still widely in use. Scientific advances have made it possible to look past the surface, to parts of the body inaccessible to earlier researchers. Magee and Miller state: “By the 1970’s, scientists studying homosexuality had left behind such crude measures. By then they believed that the essential differences that made the difference, such as hormone levels and brain structures, would not be visible to the unaided eye” (1997:74). Thus scientific research into bodily explanations



for homosexuality, rather than ending, has flourished and proliferated in the wake of new technologies and discoveries.

Historical lesbian sexology, in summary, was driven largely by the overarching belief in lesbianism as a condition of inverted sex and/or gender characteristics. Even advocates tended only to see homosexuality within such a framework, suggesting how deeply rooted was the belief in the naturalness of a heterosexual orientation as a constitutional part of one's maleness or femaleness. Sexual orientation was unproblematically tied to sex and/or gender, and sexual orientation categories were taken to be essential to human nature, their relatively recent construction (per Foucault) taken as discovery.

The science was often used as a means to establish the boundaries between the "fit" and the "unfit," by which ideological notions of superior and inferior groups of people were reinforced through a medico-scientific discourse. The pinnacle of women's evolution was accorded to those who were white, heterosexual, and undoubtedly upper-class. The ranking was "proven" by constructing the bodies of "lesser" women – white lesbians and women of color – as having similar evolutionary deficiencies.<sup>2</sup> Also, being a lesbian was associated in the scientific imagination with taking up too much space – bodily, sexually, and socially. It served to help reinforce ideologies of a woman's "proper place," helping to maintain patriarchal relations of power.

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<sup>2</sup> A recent article (Miller 2000) also suggests that the deviance of lesbians' bodies was constructed in tandem with that of the bodies of prostitutes.

## Overview of Current Scientific Efforts and Critiques

Rather than existing only as an archaic mode of thinking, the quest to “explain” identities considered deviant through scientific and medical means persists today. In fact it is argued that advances in knowledge and technologies have helped such research efforts proliferate, as we are now capable of examining aspects of the body unimaginable to early sexologists, down to our very DNA (Hubbard 1995; Keller 2000; Rothman 1998). Modern medical science continues to attempt to locate biological origins of homosexuality in various anatomical sites and physiological processes, most commonly those thought to be sexually dimorphic, revealing a continued view of homosexuality as an “inversion” of sex and/or gender. The current research being conducted to find biological origins of homosexuality is argued to persist in reproducing the ideology of homosexuality as deviant. I will overview the current lines of scientific inquiry and major areas of critique.

There are four very general types of scientific research being conducted in the current time period (1990 to present) to locate biological origins of homosexuality: differences in the brain structure, in endocrinological effects, in cognitive abilities, and in the genetic code (De Cecco and Parker 1995; Stein 1999; Zicklin 1997). Brain studies are exemplified by work such as that by Allen and Gorski, 1992; LeVay, 1991; and Swaab and Hofman, 1990. Each of these studies examined structures of the brain thought to be sexually dimorphic for correlates to homosexuality. De Cecco and Parker (1995) point out that “[i]n brain research, reports of studies claiming to have found new areas of ‘sexual dimorphism’ often precede reports claiming to have identified new markers for homosexuality” (4).

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the discourse. It is at this point that the relation between the first part of this discussion and the second should be most clear. Scientific knowledge and practice are interdependent and must be examined as such. To do so is to resist the dichotomous thinking that has been so central to maintaining the power of science to name, define, and control. As Collins (1999) states:

Science speaks the language of power because it is the language of power. However, science is about much more than language or discourse. Given its significance in Western thought, scientific knowledge and the practices it constructs and defends are intersecting dimensions of the struggle to shape reality. Whether feminist analyses of science maintain this struggle remains to be seen. (279)

### Explanation of This Project

From the preceding discussion emerges not only the rationale for the type of analysis I am proposing, but also suggestions for how to proceed. In this section I describe how I go about conducting this analysis. Discussion of the two different emphases I have just discussed, on science “as science” and on the language used in constructing the scientific claims, at first are separated out in the interest of clarity. After the elements are described separately, the analysis resulting from their integration is discussed.

### Empirical Critique

The empirical critique of the science focuses on three distinct aspects of the articles: the explanatory framework, the study sample, and the interpretations and conclusions drawn from the data. First is the explanatory framework. As discussed by Spanier (1995a), this is the portion of the research that sets up everything that follows. One particular paradigm of thought has served as the explanatory framework for a great

deal of sexual orientation research, which has been called the “intersex assumption” (Byne 1995). The intersex assumption sees homosexuality as representing an intermediate identity existing between heterosexual men and women (Byne 1995). The goal of this section of the critique is to determine whether and to what extent an intersex assumption underlies the current body of research on lesbian identity.

In this study, the explanatory framework of each study is evaluated for the presence or absence of the “intersex assumption.” The explanatory framework is first revealed in the introductory section of the article. This is the section on which the analysis focuses. Specifically, the analysis is conducted by locating in the introductory section a passage that states the research questions, hypotheses, goals, or expectations. Then, these statements are analyzed for the presence of particular words, phrases, and concepts that are considered to be associated with the intersex assumption. A critique of the problematic aspects of the intersex assumption’s role in the scientific research on origins of sexual orientation in lesbian and bisexual women is then discussed.

Second, the samples of subjects used in the research studies are critiqued. There are three bases for the critique: the selection of the samples, the categorization of sexual orientation in the samples, and the composition of the samples. These aspects are critiqued separately. The sample selection is analyzed for biases in the populations from which the researchers sampled, and the methods used to recruit subjects. Bias in either of these aspects can create a research sample that is not representative of the population at large, thus imposing limitations on how the findings may be interpreted. The section of the article discussing the sample selection procedure is read for the kinds of potential bias-inducing factors that have been discussed by previous scholars (Allen 1997; Spanier

1995b, Zicklin 1997). Next the categorization of subjects' sexual orientations is analyzed. The methods used to place subjects into a category (lesbian, bisexual, or heterosexual) are read to see what criteria and standards were in place in each article. Then issues with these processes that could cast doubt on their reliability, validity, and ultimate usefulness in the construction of scientific knowledge claims are then discussed. The third aspect of the sample analyzed is that of composition in terms of demographic variables such as age, race, social class, and education levels. If the samples are very skewed on important demographic variables, the generalizability is again put into question. The diversity of the samples on these aspects is critiqued in terms of the representativeness of the population in general.

Last, the empirical critique of the scientific articles analyzes the interpretations and conclusions drawn from the research data. These are present in the final section of each article, typically called the "Discussion" section. Two aspects of the interpretations and conclusion are analyzed. First, they are read for the degree to which the researchers acknowledged sample-related limitations when interpreting their findings and drawing conclusions. As discussed in the section on the critique of the samples, bias in the selection, categorization, and composition of the study samples creates serious limitations to how the data may be interpreted and to whom the findings may be considered applicable. In interpreting the findings and drawing conclusions about them, these potential limitations must be taken in account, yet it has been suggested by past research that scientists may "fail to be cautious" in work on topics such as sex differences and sexual orientation (Spanier 1995a). The acknowledgement of potential sample-related limitations is examined and implications discussed. In addition, the interpretations and

conclusions are analyzed for mechanisms of exaggerating the importance or significance of the findings (Spanier 1995b:74). These mechanisms include basing interpretations and conclusions on findings that did not achieve statistical significance or that are otherwise questionable. The implications of overstating one's research findings are then discussed.

### Discourse Analysis

The part of the project that involves utilizing discourse analysis methods examines the meanings associated with lesbian and bisexual orientations in women using the sample of scientific articles as texts for the analysis. The goal of this analysis is to uncover ideological assumptions and understandings in the discourse regarding lesbian and bisexual orientations and their intersections with sex, gender, and race.

The analysis of the scientific discourse begins by identifying words or phrases related to gender, sexual orientation, or race and reading the texts for the presence of these concepts. Once all identifiable usages of language relating to gender, sexual orientation, and race are located, the words and phrases and the context in which they arise is read closely to interpret the meanings associated with them in the text.

The meanings associated with the concepts of gender, sexual orientation, and race are interpreted based on the explicit meaning given in the text (if any), as well as implicit meanings that can be attributed through the analysis, informed by feminist standpoint theories. These meanings, then, are read to uncover patterns or "themes" that are generated inductively from the texts themselves. The themes that arise are then analyzed for the assumptions that inform them and the purposes they serve in the discourse. From this analysis, ideological beliefs, assumptions, and understandings are brought to light.

## Integrating the Methodological and Discursive Analyses

The findings from the methodological and discursive analyses are integrated in the process of interpreting their implications for what the science can say about lesbian “nature.” The integration is done in part to examine the interdependencies of scientific knowledge and practice, as discussed by Collins (1999). Collins argues that analyses of either scientific knowledge (epistemological critiques) or practice (here, methodological critiques, though Collins’ discussion focuses more on institutional practices) alone miss important ways in which the two work together, suggesting instead the value of “intersectional analysis.” Feminist critiques of the empirical inadequacies of scientific research have been criticized for ignoring the androcentrism inherent in “science as usual” (Lennon 1998; Longino 1990). While as discussed earlier I think these criticisms are not entirely well-founded, it is true that critiquing science only by its own standards may fail to get at more fundamental biases that exist within science as a system of knowledge. However, discursive critiques of science have also been criticized for ignoring the material effects of scientific practice (Collins 1999). Also, as discussed earlier feminist scientists have made convincing arguments for the necessity of analyzing the cases in which scientific research does not measure up to its own standards (Fausto-Sterling 1992a, 1992b; Spanier 1995a). When these analyses serve as a means to furthering understanding of why this occurs, or may occur more frequently in some types of research as opposed to others, the connections between the critiques of empirical inadequacies and of ideological elements in science are made clear.



This project asserts that underlying assumptions influence both the methodological and discursive choices made by researchers, and that the limitations imposed by those choices intersect in complex ways to place boundaries on the scientific knowledge claims. While the methodologies and discourse are analyzed separately, they affect one another and ultimately work together to create implications for the reach of the claims of the science. Thus the two analyses are integrated in the process of interpreting these implications. In this way it is hoped that both analyses can be more meaningful and produce more useful results.

### Sampling

The discussion of the sample of articles analyzed is divided into five subsections. The first subsection describes the process by which the full sample of all relevant articles in the time period under consideration (1990-2000) is constructed. Second, the characteristics of the sample itself are described. Next, the process by which the full sample is reduced to a subsample of articles for analysis is described. The characteristics of the full sample are then compared to the subsample in order to establish that the smaller set of articles adequately represents the full set. Last, potential limitations of the sample are discussed.

#### Construction of the Full Sample

The full sample consists of all English-language articles published in academic science journals from January 1990 to June 2000 that report research findings from a scientific study of possible biological or genetic correlates for lesbian and bisexual orientations in women. This decade was chosen because it represents the period of

dramatic increase in not only such biological research but also media and public interest in it. The 1991 publication of LeVay's brain research represented the beginning of major public attention to the possibility of definitively locating a biological difference between gay and straight people (Fausto-Sterling 2000; Zicklin 1997).

The articles were gathered by use of comprehensive online search indexes including "Web of Science," a database published by the Institute for Scientific Information, which was used as a main source; "MedLine," a database of the National Library of Medicine; and "UnCover," another online database of journal articles. The article searches were conducted primarily in June and July 2000, and were concluded in November 2000. The searches were initially conducted utilizing relevant search terms and various combinations thereof, including "lesbian", "bisexual", "sexual orientation", "homosexuality", "heterosexuality", "women", "biological", "genetic", "heritable", and "etiology". When these search terms returned no additional articles, other methods were employed to ensure thoroughness. For example, I used functions available on the "Web of Science" database to locate additional articles, such as "find related articles," a function that locates articles containing similar reference lists; another function that lists the works that have cited the article in question; and an additional method by which one can search for all articles written by specific authors or that have cited works by specific authors.

In addition, to avoid failing to identify articles published in journals not indexed in the databases utilized, I searched the reference lists of articles that were obtained for any additional articles that might be qualified for inclusion. Articles were excluded if they: a) reported results of a study of men only; b) reported results of a study on animal

subjects rather than humans; c) primarily or solely reported results of a psychological study; d) consisted of a review of other studies rather than original research; or e) consisted of a “meta-analysis”<sup>1</sup> or “re-analysis”<sup>2</sup> of others’ findings.

### Overview of the Full Sample

The full sample consists of articles published in English-language academic science journals from January 1990 to June 2000 that report results of original scientific research testing hypotheses of biological or genetic explanations for lesbian or bisexual orientations in women. The number of articles in this sample is 35 (see Appendix). Five of these articles are different from the other 30 in that their focus is on identifying possible lesbian or bisexual orientations in girls and women with sex-hormone related disorders. These articles are considered separately, as their primary focus is on potential effects of pathological conditions rather than lesbians and bisexual women specifically.

Some characteristics of the full sample, including area of scientific research and lead authorship, are described here in order to establish a basis for comparison to the final subsample upon which the actual analysis is performed. It is important to know the similarities and differences of both sets of articles on these meaningful characteristics to support the claim that the subsample is in fact representative of the sample as a whole. If the subsample is very different from the full sample, it cannot be claimed that the results of the analysis have significance for the general scientific discourse that is reflected by the full sample.

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<sup>1</sup> Lalumiere ML, Blanchard R, Zucker KJ. Sexual orientation and handedness in men and women: A meta-analysis. *Psychol Bull* 2000; 126 (4): 575-592.

<sup>2</sup> Daniel WF, Yeo RA. Handedness and sexual preference: A re-analysis of data presented by Rosenstein and Bigler. *Perceptual Motor Skills* 1993; 76: 544-546.

In terms of authorship, the lead author for each article is noted in order to determine potential similarities in research approaches and programs across multiple studies. The main set of 30 articles has 19 different lead authors. Two different researchers have lead authorship on four studies each (Bailey and Gladue); five other researchers each are lead author to two studies (Bogaert, Dörner, McCormick, McFadden, and Wegesin); and the remaining 12 articles each have different lead authors. The other main issue noted of importance to the representation of the full sample is that of the area of scientific focus. Based on preliminary readings, the sample is first divided into two general categories reflecting a notable divergence of scientific approach: studies of genetic influences and studies of neuroendocrine effects. Nine of the 30 analyze possible genetic influences on sexual orientation, while the remaining 21 study various anatomical and physiological sites and processes thought to be affected by the neuroendocrine system. Then, the two groups are read further to determine if additional divisions can be made on the basis of multiple (defined as two or more) articles focusing on very similar areas. From this, the 21 neuroendocrine-approach articles are further subdivided into two groups by separating out seven whose primary focus is on brain-function or cognitive effects. No other multiple groupings are established. By using this separation process the subsample can be constructed in a way that reflects accurate proportions of the different research areas.

### Construction of the Subsample

Because the full set of articles is too large to conduct a full analysis on them in entirety, sampling methods are employed to create a subset of the full sample for further analysis. The primary rationale behind the sampling procedures is that the sample for

analysis should be chosen in such a way as to reflect as much as possible the full range of biologically-oriented research conducted, both in terms of the type of studies and publication across the full time period under consideration, 1990-2000. Thus the final sample needs to include enough articles to adequately reflect this range, while still being manageable for such in-depth analysis.

First, the articles are divided into three groups according to the type of study being conducted: the “Genetic” group consists of those with a genetic focus; the “Brain/Cognition” group, a brain-function and/or cognitive focus; and the “Neuroendocrine” group, a focus on neuroendocrine effects other than cognition-related ones. This categorization scheme is informed by discussions in Byne, 1995; Stein, 1999; and Zicklin, 1997, and is implemented in order to categorize most accurately the types of research conducted on lesbian and bisexual women during the time period under consideration in order to identify the relative emphasis (as judged by numbers of articles) of each type of research. In this manner, the final sample could be constructed in a way that best reflects these emphases, rather than having an over-representation of any one relative to its actual representation in the full sample. It should be noted that the groupings are not perfectly clear-cut in two cases, for which decisions were made regarding the article’s primary emphasis. Specifically, one article placed in the Brain/Cognition group, because of its multiple focuses of study, could be placed into the Neuroendocrine group,<sup>3</sup> and two articles placed in the Neuroendocrine group also have genetics-research components and thus could be placed into the Genetic group.<sup>4</sup> In both

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<sup>3</sup> Gladue BA, Bailey JM, 1995 (see Appendix for full citation).

<sup>4</sup> In chronological order, these are articles are: Dörner G, Poppe I, Stahl F et al., 1991; Dörner G, Lindner R, Poppe I, et al. 1995 (see Appendix for full citations).

cases the relative emphases of the different study areas are evaluated in order to determine placement, and the dominant emphasis in terms of quantity of discussion is the determining factor.

Next, the studies that are primarily following outcomes of disorders identified in sample subjects are excluded from consideration for the final sample. Specifically, the articles excluded are four studies on girls and women with a disorder called congenital adrenal hyperplasia (CAH),<sup>5</sup> as well as one study on girls exposed prenatally to the synthetic estrogen drug diethylstilbestrol (DES),<sup>6</sup> so that five total articles are excluded from the original 35. The reasoning for their exclusion is that these articles, unlike the rest of the sample, have by definition an approach to understanding lesbian and bisexual orientations in women to be a potential outcome of an abnormal condition relating to sex hormones. In the remaining articles, this is an approach for which analysis is conducted; therefore, including articles that necessarily are based on an understanding of lesbianism/bisexuality through the lens of pathology would bias the analysis in that direction.

Additionally, the articles are different from the rest because, as the focus of these studies was on the effects of a disorder, their samples are chosen based on that status rather than on sexual orientation, as in the remainder of the sample. Thus it could be said that for most of the articles, the research is conducted in such a way that sexual

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<sup>5</sup> In chronological order, these articles are: Dittman RW, Kappes ME, Kappes MH, 1992; Slijper FME, van der Kamp HJ, Brandenburg H, et al., 1992; Berenbaum SA, Snyder E, 1995; Zucker KJ, Bradley SJ, Oliver G, et al., 1996 (see Appendix for full citations).

<sup>6</sup> Meyer-Bahlburg HFL, Ehrhardt AA, Rosen LR, et al., 1995 (see Appendix for full citation).

orientation was an independent variable and some other, potentially biologically-related site or process is the dependent variable; whereas in these five articles, the reverse is true. It is acknowledged that these studies can certainly provide insights into assumptions made by researchers regarding biological explanations for lesbian and bisexual orientations in women and are related to efforts to find such evidence, and they are included in the descriptions of the full sample for those reasons. Also, some of the studies in question as well as similar, previous ones have already been critiqued elsewhere, as noted in the review of the literature.

Of the remaining studies, there are nine articles in the Genetic group, seven in the Brain/Cognition group, and fourteen in the Neuroendocrine group, for a total of 30 articles. Within each group, the articles are organized chronologically by year of publication, starting with the earliest. If there is more than one article in any given year, the articles published in the same year are alphabetized by the last name of the lead author. It is not practical to construct within-year chronologies because of the differences in the ways journals publish (some monthly, some bimonthly, et cetera).

Once the groups of articles are organized in this way, the selection process can proceed in a systematic manner. For each categorization group, the first listed article is selected for inclusion in the final sample, then every third article listed after the first one. The only deviation from this sampling process is made if the article to be selected has the same lead author as one already selected within that grouping. If this happened, the next sequential article is chosen instead, for purposes of representing a wider range of research. The process results in the selection of three articles from the Genetic group,

two from the Brain/Cognition group, and five from the Neuroendocrine group, for a total of ten articles in the final sample (see Appendix).

### The Full Sample Compared to the Subsample

In order to use the findings from this project to make claims about the scientific discourse in the 1990s on lesbian and bisexual orientations in women, the articles analyzed need to be reasonably representative of the entire set of articles from which they are sampled. Systematic sampling procedures are utilized specifically in order to maximize the probability that this would be the case. Ideally, systematic sampling procedures should not produce a subsample for analysis that is different in meaningful ways from the whole sample population. For this reason I examine and compare the subsample and the full sample on some key characteristics to identify their similarities and differences. Large differences between the two sets of articles on these key characteristics would suggest that much caution should be exercised when applying the results of this study to the general scientific discourse on lesbian and bisexual orientations in women during this time period. Small differences increase confidence in the reliability of this research and representativeness of this sample, because they reflect a greater degree of similarity between the full sample and the subsample.

The characteristics evaluated are the following: 1) the proportion of types of studies in the full sample and the subsample, where “types” refers to the scientific approach and issue studied; 2) the proportion of lead authors in each set of articles; and 3) the proportion of articles in each set that assert findings of evidence supporting biological differences between lesbians and/or bisexual women and heterosexual women.



The first issue, that of the proportion of types of approaches represented in the full sample and the subsample, is important because different explanatory frameworks, research focuses, and conclusions are likely to be found in different approaches to the subject. Thus a subsample that is, for example, composed predominantly of only one type of approach, will poorly reflect the scientific discourse as represented by the full sample. For this reason, this is an area in which some effort is made in the sampling procedure to achieve similarity (see previous section). Specifically, the full sample of 30 articles contained nine articles (30.0%) that focused on possible genetic influences, and 21 (70.0%) that focused on various neuroendocrine effects, which was further subdivided into seven (23.33% of the full sample) focusing on brain function and cognition, and 14 (46.67%) on all other neuroendocrine-related studies. The group of 14 does not lend itself to further subdivision, as there are no other areas of focus consisting of more than two articles.

The subsample of 10, in comparison, contains three articles (30%) on genetic influences; two (20%) on brain-function and cognitive effects; and five (50%) on other neuroendocrine-related research. Thus the Genetic group is exactly proportionate to its representation in the full sample, the Brain/Cognition group is very slightly under-represented (by 3.33%), and the Neuroendocrine group is very slightly over-represented (by the same 3.33%). In terms of different types of approaches to research on biological bases for lesbian and bisexual orientations in women, the subsample can be considered to be representative of the scientific discourse of the time period in question.

The issue of lead authorship is important because it can suggest similarities in approaches to the topic and in the processes under consideration. For example, if there

are only a very few number of lead authors in the full sample, it could suggest a predominance of a few types of explanatory frameworks, hypotheses, and anatomical or physiological sites under consideration. If this were the case, in order to represent faithfully such a predominance, the subsample should contain a proportionate number of same-authored articles. As noted previously, the full sample has several instances of multiple lead authorships. Two lead authors represent four each of the 30 articles (13.33% each of the sample), while an additional five lead authors represent two articles each (6.67% percent each). A closer examination of the first two reveals that one researcher, JM Bailey, is lead author to four of the nine (44.44%) studies of genetic influences. Another researcher, BA Gladue, is lead author to four of the 21 (19.05%) of the articles analyzing neuroendocrine effects, which are divided such that two of the articles were placed into the Brain/Cognition group (two of seven, or 28.57%), and the other two were placed into the Neuroendocrine group (two of 14, or 14.29%).

The composition of the subsample, on the other hand, is constructed, as discussed previously, in such a way as to exclude multiple lead authorships. This is done in order to achieve the widest possible representation of the scientific discourse on lesbian and bisexual orientations in women from the time period in question. An examination of the sampling process reveals that using the process described, no articles by JM Bailey were actively excluded; rather, the systematic procedure employed resulted in the selection of only one article for which Bailey is lead author. For BA Gladue, one article was actively excluded using the process described for avoiding multiple lead authorships in the subsample. It might be considered a more faithful representation of the discourse to construct the subsample proportionate to the full sample with respect to the multiple lead

authorships, at least in the cases of the two researchers discussed. However, achieving a representation from a diverse set of lead authors is considered to be of value in terms of reflecting the scope of the research. Representation of types of approaches is achieved by the process of constructing the different groupings and sampling within them so that each approach is represented proportionate to the full sample.

In addition, it was decided that in constructing a manageably-sized subsample, proportioning according to lead authorships would necessarily produce other problems. For example, with proportionality of authorship as the main goal, it would be much more difficult to be systematic in selecting articles by other authors (without multiple lead authorships) without creating an unmanageably large subsample. Also, while certainly important, constructing the sample to be proportionate by that criterion would actually overemphasize the significance of the issue of lead authorship, as it is only one measure of a single researcher's importance to a particular study. Additional authors, and other factors not easily determinable such as research relationships and mentors, can have as much or more influence on a study's approach, focus, and conclusions. For these reasons it was decided to construct a diversified sample in terms of lead authors and to sample groupings of different types of approaches in a systematic manner. Future studies may want to emphasize instead the influence of multiple lead authorships and determine if an effect on results is found.

The third issue of comparison between the full sample and the subsample concerns the conclusions of the study, specifically, whether the two sets of articles are similar in terms of the proportion claiming results supporting theories of biological bases for lesbian and bisexual orientations in women. Because the scientific assertions about

biological origins of lesbian and bisexual orientations in women are to be analyzed, the subsample must be relatively similar to the full sample in terms of results concerning such findings. In other words, it is important that there not be a large discrepancy between the two sets of articles in the percentages that claim findings supporting and not supporting possible biological evidence. Systematic sampling methods are employed to help minimize any meaningful differences between the full sample and the subsample in this area, but they are not guaranteed to produce similarities between the two sets of articles.

An examination of the results from all 30 studies shows that in 14 (46.67%), the results do not support a biological or genetic basis for lesbian or bisexual orientations in women, while in the remaining 16 (53.33%), they do. The subsample of 10 articles consists of four (40.0%) with findings not supporting biological bases, and six (60.0%) with findings that do. Thus the subsample slightly under-represents (by 6.67%) studies whose results do not support theories of biological explanations for lesbian and bisexual orientations in women, and slightly over-represents (by the same 6.67%) studies claiming positive findings of such evidence. This small difference should not affect the applicability of the findings from the analysis of the subsample to the scientific discourse as represented by the full sample, but its existence should be noted.

#### Limitations of the Sampling Procedures

There are several potential limitations in constructing a sample such as the one used in this research. It is my belief that my procedures minimize them enough so that they will not adversely impact the results of this study or their usefulness.

First, one must be systematic in defining the set of articles in their entirety. My intent is to identify all English-language scientific articles published in academic journals between January 1990 and June 2000 relating to research conducted relating to identifying biological correlates to lesbian and bisexual orientations in women. Though my search is conducted as thoroughly as possible, there is always a chance that some articles were somehow overlooked. Primarily, the negative effects that could be produced by a failure to identify all articles qualified for inclusion in the study would be on the potential accuracy and utility of the findings. Results produced from such research could not be said to be representative of the entire set of research articles described as that under study. The application of the findings to understanding the scientific construction of lesbian and bisexual orientations in women would be hampered because it could be said that the findings themselves were only relevant to a specific (and perhaps somehow biased) portion of the whole set of articles. However, I argue that my search procedures could not have failed to identify enough articles to have a limiting impact on my findings or their ultimate usefulness.

The second issue concerns the construction of the subsample. Once the entire set of articles under consideration is identified, it is still possible to introduce limitation due to the process of sampling to create a manageable subset of the original sample. This procedure also needs to be conducted in a systematic manner. The sampling procedure described above is implemented in order to minimize limitations that could be imposed at this point. For example, if the subset were chosen in an unsystematic way or if it were comprised of an insufficient number of articles, it could not be said that the results from the analysis of that subsample are relevant to the entire set of articles in question. In

other words in such a case it could be argued that findings produced would not accurately reflect the set of articles about which statements are being made. Because the subset is selected in a fair and systematic manner, which has been described in sufficient detail to be replicated fully by another researcher, this possible limitation is minimized.

The decisions made during the construction of the subsample certainly impact the results, as some articles are chosen at the expense of others. However, no article's chances of selection are significantly greater or worse than others, with two possible exceptions: 1) the decision to include only one article from each lead author means that multiple articles by the same lead author could be considered to have a worse chance than other articles to be included in the subsample, an issue that has already been discussed at length; and 2) articles published very early in the time period in question could have a slightly greater chance at inclusion, since the starting point for the sampling procedure is the chronologically first article from each of the three categories described earlier. This second issue could have been eliminated by choosing a random starting point within each category; however, the simplicity of having a clear starting point that is consistent across the three subgroups was deemed valuable as well.

Also, the decision to exclude the articles following the course of disorders imposes a limitation on the relevance of findings for those types of studies, but limiting the scope of this project in that way was considered necessary due to the breadth of the subject as it is. Last, it is possible for limitations to be introduced by the categorization scheme itself, for if the articles are categorized in a different manner, there may be different chances for each article to be chosen for inclusion. The possibility for actual limitation imposed by the categorization decisions made is remote; rather, the

categorization scheme has value in helping to better reflect the representation of the types of research in the full sample.

### Summary

In conclusion, two different but related methods used by feminist scholars to analyze scientific writing are employed in this project, and an effort is made to integrate them to build a stronger, more thorough analysis. Questions regarding the ways in which science is practiced are not considered to be truly separable from questions about ideologies in scientific knowledge reflected through the discourse, and integrating their critiques exposes the ways in which they intersect. In this way a feminist analysis can be constructed that allows for an understanding of the material effects of the standpoint from which science is produced.

## **CHAPTER 4**

### **METHODOLOGICAL CRITIQUE**

#### **OF THE SCIENCE**

##### **Part I: Introduction to the**

##### **Methodological Critique**

**This research project analyzes a sample of 10 scientific research articles published from 1990-2000 on biological origins of lesbian and bisexual orientations in women, utilizing elements of both feminist critiques of methodological inadequacies and principles of discourse analysis and integrating them to demonstrate how they intersect. The first layer of analysis is described in this chapter and consists of the critique of empirical limitations in the scientific studies. By “methodological limitations and inadequacies,” I refer to aspects of the reported research in which the study’s conceptualization, design, implementation, analysis, or interpretation fails to measure up to the standards expected of scientific research (Longino 1990; Spanier 1995a).**

**This analysis is informed by previous critiques of scientific research into biological origins of homosexuality conducted by scholars in the interdisciplinary fields of feminist science studies and lesbian and gay studies (Byne 1995; Doell 1995; Fausto-Sterling 2000; Spanier 1995a; Stein 1999; Terry 1999). In addition, this research is informed by analyses conducted by feminist science studies scholars on other types of scientific research, most prominently sex-differences research (Bleier 1984, 1988b;**



Fausto-Sterling 1992b). These analyses have demonstrated instances of questionable or biased explanatory frameworks, flawed research designs, misrepresentations of data, and failures to consider alternative explanations or reconcile findings with contradictory data (Bleier 1988b; Byne 1995; Spanier 1995a). Such critiques are important in debunking some potentially oppressive scientific claims about the “natures” of men versus women, or heterosexuals versus homosexuals (Bleier 1988b; Fausto-Sterling 1992b, 2000; Spanier 1995a).

At least as important as providing grounds by which to argue against biological claims that legitimate oppressive social relations is the ability of such critiques to provide insight into assumptions and biases of the researchers who conducted the study and of the scientific community at large (Byne 1995; Spanier 1995a; Stein 1999). Spanier writes:

By analyzing any study we can locate where and how the authors make judgments affected by biases, and then we can draw our own conclusions about the limitations of the study as well as the ways that scientists incorporate their biases into their work—and how that affects what we can learn from scientific research. (60)

Also, the fact that flawed research on differences between the sexes or sexual orientations gets published and its findings become accepted is indicative of “values shaping decisions about when to give more leeway on what is labeled valid science,” according to Spanier (1995a). Pointing out instances in which published research supporting biologically deterministic explanations is weaker methodologically than scientific standards require may, then, provide a window into the values that influence the construction of these scientific claims.

To accomplish this, one might “work backward”—utilizing the standards of science to uncover methodological weaknesses, then interpreting the assumptions and

values held by the researcher from which such methodological oversights might follow logically. Stein (1999) demonstrates this approach when he writes:

My goal ... is not simply to criticize scientific research on sexual orientation; rather, it is to tease out and evaluate its unquestioned assumptions. Evaluating its assumptions is a precondition for strengthening the foundations of this research program, although my critical examination does not guarantee that the research program will in fact be strengthened. It might instead lead to the conclusion that scientific research on how humans develop their sexual desires can progress only if it is dramatically reconceptualized. (190)

In addition one can uncover the assumptions of the dominant explanatory paradigm within the scientific community of the publication of flawed research, by interpreting the “blind spots” that facilitated such publication (Byne 1995):

The peer review process ... allows seriously flawed studies to be published in prominent interdisciplinary journals if and when they support the biologically deterministic paradigm. On the contrary, studies that challenge this paradigm, even if methodologically superior, may not receive a ready welcome. They may either be relegated to relative obscurity in specialty journals or fail to be published at all. (330)

Thus, this type of methodological critique should not be considered merely to be upholding traditional standards of scientific methodology in an uncritical manner. Such a position has been criticized, and rightly so, as failing to challenge the cognitive authority of traditional science or of its claim to objectivity and value-freedom (see Laslett et al. 1996; Lennon 1998; Longino 1990). Rather, methodological critiques challenge the validity of certain scientific claims while not necessarily confirming the “truth” of others, a necessary step to enter into debate with scientific communities over the validity of their predominating explanatory frameworks (Fausto-Sterling 1992a; Spanier 1995a). In addition, the critiques help expose the presence of assumptions and values as the origin of

the methodological limitations and help in the interpretation of what these assumptions and values are.

In other words, as suggested by feminist standpoint epistemologies, the social locations from which the scientific study of biological origins of lesbian and bisexual orientations in women is produced influence not only the values and assumptions that inform the research, but also the scientists' ability (and that of their peers) to recognize the cultural influences. Pointing out methodological flaws is an empirical means to demonstrate the influence of standpoint on the knowledge produced. Thus, the critiques are not conducted to suggest that the science would be inherently better if values were removed from the research process, or that they can even be so removed (Harding 1991; Keller 1992; Longino 1990). Rather, they demonstrate how values that inform research affect the decisions made by researchers about the conduct of the study, what counts as evidence, and how to interpret the findings. Ultimately, feminist science scholars assert, awareness of these issues should be a part of the scientific process itself: "If we are successful in changing science sufficiently as a consequence of liberatory transformations, one day 'traditional science' may well include—no, require—the tools and insights of feminist critique and experience" (Spanier 1995a).

I will examine three aspects of my sample of research articles: 1) the explanatory framework; 2) the selection, categorization, and composition of the study sample; and 3) the interpretations of the data and conclusions drawn. While the analytic procedures are informed by several previous critical analyses of scientific methodologies, the overall structuring of the analysis owes much to the work of Bonnie Spanier (1995a), in which she articulates the aspects of scientific research that should be analyzed:

To analyze validity, we can examine and critique a number of points in the construction of any scientific claim: the explanatory framework and premises upon which it is based, the methods and design of the study, the presentation and manipulation of data and conclusions drawn, and the interpretations of data and conclusions. (59)

Spanier's clear explanation of the importance of each of these elements, suggestions regarding problems that can be encountered in them, and examples provided by conducting a critique utilizing this framework have all been exceptionally informative in guiding this methodological critique.

The first section of the methodological analysis, the critique of the explanatory framework, focuses on evaluating the articles for whether they approach the topic of biological origins of lesbian and bisexual orientations in women through a framework that asserts these orientations to be the result of biological masculinization. Labeled here the "masculinization hypothesis," this explanatory framework, I argue, points not only to the potential for certain types of conceptual and empirical limitations, but also to assumptions and beliefs of researchers regarding relationships among sex, gender, and sexuality. Also, I argue that the degree to which this explanatory framework can be revealed to underlie the current body of scientific work on origins of sexual orientations suggests the dominance of a paradigm of thought that is inherently biased toward reproducing hegemonic ideologies of sex, gender, and sexuality.

The second section of the methodological critique analyzes the sampling procedures and study samples used in the ten scientific articles. This section is divided into three parts, all analyzing different aspects of the research samples. First, an evaluation of the means by which the authors recruited their subjects for the study. Flawed recruiting methods can lead to a subject group that is not representative of the

larger population from which it was drawn, placing serious limitations on the validity of results and limiting the ability of the authors to generalize legitimately their research findings to groups beyond their own subjects. The second element of the critique of the sampling methods analyzes the ways in which the authors assign sexual orientations to their subjects. Because sexual orientation is the primary distinguishing characteristic of the sample groups for the purposes of the experimental design, problems found in these procedures have great significance for the validity of any results obtained. The third part of the critique of the sampling procedures consists of an examination of the composition of the samples. In particular the diversity of the samples in terms of social identity characteristics that may bear upon the main characteristic of sexual orientation are examined. I argue that failure to acknowledge socially-influenced differences in the understanding and expression of sexual orientation may make the study sample unrepresentative of larger populations of lesbian and bisexual women.

In the third and final section of the methodological analysis, the interpretations of data and conclusions drawn from them are subjected to critique. This section is divided into two parts. The first part focuses on whether the researchers acknowledge the limitations of their sample when interpreting their data and drawing conclusions. It is understood that most samples will have limitations in some form, but these limitations must be recognized and findings interpreted accordingly, particularly regarding the applicability of results to larger populations. I examine whether such considerations are present in each article. The second part examines the interpretations and conclusions for forms of inconsistency with data and “misleading” statements (Spanier 1995b) in reporting of findings, in which interpretations and conclusions are drawn in ways that are

not as well supported (either by the study's own data or by previous studies) as the researchers suggest is the case. The types of inconsistencies and misleading statements analyzed are informed both by previous analyses conducted by feminist science scholars critiquing studies of sex differences or sexual orientation and by issues noted upon initial readings of these sections. Awareness of inconsistencies and misleading statements in research interpretations and conclusions is of great importance to evaluating the validity of not only claims made by individual research studies but of dominant scientific explanatory paradigms as well.

Each of these three aspects of the methodological critique is discussed in detail in its respective section of this chapter. Each section and subsection consists of an introduction to the relevant issues, an explanation of the methodology used in the analysis, description of research results, and discussion of the significance of the findings for evaluating research claims, as well as of the implications of the findings for understanding the assumptions and beliefs that underlie the scientific search for biological origins of lesbian and bisexual orientations in women. In addition, Table 1 provides some basic information on the research topic of each article, the methods used, and research conclusions. Information is provided on all articles reporting scientific research on biological origins of lesbian and bisexual orientations in women from 1990-2000 (including the full sample gathered initially and the subsample selected for analysis) for comparison purposes.

**Table 1. Information on scientific articles reporting research on biological origins of lesbian and bisexual orientations in women from 1990-2000.**

<b>Article</b>	<b>Primary issue examined *</b>	<b>Methods*</b>	<b>Conclusions *</b>
<b>Articles 1-10: Sample analyzed in the current study</b>			
<b>1. King M, McDonald E 1992.</b>	<b>Rate of homosexuality in twins of homosexuals</b>	<b>Questionnaire</b>	<b>"the discordance for sexual orientation ... confirms that genetic factors are insufficient explanation of the development of sexual orientation" (409)</b>
<b>2. Bailey JM, Pillard RC, Neale MC, Agyei Y 1993.</b>	<b>Rates of homosexuality in twins and adoptive sisters of lesbians and bisexual women</b>	<b>Interviews of probands, questionnaires sent to sisters of consenting probands</b>	<b>"genetic factors may play a role in the origin of female sexual orientation" (221)</b>
<b>3. Pattatucci AML, Hamer DH 1995.</b>	<b>Rates of homosexuality in family members of lesbians, bisexuals, and heterosexuals</b>	<b>Interviews</b>	<b>"clear evidence of a familial component to female sexual orientation was obtained in our sample" (417)</b>
<b>4. Gladue BA, Beatty WW, Larson J, Staton RD 1990.</b>	<b>Abilities of homosexual and heterosexual men and women on spatial tasks</b>	<b>Interview and administration of tests of spatial and other cognitive abilities</b>	<b>"homosexual women are either no different from their heterosexual counterparts, or are even more 'female-like' in their spatial abilities. (106)</b>
<b>5. Wegcsin DJ 1998.</b>	<b>Verbal and spatial ability in homosexual and heterosexual men and women</b>	<b>Verbal ability and spatial ability tests administered</b>	<b>"The majority of measures, including those of spatial perception and verbal ability, indicated that lesbians performed more like HT women than HT men" (104)</b>
<b>6. McCormick CM, Witelson SF, Kingstone E 1990.</b>	<b>Incidence of left-handedness in homosexuals compared to general population</b>	<b>12-item hand preference questionnaire administered</b>	<b>"homosexuals showed a higher prevalence of left-hand preference than did the normative sample" (72)</b>
<b>7. Holtzen DW 1994.</b>	<b>Handedness distribution in homosexuals and bisexuals compared to heterosexuals</b>	<b>5-category self-assessment handedness questionnaire administered</b>	<b>"the non-heterosexuals in this study demonstrated a significantly higher incidence of non-exclusive right handedness compared to their heterosexually-oriented counterparts" (709)</b>

Table 1 (continued)

Article	Primary issue examined *	Methods*	Conclusions *
8. Hall JA, Kimura D 1995.	Abilities of homosexual and heterosexual men and women on motor tasks	Two tests of motor-task abilities administered	"evidence suggesting that lesbians may have a more male-typical ability for a spaciomotor task, ... not at the expense of female-typical superiority on another fine-motor task." (404)
9. Bogaert AF 1998.	Height, weight, and onset of puberty in lesbians compared to heterosexual women	Kinsey data analyzed	"lesbians were found to report being heavier and taller than comparable heterosexual women. No difference in onset of puberty was observed" (118)
10. McFadden D, Pasanen EG 1999.	SOAE patterns of homosexual, bisexual, and heterosexual men and women	SOAE data collected: number, strength, and proportion of each group exhibiting SOAEs.	"the SOAEs of homosexual and bisexual females were both less numerous and weaker than those of heterosexual females. <i>On all the SOAE measures, the homosexual and bisexual females were intermediate to heterosexual females and heterosexual males</i> " (2411)
Articles 11-30: Not selected for analysis in this study			
11. Bailey JM, Bell AP. 1993.	Rates of homosexuality in siblings of homosexuals and heterosexuals	Interviews	"Homosexual males and females had an excess of homosexual same-sex siblings compared to same-sex heterosexuals. Thus, homosexuality appears to be familial" (318)
12. Bailey JM, Benishay DS. 1993.	Rates of homosexuality in siblings of lesbians and heterosexuals	Interviews, questionnaire sent to sibling	"Female homosexuality appears to run in families" (277)
13. Whitam FL, Diamond M, Martin J 1993.	Rate of homosexuality in twins of homosexuals	Interview and/or questionnaires of twin pairs	"rates of concordance for MZ twins are sufficiently high as to suggest a strong biological basis for sexual orientation. The rate of concordance for both MZ and DZ twins is considerably higher than might be expected by chance" (202)
14. Hu S, Pattatucci AML, Patterson C, et al. 1995.	Correlation of Xq28 with sexual orientation	Lesbian sib-pairs and heterosexual sisters tested with DNA linkage studies	"it appears that the Xq28 locus does not have a major role in individual variations in female sexual orientation" (253)



Table 1 (continued)

Article	Primary issue examined *	Methods*	Conclusions *
15. Hershberger SL 1997.	Genetic influences on sexual orientation in twins	Questionnaire sent to sample of Minnesota Twin Registry	"Phenotypes relevant to sexual orientation are significantly influenced by genetic effects. Specifically, significant genetic effects were found for self-identified female homosexuality" (221)
16. Bailey JM, Dunne MP, Martin NG 2000.	Genetic influences on sexual orientation and related traits in twins	Questionnaire sent to sample of Australian Twin Register	"we found consistent evidence that familial factors influence sexual orientation and two related traits, childhood gender nonconformity and continuous gender identity" (533)
17. Tuttle GE, Pillard R 1991.	Cognitive abilities of homosexual and heterosexual men and women	Tests of cognitive abilities and "femininity scale" administered to sample of heterosexual and homosexual men and women	"Both HS men and women were gender-atypical relative to matched HT controls" (314); "The cognitive results generally do not support the hypothesis of underlying gender-atypical patterns in either HS women or men" (315)
18. McCormick CM, Witelson SF 1994.	Patterns of functional cerebral asymmetry in heterosexual and homosexual men and women	Hand preference and linguistic dichotic listening test administered	"results suggest that there is less association between the two components of functional cerebral asymmetry – language and praxis – in gay than in heterosexual people" (528)
19. Gladue BA, Bailey JM 1995.	Relationships among handedness, spatial ability, and sexual orientation in heterosexual and homosexual men and women	Intelligence tests, spatial abilities tests, and handedness questionnaire administered	"the present study found no significant relations between sexual orientation and spatial ability" or handedness (494-495)
20. Wegesin DJ 1998.	Event-related brain potentials (ERPs) in heterosexual and homosexual men and women	ERPs were recorded as participants were administered mental rotation and lexical-decision/semantic monitoring tasks	"Results for the lesbians did not provide support for the hypothesis that homosexuals differentiate in the direction of their opposite-sex counterparts, as their ERPs did not differ significantly from those of HT women" (86)
21. Neave N, Menaged M, Weightman DR 1999.	Relationships among levels of salivary free testosterone (T), cognitive performance, and sexual orientation in heterosexual and homosexual males and females	Mental rotation and verbal ability tasks were administered. T concentrations determined from the saliva samples	"the homosexual females demonstrated a female-typical pattern of performance, in each of the tasks their performance did not differ significantly from that of heterosexual females" (257); "the HmF group tended to have higher T levels than the HtF group [but not enough] to significantly influence their cognitive performance" (259)
22. Dörner G, Poppe I, Stahl F, <i>et al.</i> 1991.	Relationship between 21-hydroxylase deficiency and homosexuality in men and women	ACTH stimulated, 21-DOF/F measured	"21-hydroxylase deficiency appears to represent a genetic predisposition to female homosexuality in heterozygous form" (144)

Table 1 (continued)

Article	Primary issue examined *	Methods*	Conclusions *
23. Gladue BA 1991.	Relationships among aggressive behavioral characteristics, hormone levels and sexual orientation in heterosexual and homosexual men and women	"Aggression Inventory" administered, blood samples drawn and hormones were assayed to test for levels of testosterone and estradiol	"Among women in the present study, heterosexuals were similar to homosexuals on all measures of aggression but one, in which lesbians reported <i>less</i> physical aggression" (324,emph. in orig.)
24. Dörner G, Lindner R, Poppe I, <i>et al.</i> 1995.	Relationship between partial 21-hydroxylase deficiency (21-OHD) and homosexuality in men and women as well as genetic correlation to partial 21-OHD	ACTH stimulated, 21 DOF/F ratios measured, molecular studies of the 21-hydroxylase genes performed	"homozygous or compound heterozygous mutations of CYP21A can lead to partial 21-OHD and appear to represent a biological basis for homosexuality" (329)
25. Gladue BA, Bailey JM 1995.	Relationships among aggressiveness, competitiveness, and sexual orientation in heterosexual and homosexual men and women	Portions of aggressiveness questionnaires and "Interpersonal Competitiveness" subscale administered	"There was no significant difference between homosexual and heterosexual women on any aggressiveness measure" (482)
26. Bogaert, AF 1997.	Birth order in lesbians compared to heterosexual women	Kinsey data analyzed	"results suggest that birth order does not affect women's sexual orientation" (1396)
27. Blanchard R, Zucker KJ, Siegelman M, <i>et al.</i> 1998.	Birth order and siblings' gender distribution patterns in heterosexual and homosexual men and women	Questionnaire	"homosexual women did not differ from heterosexual women with regard to any class of sibling" (517)
28. McFadden D, Pasanen EG. 1998.	CEOAE waveforms in heterosexual and homosexual men and women	CEOAE waveform data collected	"it seems that CEOAE magnitude is related to sexual orientation in females" (2711)
29. Tenhula WN, Bailey JM 1998.	Pubertal onset in lesbians compared to heterosexual women	Questionnaire	"there was no significant difference in the overall timing of puberty between lesbians and heterosexual women in either discordant twin pairs or in non-twin participants" (379)
30. Williams TJ, Pepitone ME, Christensen SE, <i>et al.</i> 2000.	Finger-length ratios in heterosexual and homosexual men and women	Questionnaire, finger-length ratios recorded	"The right hand 2D:4D ratio of homosexual women was significantly more masculine (that is, smaller) than that of heterosexual women, and did not differ significantly from that of heterosexual men" (455)

Table 1 (continued)

Article	Primary issue examined *	Methods*	Conclusions *
<b>Articles 31-35: Excluded from selection of sample to be analyzed</b>			
31. Dittmann RW, Kappes ME, Kappes MH 1992.	Psychosexual development of female CAH patients compared to control sisters	Interviews of female CAH patients and sisters	"results corroborate earlier findings of a delay in psychosexual development for CAH females and a higher rate of homosexual/bisexual orientation" (162)
32. Slijper FME, van der Kamp HJ, Brandenburg H, <i>et al.</i> 1992.	Psychosexual development of female CAH patients	Physical and gynecological examinations, interviews.	"we could not find a homo- or bisexual orientation in our patients" (205)
33. Berenbaum SA, Snyder E 1995.	Playmate and activity preferences in male and female CAH patients and controls; implications for sexual orientation	Assessment of sex-typed activities and interests, as well as sex of child's playmate preference	"These results suggest that two early-childhood sex-typed behaviors – activity preferences and playmate preferences – related to sexual orientation have different etiologies and are minimally related to each other" (38); "results suggest a complex relationship among hormones, childhood sex-typed behavior, and sexual orientation" (40).
34. Meyer-Bahlburg HFL, Ehrhardt AA, Rosen LR, <i>et al.</i> 1995	Sexual orientation in prenatally DES-exposed women compared to controls	"psychiatric and psychologic interviews, questionnaires, and psychometric tests" (15)	"women with a history of prenatal DES exposure showed higher Kinsey scores than nonexposed women" (17)
35. Zucker KJ, Bradley SJ, Oliver G, <i>et al.</i> 1996.	Psychosexual development of female CAH patients compared to control relatives	"Psychosocial and medical assessment" (gynecological examination, interview, questionnaire) (305-306)	"the CAH probands had lower rates of exclusively heterosexual fantasies..., and lower amounts of sexual experiences with men... There were, however, no significant proband-control differences ... for sexual experiences with women" (313)

\*includes only those relevant to study of origins of lesbian/bisexual identity in women.

## Part II: Critique of the Explanatory Framework

This methodological critique begins by examining the explanatory framework.

The explanatory framework refers to the ways in which the topic of research is conceptualized and what theories, assumptions, and prior research inform the research hypotheses (Spanier 1995a). It is revealed in several ways, including the ways in which the research questions are asked, by the stated hypotheses or expectations, and by the empirical evidence cited. The explanatory framework is of great importance because, like the framework of a structure, everything that follows is built upon it. Thus if it is biased against certain groups, or based on faulty logic or invalid empirical precedents, the study itself may be apparently methodologically sound, yet data obtained may still be inaccurate or conclusions invalid.

Spanier (1995a) explains:

When the *premises* on which a study is based are faulty or highly questionable, the question being asked in the study is flawed. This occurs, more broadly, when the paradigm within which the study is conducted—the *explanatory framework* that guides the original question and the approach taken to answer it—is defective or questionable. In this case, measurements may be correct but whole conclusions may be questioned or deemed invalid. The framework or paradigm of an area of science can also influence the results obtained, as Stephen Jay Gould has shown in remeasuring the size of skulls studied by an eminent scientist in the nineteenth century. (59)

The researchers' explanatory framework derives in part from their assumptions about the issue being studied. A researcher's assumptions frame the research study at every level, including whether the topic is considered of value to study in the first place. For example, if my assumptions included that the natural sciences are free of social influences, this current project would be not only nonsensical, it would be literally inconceivable. Certain sets of assumptions lead logically to particular explanatory

schemes that would not follow from other assumptions. Similarly, assumptions and the explanatory schemes that they inform lead to certain kinds questions asked about the topic of research, and logically consequent possible answers. Thus a researcher's theoretical framework is like a lens through which she or he views the research topic, which filters what is asked, answered, and how the answers are interpreted.

### The "Masculinization Hypothesis"

In the scientific study of biological origins of lesbian and bisexual orientations in women, I assert that historically, one explanatory framework has guided much of the research—that which sees lesbian and bisexual women as being somehow “masculinized” (Gibson 1997, 1998; Magee and Miller 1998; Terry 1990, 1999). I am referring to this explanatory framework as the “masculinization hypothesis.” This framework rests on certain assumptions about inherent connections among sex, gender, and sexual orientation, notably that sexual desire for women is an essentially masculine (and/or male) trait. From this explanatory framework follows research programs intent on locating signs of “masculinity” (or maleness) in lesbian and bisexual women. As explained in the quote from Spanier (1995a) above, even if the actual data-gathering methods are sound, the assumptions in the explanatory framework in these historical studies make any findings “suspect” (see also Laslett et al. 1996). This is because the “lens” of the presumption of masculinization excluded other possible explanations for any differences found (Terry 1990).

The idea that same-sex desire in men or women is a characteristic of the “opposite sex,” and that homosexual people must therefore be incorrectly sexed or gendered, has

been critiqued by many scholars. Stein, for example, describes this explanatory framework as the “inversion assumption” (1999:191). He writes:

Relatedly, I look at implicit and undefended assumptions that studies in the emerging research program make about sexual orientation. ... I argue that many of the studies accept without argument a quite particular picture of sexual orientation; such a picture may skew the results of such studies. For example, many studies in the emerging research program unquestioningly accept the inversion assumption, according to which lesbians and gay men are seen as sex-gender inverts. Although this is a culturally salient assumption, it is scientifically unsupported. As this assumption infiltrates much of the emerging research program, a crucial premise of the program remains unjustified. (191)

Stein questions the scientific basis for the inversion assumption, while also noting its “cultural salience;” that is, that there may be culturally-specific reasons the inversion assumption may appear to have merit. In other words, if gay men and lesbian women appear to have traits of the “opposite sex,” that is because of factors in our culture and not because of anything essential in them.

Similarly, Byne (1995) refers to the same explanatory framework as being based on the “intersex assumption” (306). He challenges the scientific basis for the differences between heterosexual men and women that must exist for this framework to make sense, and notes the following:

This assumption also equates the androphilia (attraction to men) of homosexual men with the androphilia of heterosexual women, and, conversely, the gynephilia (attraction to women) of homosexual women with that of heterosexual men. However, to this author’s knowledge, no research has even addressed, let alone validated, these equations. (1995:306)

Thus the empirical basis for the inversion or intersex assumption is questioned on several levels. In addition, like Stein, Byne notes the “culture-bound” nature of the equation of same-sex desire with characteristics of the “wrong” sex and/or gender (306). De Cecco

and Parker (1995) also discuss the “woeful ignorance of historical and cultural studies that have discovered various alignments of gender roles of homosexuality” in what they call the “cross-sex assumption” (14). In other words, all of these scholars assert that explanatory frameworks based on the inversion/intersex/cross-sex assumption are ethnocentric and ahistorical with regard to sex, gender, and sexuality.

Stein asserts that “[t]he inversion assumption is present to a greater or lesser degree in most biological research on sexual orientation from the late nineteenth century to the present” (1999:203). Thus while it can be said that the explanatory framework based on the “intersex,” “inversion,” or “cross-sex” assumption—here the masculinization hypothesis—has guided much of the historical research on origins of lesbian and bisexual orientations in women, it is based on problematic associations among sex, gender, and sexual orientation. In addition, its empirical basis in scientific data has been challenged, as has its apparent failure to consider differences across time and culture. Critiques of explanatory frameworks for lesbian and bisexual orientations that rely on assumptions of biological masculinization suggest that these frameworks are biased with regard to culturally-specific, hegemonic ideals of gender and sexual orientation following in a particular way from sex.

Informed by these critiques, I assert that the presence of the masculinization hypothesis as the explanatory framework for scientific studies of biological origins of lesbian and bisexual orientations in women makes the research inherently biased and limited with respect to what it can see and explain. In this section of the analysis, I examine the articles in my sample of 10 articles on biological origins of lesbian and bisexual orientations in women to determine whether their explanatory frameworks are

based on the masculinization hypothesis. My goal is to determine whether the masculinization hypothesis in fact underlies the current body of research on lesbian and bisexual orientations in women. How this question is to be answered is discussed next.

### Method

This analysis seeks to identify the presence of the masculinization hypothesis in the explanatory frameworks of the research articles. Following the work of Byne (1995) and Spanier (1995a, 1995b), I assert that the explanatory framework is most visible in the introductory section of the articles, and more specifically, in the statements of research questions, hypotheses to be tested, goals, or expectations of the study. For example, Byne (1995) states the following:

The social, cultural, and historical contexts within which scientists work impose more than methodological constraints on their studies. They also impose conceptual constraints—influencing the research questions that scientists find salient as well as the hypotheses that they generate and find worthy of consideration or dismiss. These conceptual constraints also act as blinders that prevent plausible alternative hypotheses from even being formulated, much less tested. (305-306)

The examination of the introductory section of each article for the presence of the masculinization hypothesis begins by identifying the stated research questions or hypotheses, or, where not overtly stated, the stated goals or expectations of the study. The statements are then analyzed for the presence of certain words, phrases, and concepts that are associated with the assumption of masculinization. The decision of which words and phrases to look for is informed by analyses conducted by other scholars on scientific studies of biological origins of lesbian and bisexual orientations (including Byne 1995; Gibson 1997, 1998; Magee and Miller 1998; Terry 1990, 1999).



Evidence for the presence of the masculinization hypothesis includes references to: “masculine,” “masculinizing,” “testosterone,” or “hormones” in a masculinizing context, “intermediate” or “in between” (specifically in reference to males and females or heterosexual men and women); “sexually dimorphic” or “sex differences;” or a comparison made of lesbian or bisexual women to heterosexual or homosexual men on some measure. I assert that the use of these concepts in the stated research questions and hypotheses reflects that the explanatory framework depends upon the assumption that same-sex desire in women is an essentially “masculine” (male) trait. If this were not the case, there would be no logic to studying the potential “masculinization” of lesbian and bisexual women. The reliance on frameworks of “sex differences” and comparisons of lesbian and bisexual women to men demonstrates the expectation of a correlation between maleness and sexual desire for women (Spanier 1995b; Terry 1990).

The statements from the introduction that contain the research questions, hypotheses to be tested, goals, or expectations are selected out for analysis and included below. References to masculinization, where present, are underlined. They are discussed separately according to the groupings discussed in Chapter 3, in which the sample was divided into three subgroups reflecting different research emphases: the Genetic group, the Brain/Cognition group, and the Neuroendocrine group. Each article is referred to according to the number assigned to it for this project; full citation information for each article is located in the Appendix. The discussion is divided according to these subgroups in order to discern any differences in explanatory framework that may occur as a result of different research emphases.

## Results

### Genetic group: Articles 1, 2, and 3

#### Article 1:

As studies have generally failed to support heredity as a complete explanation of sexual orientation, it has been argued that genetic factors may predispose individuals to environmental influences leading to a homosexual orientation, or that intense identification or other factors related to twinship might explain higher concordance rates ... Our aim was to examine concordance for sexuality and the extent of shared knowledge and physical attraction between twin pairs in which at least one member is homosexual. (408)

#### Article 2:

The study reported herein has two broad goals: first, to determine if there is a genetic contribution to female sexual orientation, and second, to investigate the behavioral expression of this contribution. ... We predicted that the rate of homosexuality would be higher for MZ than for DZ cotwins, and would be lowest for adoptive sisters of homosexual probands. (217)

#### Article 3:

As a first step in addressing the possible role of inheritance in sexual orientation in females, we conducted a familial and developmental analysis of 358 female probands. Our goal was to ascertain the degree of familial clustering of homosexual and/or bisexual orientations and to determine if discernable patterns of transmission could be identified. Additionally, we investigated possible developmental differences among heterosexual, bisexual, and lesbian probands with the aim of identifying potential markers for genetic loading. (409)

### Discussion of the Genetic group

None of the selected words, phrases, or concepts related to the masculinization hypothesis is present in these articles. The research questions, hypotheses, goals, and expectations as stated in the introductory sections of these articles do not obviously rely on comparisons of lesbian and bisexual women to men in any way. Rather, the explanatory frameworks of these articles focus on the possibility of locating clustering of same-sex orientation in families. Such hypotheses are not dependent upon the assumption of masculinization.

### Brain/Cognition group: Articles 4 and 5

#### Article 4:

Since women exposed prenatally to “masculinizing” hormones are more likely to report lesbian or bisexual orientation in adulthood (Ehrhardt et al., 1985; Money, 1987) and a somewhat masculine pattern of cerebral lateralization (Hines & Shipley, 1984), we expected that homosexual women would outperform heterosexual women on spatial tasks. More generally, however, we explored the possibility that there might be a difference in spatial ability between heterosexual and homosexual women comparable to the apparent difference in spatial ability that is reported to exist between heterosexual and homosexual men. (102)

Article 5: It was hypothesized that HT [heterosexual] men would obtain the highest scores on tests of spatial ability. HT women and gay men were expected to outperform the HT men on the lexical-decision task. Finally, based on psychosexual differentiation theory, lesbians were predicted to produce more male-typical spatial and verbal scores – though this prediction is at odds with the limited experimental data available on lesbians’ performance. (94)

### Discussion of Brain/Cognition group

Both articles on brain-function and cognition studies contain references to masculinization in the statements from their introductory sections. Specifically, as support for the stated expectations of the data, Article 4 refers to evidence of “‘masculinizing’ hormones” as a factor in the development of “lesbian or bisexual orientation,” a label that associates a sex and gender with “hormones” despite the fact that hormones are not inherently sexed nor gendered (Fausto-Sterling 2000; Spanier 1995b; van den Wijngaard 1997). In this example, by gendering hormones the subsequent atypical behavior—lesbian or bisexual orientation—is made to appear inherently gendered as well.

The “masculine pattern of cerebral lateralization” refers to both a reported outcome of exposure “prenatally to ‘masculinizing hormones’” and, indirectly, to the expectation for the spatial performance of the lesbian women in the study being reported. Thus there is an assumed, circumstantial link between the exposure to “masculinizing

hormones,” lesbian or bisexual orientation, and “masculine” spatial ability (which is being associated with cerebral lateralization). As this link forms the premise of the study, any differences found can only be interpreted within the framework of “masculinization.” Article 6 achieves a similar linkage by labeling a certain range of spatial ability as “male-typical,” and predicting lesbians will score in that range. In both cases, it is clear that the explanatory framework is reliant upon the assumption of sexual desire for women as being “masculine.”

#### Neuroendocrine group: Articles 6-10

##### Article 6:

We predicted that (1) homosexual women would show a greater prevalence of left-hand preference than the general population, the proposed mechanism being exposure to higher-than-normal levels of prenatal masculinizing hormones, and (2) homosexual men also would show a greater prevalence of left-hand preference, the proposed mechanism being exposure to lower-than-normal levels of prenatal masculinizing hormones. (71)

##### Article 7:

Geschwind and Galaburda (1985b) have indicated that the study of handedness in homosexuals is worthwhile, since intrauterine testosterone may play a role in both sexuality and handedness. ...The focus of the present study is to test Geschwind and Galaburda's hypothesis (1985a,1985b) that both sexual orientation and handedness may share a common hormonal substrate by (a) comparing the handedness distribution between heterosexuals and non-heterosexuals and (b) examining whether sexual orientation predicts handedness. (702-703)

##### Article 8:

The present study is novel insofar as it employs motor tasks that reliably demonstrate sex differences in opposite directions... To the degree that physical and experiential differences can be ruled out as the major sources of variation in motor performance, such variation may yield information about the development of biological mechanisms which mediate human motor performance and may also help elucidate any biological component to sexual orientation. (397)

##### Article 9:

In men and women in the general population, some of the largest somatic sex differences occur for certain basic physical development variables, such as height, weight, and onset of puberty, with men, on average, being taller, heavier (even for their height), and older at the onset of puberty than women (Underwood & and

Van Wyk, 1992). Thus, evidence that gay men and lesbians score in the direction shifted toward the pattern of the opposite sex on height, weight, and onset of puberty may provide additional support for the biological approach to sexual orientation development. Research has supported such patterns in gay men (e.g. Blanchard & Bogaert, 1996; Bogaert & Blanchard 1996), but less research exists on these variables in lesbians. This is the focus of the present paper. (115)

**Article 10:**

We recently reported that CEOAEs [click-evoked otoacoustic emissions] are weaker in homosexual and bisexual females than in heterosexual females (McFadden and Pasanen, 1998). That is, the strength of the CEOAEs in nonheterosexual females was intermediate to that in heterosexual females and heterosexual males. ... Here we report that the SOAEs [spontaneous otoacoustic emissions] of those same basic pattern as did their CEOAEs. ... This additional evidence of functional differences in the cochleas of nonheterosexual females bolsters the interpretation that their peripheral auditory systems have been masculinized, possibly at the same stage of development when whatever brain structures are responsible for sexual orientation also were masculinized." (2403-2404)

**Discussion of the Neuroendocrine group**

The Neuroendocrine group is composed of articles that hypothesize relationships between prenatal hormone effects and lesbian or bisexual orientations in women. Thus it is almost (though not necessarily) by definition that they utilize the masculinization hypothesis. This is not to say, however, that they cannot, or should not, be examined and critiqued for the biases inherent to this explanatory framework and the limitations it places on lines of inquiry and interpretation.

In fact, it is the case that all the articles in the Neuroendocrine group contain references to masculinization, directly or indirectly, in their introductory sections. Article 6 proposes overexposure to "masculinizing hormones" as the cause for the predicted result, which is that lesbian women would demonstrate a higher prevalence of left-hand preference than the general population. It is the presumption of a link between androgens and increased left-handedness that provides the basis for this expectation, thus any

findings of a higher than usual prevalence of left-handedness in the lesbian sample can only be interpreted as tentative proof of their masculinization. Article 7 contains essentially the exact same proposition, both based on the masculinization hypothesis.

In Article 8, the reference to the assumption of masculinization is subtler but still present. By examining “motor tasks that reliably demonstrate sex differences in opposite directions” to test for differences in the sample groups (of lesbian and heterosexual women), the implicit hypothesis is that differences between “the sexes” (women and men of unstated sexual orientation) will provide a framework by which to evaluate any differences seen between lesbian and heterosexual women. In other words, the anticipated difference between lesbian and heterosexual women is hypothesized to be similar to (an explainable by) the difference (known or thought to exist) between men and women in general. Thus lesbian women are thought to be “masculinized,” or like men.

Article 9 makes use of the same “sex differences” framework as Article 8, but goes on to explain more specifically what is meant. In this article, the features of “height, weight, and onset of puberty” have been assigned a male-typical pattern and a female-typical pattern. Lesbian women are hypothesized to score more closely to the male pattern than do the heterosexual women. By relying on presumed sexually dimorphic characteristics to explain anticipated differences between lesbian and heterosexual women, the explanatory framework is thoroughly reliant on the assumption of lesbian women as being biologically more “male” than heterosexual women.

Last, Article 10 (which does not state its expectations in the introduction, but rather a brief description of findings), reports obtaining a pattern of otoacoustic emissions results from lesbian and bisexual women that was “intermediate to that in heterosexual

females and heterosexual males.” As discussed previously, it is the comparison of data from lesbian and bisexual women to that from heterosexual men that demonstrates the explanatory framework based on the masculinization hypothesis. In this article, the framework is directly explained, as the authors claim their results of masculinized auditory systems (inferred from otoacoustic emissions data) provide support for the hypothesis that “brain structures” have been masculinized in lesbian and bisexual women. As with the other articles, the assumption of masculinization provides the avenues of research inquiry and interpretation as being lesbian and bisexual women’s assumed atypical level of “maleness.”

### Discussion

In general, analysis of explanatory frameworks is done for one or both of two slightly different goals: to identify those based on faulty or inaccurate premises or assumptions, as discussed by Spanier (1995a), and to identify those not obviously flawed but infused with hegemonic biases that lead to conceptual limitations, as discussed by Byne (1995). In a sense, these two goals reflect the difference between critiquing “bad science” and “science as usual,” which, as discussed by Longino (1989), is not as clear a distinction as one might think on the surface. Relatedly, according to Spanier (1995b):

While “bad” science (inaccurate or incomplete data; outright fraud) can be more clearly distinguished from “good” science at the level of construction of studies (such as choice of controls and sample size), the framing of research questions within a paradigm will be judged “good” or “bad” depending on factors other than those which most scientists would find scientifically sound. Thus, the field of sex[-]differences research is “science as usual.” But I would label it “bad” science (within accepted notions of scientific method) in its narrow assumptions about the causes of observed differences... However, researchers within the field believe they are adhering to scientific norms. (47)

Thus, the current critique focuses on the “science as usual” aspect of the explanatory frameworks, rather than attempting to identify the cases in which their premises are clearly faulty, asserting that a focus narrowed by hegemonic bias creates research overly limited in its ability to construct adequate questions, methods, and interpretations. In other words, to the extent that “science as usual” allows for hegemonic bias to inform its explanatory frameworks, it is “bad science.” The “masculinization hypothesis” contains such bias, as it assumes and reproduces a dominant ideal of connections among sex, gender, and sexuality.

This analysis reveals that of the sample of 10 articles, seven (70%) utilize the masculinization hypothesis in their explanatory frameworks. The three that do not are all those that approach the subject of biological origins of lesbian and bisexual orientations in women from the field of behavioral genetics. While it cannot be said from this analysis of the research questions, hypotheses, goals or expectations stated in the introductory section of each article that these articles are completely free of any assumption of masculinization, it can be said that the basic framework they use to conceptualize the subject does not rely on the assumption of masculinization. Thus, the behavioral genetics research analyzed here is not obviously structured by this form of hegemonic bias nor are its questions, methods, and interpretations necessarily limited by it.

The seven articles that do contain the masculinization hypothesis in their explanatory frameworks depend upon the assumption of a “cross-sex,” “intersex,” or “inverted” (as described by De Cecco and Parker 1995, Byne 1995, and Stein 1999, respectively) biological origin of lesbian and bisexual orientations in women. This



assumption goes back at least as far as Krafft-Ebing's 1886 publication of *Psychopathia Sexualis* (Terry 1999). It is based on an unproblematic acceptance of the "naturalness" of heterosexual desire, seeing sexual desire for women as a distinctly male (and masculine) trait.

This belief in turn depends on the assumption of two distinct sexes that lead to two distinct genders; as stated by feminist theorist Judith Butler (1990): "The heterosexualization of desire requires and institutes the production of discrete and asymmetrical oppositions between 'feminine' and 'masculine,' where these are understood as expressive attributes of 'male' and 'female'" (17). The "heterosexualization of desire" inherent in the masculinization hypothesis serves to shore up the boundaries between males and females, men and women, and to contribute to the belief in gender attributes as naturally following from sex.

For example, to test the question of lesbian and bisexual women's masculinization, distinctions between heterosexual men and women must be established in order to have a basis for comparison. By establishing heterosexual men and women as the reference groups, it is already assumed that only heterosexual men and women are "properly" masculinized and feminized, respectively. Thus lesbians and bisexual women are compared to standards of biological "masculinity" and "femininity" from which they are already excluded. In this way do the assumptions that underlie the masculinization hypothesis create a limited view of what might constitute appropriate questions to ask and methods by which to answer them.

An explanatory framework that relies on the masculinization hypothesis also limits interpretations of data, in that any differences found can only be explained in

reference to the possible biological “maleness” (masculinization) in lesbians and bisexual women. The problem lies in the failure to acknowledge this limitation, when assertions are made regarding such differences as if they reflect some inherent reality of the subjects’ sexed or gendered status. It is only within this masculinization framework that such assertions’ truth or falsity can be judged, as results—positive or negative—can only serve to reinforce the framework from which they are produced. The necessity for researchers to situate their findings contextually in this way is precisely what is called for by some feminist epistemologists (Haraway 1991; Harding 1991, 1993).

Thus the question of whether the explanatory frameworks of the sample articles contain the masculinization hypothesis sheds light on the assumptions made by the scientific researchers regarding sex, gender, sexuality, and their presumed interconnections. The analysis reveals that the majority of the studies approach the subject of biological origins of lesbian and bisexual orientations in women from the presumption of the sexes as distinct and heterosexuality as natural. These assumptions structure what questions can be asked, the methods considered appropriate to answer them, and the interpretations that appear to represent an absolute truth about the natures of lesbian and bisexual women. Because of the types of assumptions built into the masculinization hypothesis, assertions made by the researchers from these studies can only reinforce hegemonic ideals of sex, gender, and sexuality.

### Part III: Critique of the Research Samples

#### Introduction

In this section of the methodological critique, I examine the procedures used for sampling subjects, and the research sample so constructed, in each of the 10 articles on biological origins of lesbian and bisexual orientations in women. Babbie (1995) defines sampling as “the process of selecting observations” (188). Sampling is employed when studying each and every single element<sup>1</sup> (in this case, person) that one wishes to analyze is not feasible, usually due to the unmanageably large size of the population,<sup>2</sup> often combined with the impossibility of accurately locating all of its members. Sampling is typically done not only to obtain subjects, but to obtain subjects from whom findings can be generalized to a larger group. The subjects in a study thus comprise the sample: “a special subset of a population observed for purposes of making inferences about the nature of the total population itself” (Babbie 1995:226).

If researchers wish to draw conclusions about a larger population of people from the data obtained from their study sample, they must construct a sample that is not very different from the larger population in ways that are relevant to the study. Such a sample can be called “representative” of the larger group. Babbie (1995) states that “a sample will be representative of the population from which it is selected if the aggregate characteristics of the sample closely approximate those same aggregate characteristics in the population” (192). If representativeness is not achieved, findings of the study cannot

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<sup>1</sup> Element: “that unit about which information is collected and that provides the basis of analysis” (Babbie 1995:193).

<sup>2</sup> Population: “the theoretically specified aggregation of study elements” (Babbie 1995:193).

be considered accurately generalizable to any group beyond that actually studied (Bouma and Atkinson 1995).

Because the sample studied can impact the results obtained, construction of the research sample is extremely important. Consequently, when one analyzes the meaningfulness of research results for larger populations, considering the sample and how it was constructed are of tremendous significance. Examination of the study sample is a component of many of the feminist and other critical analyses of scientific research that inform the current project (for example, Bleier 1984; Byne 1995; Doell 1995; Fausto-Sterling 1992; Spanier 1995a; Stein 1999).

In her discussion of the elements of scientific research studies that should be carefully examined when making judgments about the validity of results, Spanier (1995a) writes the following:

Research results can be similarly faulty when a study is poorly set up, with improper or too few controls, with an inadequate sample size, with a nonrepresentative or nonrandom sample. In this case, the methods and experimental design are often inadequate for scientific validity. (59-60)

As discussed previously, the importance of analyzing such methodological limitations extends beyond just pointing out examples of “bad science.” If the analysis were conducted solely for this reason, it might serve only to support the traditional ideals of science, such as objectivity and value-neutrality, by suggesting they could be achieved if the methodological flaws were eliminated (Harding 1986; Laslett et al. 1996; Longino 1990). Rather, the critique of the limitations of the samples used in research on origins of lesbian and bisexual orientations in women is also done to reveal the assumptions and values of the researchers and scientific communities regarding such orientations. As

suggested by Byne (1995), De Cecco and Parker (1995), Spanier (1995a), and Stein (1999), we can uncover such assumptions and values by examining the cases in which flawed research is conducted, accepted, and published. Doell (1995) provides an example of how examining methodological flaws can initiate such questioning, as she writes:

What then are we to make of this recent demonstration of differences in the size of one hypothalamic nucleus between homosexual and heterosexual men [in LeVay, 1991]? Surely the answer is: Not much. The study is a small one, involving only 19 homosexual and 16 heterosexual subjects, and with such a degree of variation among both groups as to suggest immediately the need for many more subjects before a real size difference could be demonstrated. This, coupled with some uncertainty as to the sexual preference of some of the subjects in the study, leaves me rather surprised both that it was published at all, at so premature a stage of the research, and that it has been so widely accepted by some of the scientific community. (349-350)

There are several different factors of importance in the construction of research samples in studies of sexual orientation. They include the process by which subjects are selected for inclusion in the study, the definitions and categorizations of sexual orientation groupings in the sample, the size of the research sample, and the composition of the sample in terms of characteristics relevant to sexual orientation (Allen 1997; McGuire 1995; Spanier 1995a; Stein 1999). Each of these aspects is examined in this research. The analysis is divided into three sections: 1) issues related to the selection of the sample; 2) issues of the categorization of subjects in the sample; and 3) issues relevant to the composition of the sample, including size. Each of the three issues is introduced with an explanation of the rationale for analysis, the analysis procedure, description of results, and interpretation and discussion.

### Recruitment of the Samples

The first aspect of the research samples to be analyzed is that of the selection, or recruitment, of subjects to participate in the studies. The recruitment process is important because it contributes greatly to determining whether and in what ways the actual study samples differ from the populations under consideration. These determinations occur at two main, inter-related stages of the recruitment process: first, defining the study population; and second, deciding how participation in the study is to be solicited. While these two issues depend upon one another to some extent, they also can each result in distinct ways in which the research sample might differ from the entire population under consideration.

The first issue to consider is the “study population,” defined by Babbie (1995) as “the aggregation of elements from which the sample is selected” (194). The study population is a different entity from the whole population under consideration when the entire population is not being sampled in a study. Very often, sampling all members of a given population is not feasible due to factors such as size and difficulty in locating all members. Study populations may be limited by characteristics that facilitate the ease of the sampling process, such as limiting to one geographical region (Babbie 1995). While it is expected that some members of the population being studied will be necessarily excluded from participation by establishing a study population, such potential exclusions must still be examined to see if meaningful characteristics are over- or under-emphasized by the nature of the study population.

Second, one must consider the methods chosen to inform members of the study population about the study and solicit their participation. This step can result in

differences between the eventual sample and not only the population as a whole, but the study population itself. For example, if the study population is limited to one geographic region and population members in that region are sought solely through newspaper advertisements, the procedure may result in over-representing those members of the study population who are literate or have higher educational levels than average. While some over- and under-representations may not affect the data obtained, the effects of the recruitment procedures must be examined when considering the generalizability of the results.

To the extent that the study population consists of people who are meaningfully different from the whole population, or that the recruiting methods themselves result in meaningful differences between those who respond and those who do not, the selection of subjects can result in limited or flawed research results. Importantly, the researchers' decisions about sampling procedures and subsequent assertions of applicability to larger populations of results obtained from their samples can reveal how the researchers conceptualize the topic of study. Examining how the researchers go about selecting subjects and generalizing findings obtained from their samples suggests what is, for example, considered important or relevant about the topic and what is not. Thus by analyzing sample selection decisions and their effects, it is possible to uncover researchers' assumptions and beliefs about the populations and characteristics being studied.

Previous analyses have demonstrated ways in which studies of sexual orientation in particular are affected by subject selection issues. The marginalized and stigmatized nature of homosexual and bisexual orientations produces problems specific to sampling

difficult-to-locate and -access populations. As a result, samples used in research on lesbian, gay, and bisexual (LGB) subjects are typically selected in a nonsystematic manner, which, while necessary, can be a source of error.

Allen (1997) notes that historical studies of gay men and lesbians tended to use “samples taken from institutionalized populations (prisons, homes for delinquents, hospitals) or from psychiatrists’ private practice” – groups likely to differ in important ways from gay men and lesbians in general (1996:256). Nowadays, LGB subjects are often recruited from the membership of LGB organizations or the readership of LGB publications. Because lists of such members or readers are typically kept private, announcements are usually placed where it is hoped they will be read.

Recruiting subjects through LGB organizations and publications could be considered a form of “purposive sampling,” which is considered appropriate “to select members of a difficult-to-reach, specialized population” (Neuman 1994:198). While allowable because it might be extremely difficult or impossible to locate sufficient numbers of subjects otherwise, it is still true that when using such a sampling technique “the researcher never knows whether the cases selected represent the population” (Neuman 1998:198).

For example, while an improvement over sampling LGB subjects from institutionalized populations, those who are reachable through organizations and publications may also have characteristics that make them different from larger populations of LGB persons. McGuire (1995) states that “homosexual subjects are often recruited through gay and lesbian publications even though the readers of such publications are not representative of the entire homosexual population” (120).



Depending upon the cultural makeup of the location of the study population and other factors, those who participate in organizations or read publications may tend toward a different race, ethnicity, or class background than those who do not.

Also, those who participate in organizations, and to a slightly lesser extent those who read LGB publications, are more likely to be “out” and active in their LGB communities than those who do not. At the very least, they are more likely to have acknowledged their same-sex feelings to themselves, and feel positive enough about them to seek out LGB communities. It cannot be known how such people may differ from those who do not take part in LGB organizations or read publications, but some importance can be inferred from the potential for difference in their feelings about and experience of their sexuality.

Behavior-genetics studies in particular tend to have additional difficulties because they often require the participation of at least one family member of the subject. Allen (256) states that “[h]uman behavior genetics has been plagued by problems of selecting representative samples of the population for genetic studies” (256). Unless the family member’s participation can be obtained without revealing the nature of the study, the subject almost certainly must be “out” about their sexual orientation to that family member. McGuire (1995) states: “In family studies, one might recruit a subject but then fail to obtain the cooperation of other family members. Family members that agree to participate might be very different from those who do not” (120).

Besides potential differences in the family members, the nature of family studies can produce a very self-selected subject group. Knowing that a family member’s participation will be necessary may be enough to deter many LGB subjects. Those who

are aware of having another LGB family member may be more likely to participate. In studies of twins, the self-selection may be even more of a factor. Twin studies have been charged with such bias in that it is thought to be “very likely that twins showing striking differences will be the most likely to refuse participation” (McGuire 1995:120).

Relatedly, the means of recruiting LGB subjects may result in significant differences between those who agree to participate and those who decline. For example, when LGB organizations and publications are used to recruit subjects, typically announcements or advertisements are posted, to which people may respond or not. Allen notes that subjects responding to recruiting advertisements “may represent a particularly outgoing or flamboyant personality type whose behavior, or perception of their own behavior, may be quite atypical of the population as a whole” (1997:256).

The announcement of recruitment of subjects for a biological study of sexual orientation may itself result in differential rates of participation between those who feel very strongly—positively or negatively—about the issue. As with readers versus nonreaders of LGB publications, those who feel strongly about the biology of sexual orientation may have put more effort into conceptualizing and understanding their own sexuality, which may result in a meaningful difference from those who have not. Clearly, it is not possible to ascertain the characteristics of those who choose not to participate, since they may never be identified.

All of these issues in sample selection may impact the applicability of results obtained for populations beyond the group actually studied, or those with the same characteristics as the sample group. Because of the importance of these issues, the selection of the research sample must be carefully evaluated in order to make a judgment

about the meaningfulness of findings. In addition to exposing potential limitations on scientific claims about origins of lesbian and bisexual orientations in women, examination of sampling limitations is done to reveal assumptions and beliefs of the researchers and scientific communities. The analysis conducted in this study is discussed next.

### Method

The analysis of the selection of subjects in the 10 articles on origins of lesbian and bisexual orientations in women is conducted following the examples of other feminist and critical analyses of sexual orientation research (Allen 1997; Byne 1995; De Cecco and Parker 1995; McGuire 1995; Spanier 1995a; Stein 1999). The examination is initiated by locating the section of each article that discusses the sample selection procedures. This description almost always occurs in the beginning of the “Method” section of scientific articles. The statements from the articles that contain this information are selected out for analysis and included below, separated according to the article groupings discussed previously (the Genetic group, the Brain/Cognition group, and the Neuroendocrine group). This division is utilized in order to organize the data more clearly, and to discern any differences in sample selection procedures across the different scientific approaches to the topic.

The description of the sampling procedure is then read closely and critically in order to answer the following question: “What are the recruiting methods, and what characteristics of lesbian and bisexual orientations in women might they tend to over- and under-represent?” Characteristics considered in this analysis are those discussed above, for example, whether potential subjects are more likely to be “out” or to have LGB

family members (Allen 1997; McGuire 1995; Spanier 1995a). Other meaningful characteristics of the samples affected by the recruiting process including race and/or ethnicity, age, social class, geographic region, and educational levels, as well as their implications, are discussed in the “Sample composition” section of this chapter.

My interpretations from the information in the articles of the answers to these questions are presented in the “Discussion” sections for each article grouping (the Genetic group, the Brain/Cognition group, and the Neuroendocrine group). Informed by the theoretical framework of feminist standpoint epistemologies as well as findings from previous critiques, I discuss potential limitations incurred by the sample recruiting procedures and how they might influence findings. Finally, to conclude this section of the chapter I discuss the assumptions upon which the recruiting procedures depend and their significance for the research project as a whole.

## Results

### Genetic group: Articles 1, 2 and 3

#### Article 1:

Notices were placed in several local and national ‘gay’ periodicals requesting homosexual men and lesbians who were twins to contact us. Little information was given in the notice about the study, except to stress that we wanted to contact all such men or women, regardless of whether they considered that their co-twin was also of homosexual orientation. Each subject who contacted us was posted a questionnaire ... Due to the sensitive nature of our inquiries we did not attempt to seek confirmatory information from co-twins. (408)

#### Article 2:

Probandes were recruited through advertisements placed in lesbian-oriented publications in several cities across the United States: Chicago, Ill; Dallas, Houston, Austin, and San Antonio, Tex; Boston, Mass; and Los Angeles, Calif. The advertisements specified that desired subjects were lesbian or bisexual women at least 18 years old with either (1) female cotwins or (2) adoptive or genetically unrelated sisters. (The adoptive sister component of the study was added after approximately one third of the twin data were collected.) The advertisements also stated: “We hope you will call regardless of the sexual

orientation of your twin or adoptive sister.” No mention was made of the possibility of participation of co-twins or adoptive sisters. Potential subjects were instructed to call the laboratory, where they were asked clarifying questions. An additional criterion for the adoptive sister component was assessed at this point. Both probands and their adoptive sisters must have been younger than 3 years when they entered the common rearing environment. (217-218)

#### Article 3:

Announcements seeking participants for the study were distributed to local homophile organizations and social groups and to Women’s Studies programs at universities within the Washington, D.C., metropolitan area. The announcements stated that the study was on “sexuality in women” but not that it was focused on sexual orientation. The homophile groups were targeted to obtain lesbian probands, whereas the Women’s Studies programs were chosen to recruit a sampling of heterosexual subjects. Bisexual participants were found in both groups. (409)

#### Discussion of Genetic group

The population sampled in studies 1 and 2 consisted of lesbians who most likely either read gay and/or lesbian publications themselves, or were referred to the study by someone they knew who read the ad. In study 3, the lesbian population sampled consists of those who participate in gay and/or lesbian organizations or groups, or have contact with someone who does who could refer them to the study. The lesbian populations sampled in these studies thus have the characteristics of being self-acknowledged lesbians and having contact with gay and/or lesbian publications or, in the case of study 3, participating in gay and/or lesbian organizations. The aspect of acknowledgment of lesbian orientation introduces a potentially meaningful characteristic to this sampled population that may distinguish them from women who may have lesbian feelings but have not asserted a lesbian identity. In addition it is more likely (though not necessarily so) that these women are to some extent “out” in order to have been reached by these means and to be willing to participate in such a study, which could also represent a

meaningful difference from those lesbians who are more secretive about their sexual orientations. This issue is addressed in the discussion section of study 2, which will be discussed shortly.

For studies 1 and 2 the sample population is also specifically of those lesbians who have sisters, which does not represent a difference known to be meaningful to distinguishing them from those who do not have sisters. Thus that aspect of the population is not known to introduce limitations to the sample. However, a limitation may have been introduced in terms of participation, as potential subjects may have opted not to respond to the ad because of the knowledge that they would have to provide information about their sisters, or fears that their sisters' participation might also be needed for the study. (For studies 2 and 3, subjects' sisters were contacted for information for the study, but only if the subject agreed to that.)

For gay and lesbian subjects, the fear of having their sexual orientation revealed to their families by the study, or the delicate nature of the subject within families even if their sexual orientation is known, is enough potentially to keep many subjects from participating. Thus the subjects who do choose to participate in such a study may be more likely to have a lesbian or bisexual sister, because potential subjects would be more likely to feel comfortable participating in a study involving a sister if that sister is also lesbian or bisexual. At the least, it might be expected that this method of selecting subjects might be more likely to filter out potential subjects whose families are uncomfortable with the subject's sexual orientation. This issue is a form of "ascertainment bias," which is produced by the use of nonsystematic sampling methods. A most severely limiting type of ascertainment bias occurs when the study attracts those

subjects “who fit [the] hypothesis and deter those who might weaken it” (Zicklin 1997:384).

In study 2, measures were taken to reduce some forms of ascertainment bias. The researchers state the following: “The advertisements also stated: ‘We hope you will call regardless of the sexual orientation of your twin or adoptive sister.’ No mention was made of the possibility of the participation of co-twins or adoptive sisters” (218). These efforts have face validity in terms of reducing some of the ascertainment bias related to the family issues just discussed, but it is not known how effective they really are. In their concluding section the researchers discussed forms of ascertainment bias present in their study and their statistical tests for possible effects at length; this will be discussed in the section of this study on “Interpretations and Conclusions.” The ascertainment biases present in study 2 are a limitation on the generalizability of the findings.

Study 3 also acknowledged ascertainment bias during the discussion of the results. The researchers point out that “[a]scertainment is a particular problem when studying marginalized or secretive populations such as lesbians or bisexuals, making it virtually impossible to obtain a truly random sample” (416). They go on to limit their findings’ applicability to “the particular cohort that we studied” (416). The issue of acknowledgement of potential sample limitations on findings will be discussed further in the analysis of the studies’ interpretations of results.

Interestingly, researchers in study 3 also brought up the issue of ascertainment bias as it relates to heterosexual subjects, suggesting that in studies of sexual orientation, it is likely that some heterosexual subjects will have some degree of same-sex attraction (cite that). As the other two studies did not seek out a sample of heterosexual subjects

independently from their lesbian and bisexual subjects, this issue would not have arisen. It is questionable whether studies of sexual orientation would in fact draw heterosexual subjects with any acknowledged feelings of same-sex attraction, as study 3 researchers suggest, or instead *deter* such subjects, for fears of confronting such feelings. The data in study 3 would indicate the former, as two-thirds of their heterosexual subjects indicated having “ever been romantically or sexually attracted to a female,” but this is almost certainly a partial consequence of the way in which heterosexual subjects were obtained. (Heterosexual subjects were recruited from Women’s Studies programs in the hopes of finding heterosexual women “comfortable discussing sexual and gender-related issues,” a population also likely to be more aware of and comfortable discussing any same-sex feelings they may have experienced.) The issue of heterosexual subject ascertainment bias is, as the researchers state, “rarely addressed” although it could pose at least as much of a problem as ascertainment bias of homosexual subjects. Because of this issue, comparisons between lesbian and heterosexual subjects are potentially limited by the biased ascertainment of both study groups.

#### Brain/cognition group: Articles 4 and 5

##### Article 4:

Subjects were recruited to participate in a broad research investigation of the psychobiology of gender and sexual orientation. In response to newspaper and poster advertisements, as well as referrals from friends and previous volunteers, interested persons contacted the laboratory for further information and to arrange for participation. These persons were then scheduled to visit the laboratory, where they were informed of the purpose of the study and gave informed consent. (102)

##### Article 5:

Heterosexual men (20) and women (20) were primarily volunteer undergraduate and graduate students solicited through university bulletin board notices and word of mouth. Gay men (20) and lesbians (20) were solicited through bulletin board notices posted at university homophilic organizations, electronic bulletin board



notices, a university booth at the local annual Gay Pride festival, and word of mouth. Six of the undergraduate subjects participated in order to receive course credit. Due to limited research funds only a subset of the recruitment media advertised an honorarium of \$10 for participation. Subjects recruited through those media (10 HT and 17 HM) received the \$10. Others participated without monetary compensation. Participants were not selected based on ethnicity; however, only native-English speakers were invited to participate. The sample was primarily Caucasian. Subjects were informed that they would be participating in a research project examining how the left brain and right brain process verbal and spatial information. The research hypotheses to be tested were not revealed. (94-95)

#### Discussion of Brain/Cognition group

Article 4 reported that subjects were recruited in part through “newspaper and poster advertisements,” without specifying what type of newspaper (local, national, LGB-oriented or not, etc.) or where the posters were placed (university campus only, LGB-oriented sites, etc). This lack of specificity makes it difficult to examine the strengths and weaknesses of the recruiting procedures or their potential effects on the samples and findings obtained. Such a lack of specificity is detrimental to any evaluation of the research and makes it difficult to consider the conclusions reliable.

Assuming tentatively that the “newspaper and poster advertisements” were placed in general, non-LGB-specific sites, then the sample selection procedure could possibly reduce the bias toward persons who participate actively in LGB organizations or read publications aimed specifically at LGB populations. By specifying in the announcement that the study concerned sexual orientation, however, there may be some degree of self-selection among both lesbian and heterosexual potential subjects: among the lesbians, those who are to some extent “out,” and among the heterosexuals, those who feel comfortable discussing their sexual orientation. Stein (1999) writes:

In general, there might be various social factors that affect who participates in a study, which in turn skews a study's results. People

who identify as gay men, lesbians, or bisexuals and take part in such studies belong to a subset of nonheterosexuals who are conscious of their own sexual desires for people of the same sex-gender and who are willing to describe these desires to researchers. In particular, many studies that are supposed to study gay men and/or lesbians in contrast to heterosexuals are in fact studies of some subset of out-of-the-closet gay men and lesbians. As such, the results of the studies may apply only to a distinct subset of gay men and lesbians. (194)

In study 5, the selection of primarily “out” lesbians is exacerbated by sampling from LGB organizations and forums. The potential bias in selection of heterosexual subjects, however, is reduced by the lack of overt mention of the study’s interest in sexual orientation. Both sample selection processes produced primarily or exclusively subjects who were university students at the school where the research was conducted. Recruiting subjects on one’s own campus is common, yet effectively limits the sample population to university students. Of social science research, Babbie (1995) notes: “In relation to the norm of generalizability in science, it is clear that this tendency represents a potential defect in social science research. Most simply put, college undergraduates are not typical of the public at large” (237). University students tend to differ from the general population on variables of median age, socioeconomic status, and race. While this will be discussed further in the section on the composition of the samples, it is worth noting here that the sample selection process in many of these studies is conducted on a population that is already different from the general population on some potentially important variables.

#### Neuroendocrine group: Articles 6-10

##### Article 6:

Subjects were recruited from the membership of a local homophile organization. Seventy-four homosexual men and women volunteered to participate. The criterion for inclusion in the study was that the subjects rated their sexual experience in both behavior and imagery as primarily homosexual ... (71)

**Article 7:**

Two groups comprised the sources from which participants were drawn: (a) heterosexual (HET) parent members of the national support group, Parents and Friends of Lesbians and Gays (PFLAG), and their gay/lesbian/bisexual (GLB) and HET children; and, (b) self-identified GLB university students who attend their school's GLB support/social group and their HET parents and siblings. ... Adopted and foster children were also excluded. Participants were volunteers, remained anonymous, and were unaware of the nature of the study. (705)

**Article 8:**

All subjects were paid undergraduate volunteers recruited through campus newspaper and poster advertisements. Subjects who applied to participate were tested until samples reached the following sizes: 20 heterosexual males, 20 heterosexual females, 20 homosexual males, and 18 homosexual females. (397-398)

**Article 9:**

From 1938 to 1963, 17,502 case histories were recorded by the Kinsey Institute for Sex Research using the interview schedule devised by Alfred C. Kinsey (Gebhard & Johnson, 1979). These data are currently stored in several files. The files containing adult white and nonwhite females with no convictions for felonies or misdemeanors (other than traffic violations) comprise 5,954 cases. ... 478 cases could not be classified as either heterosexual or homosexual. Of the remaining 5,476 cases, 275 were classified as homosexual (lesbian) and 5,201 were classified as heterosexual. (117)

**Article 10<sup>3</sup>:**

Subjects were recruited by contacting local gay organizations, by advertising in gay publications, in the university newspaper, and on public bulletin boards, as well as by word of mouth. All ads stipulated that subjects would be paid \$30 for about 2 h of work. Potential subjects were informed in advance about the essence of the experiment and that there would be a required questionnaire containing items about the subject's sexual experiences and orientation, among other topics. (2710)<sup>4</sup>

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<sup>3</sup> Article 10 reported very little about sampling procedures, instead referring readers to a previous report for that discussion. The article containing the sample information (McFadden and Pasanen, 1998) was written by the same researchers and reported different data gathered on the same subjects, apparently within the same research session. That article was included in the original sample of 35 from which the subsample of 10 was constructed. For these reasons, the decision was made for this project to use that information as if it had in fact been presented in article 10.

<sup>4</sup> Page number is from 1998 article.

### Discussion of the Neuroendocrine group

The varied means of selecting subjects demonstrated in these articles lend themselves to different strengths and weaknesses. The majority of these articles (numbers 6, 7, and 10) selected lesbian and bisexual women subjects through LGB-oriented forums, a sample population that likely differs in some ways from lesbians and bisexual women in general, many of whom may choose not (or not have the opportunity) to participate in LGB organizations or read LGB publications. Recruiting from a more general population, such as was done in article 8, may reduce this bias, but is often either not done or supplemented by recruiting through LGB-oriented forums because of the difficulties in obtaining a sufficient number of lesbian and bisexual women subjects.

Also, recruiting subjects using more generalized means is not assured to eliminate the bias toward more “out” lesbian and bisexual subjects, because the potential subjects are typically still alerted to the focus on sexual orientation by the text of the announcement or advertisement used. As noted earlier, this also may create bias in the sample of heterosexual subjects, toward those with a greater degree of comfort with discussing their sexual orientation. It is to some extent presumable as well that this is the case for the study (9) that utilized Kinsey Institute data – that due to the nature of the Kinsey research, the population sampled by the researchers was biased toward those more comfortable with discussing sexuality, although the very large sample size may offset this issue. Last, three of these five studies (7, 8, and 10) specifically mention sampling from university populations, of which some potential limitations have already been discussed.

### Discussion

In studying difficult-to-reach populations like lesbian and bisexual women, it is accepted procedure to sample non-randomly (Babbie 1995; Neuman 1994). However, employing non-random sampling procedures can place limits on the degree to which the research samples are representative of the larger populations about which the researchers wish to make claims. Researchers must thus “attempt to assess the effects of non-random recruitment and report how they limit the generalizability of results” (McGuire 1995:121).

In addition, the kinds of decisions made and strategies employed by researchers in the process of constructing non-random samples can provide insights into what characteristics the researchers consider more and less important about the topic they are studying (De Cecco and Parker 1995; Stein 1999). For the current study, such insights are important in that they help reveal the researchers’ assumptions and beliefs about lesbian and bisexual orientations. These assumptions and beliefs have implications for the findings from the overall scientific study of biological origins of sexual orientations.

The articles analyzed utilize many of the same types of sample recruiting strategies. One such strategy is to target university populations, tending effectively to limit the sample populations mainly to undergraduate students. While implications of utilizing undergraduate students will be discussed in more detail in the “Sample composition” section of this chapter, some issues related to the recruitment of participants from undergraduate populations are addressed here.

Of the seven studies that recruited heterosexual subjects, four (57.14%) described having reached them through at least one method directed at university populations (such

as campus newspapers and bulletin boards). Five of the ten studies (50.00%) recruited lesbian (and sometimes bisexual) subjects utilizing at least one method directed at university populations. As discussed earlier, while undergraduate students are often studied because of convenience of access, they are not generally considered truly representative of the general population, in part because of overrepresentation of specific categories of race, social class, and age.

The wide use of sample populations largely made up of undergraduate students in the studies analyzed here suggests that the researchers do not believe the differences between the students and larger populations diminish significantly the generalizability of results obtained. Thus one can infer that researchers may assume that social differences of race, class, and age are not of great importance to the development of one's sexual orientation. Some work in feminist standpoint theories calls this assumption into question, suggesting that the ways in which one experiences a particular social identity are intertwined with one's other identifications, and are then different depending on one's social positionality (Collins 1990, 1997; Harding 1997).

Another frequent strategy employed by researchers in order to obtain sufficient numbers of lesbian and bisexual women subjects is to recruit from the memberships of local and/or national lesbian, gay, and bisexual (LGB) organizations, or by advertising in local and/or national LGB publications (Allen 1997). Five of the ten studies (50.00%) specifically discussed recruiting from LGB organizations as at least one of their recruitment methods, and four of the ten (40.00%) described having made use of advertisements in LGB paper publications or internet bulletin boards.

Some of the potential limitations on generalizability that may result from these recruiting strategies are discussed above and need not be repeated here. Rather, at this point I will discuss some of the possible assumptions and beliefs of the researchers regarding sexuality that inform decisions to use such sampling methods.

Using these recruiting methods results in samples of lesbian and bisexual subjects who self-identify as lesbian or bisexual, who read LGB publications and/or participate in LGB organizations, and who are willing to volunteer their participation in a study of lesbian and bisexual orientations. For researchers to claim that results obtained can be generalized to larger populations, they must assume or believe that their samples of subjects are not meaningfully different from the larger populations of whom they are meant to be representative.

It is not known whether or in what ways those who come to self-identify as lesbian or bisexual are meaningfully different from those women who may have same-sex sexual feelings, but choose not to identify as lesbian or bisexual, or from those who may have same-sex sexual feelings, but, for psychosocial or other reasons, never acknowledge their existence. However, the deeply-stigmatized nature of lesbian and bisexual orientations in our culture must give rise to such questions in studying lesbian and bisexual populations. The continued use of recruiting methods that do not attempt to address the potential significance of these issues suggests that the researchers have either not considered or have dismissed the potential importance of such issues.

Relatedly, many researchers do not evaluate the impact of utilizing subjects who are “out” enough to be reached by recruiting strategies directed at LGB populations, as well as those who actively volunteer to participate in a study in which their sexual

orientation is a focus of investigation. Also, in the behavior genetics studies, potential subjects had likely self-selected to some extent to result in samples that either were “out” to family and/or that had a lesbian, gay, or bisexual family member. When researchers fail to acknowledge or to examine seriously the possibility that any results obtained are applicable only to a very limited subset of lesbian and bisexual women, it suggests that they believe this is not the case. As with the issue of recruiting from undergraduate populations, this reveals an underlying assumption that sexual orientation is not meaningfully impacted by social and psychological factors.

In many of the studies analyzed here, the sample recruitment methods suggest that the researchers do not consider seriously the potential social or psychological factors affecting sexual orientation to be of significance to the actual focus of investigation. One can infer from this that the researchers, while claiming to be testing for a biological origin to lesbian and bisexual orientations, already assume that which they are studying is solely or primarily determined by genetic and/or biological factors. This presumption has been revealed to exist in other, similar research studies such as those of LeVay (1991) and Hamer *et al.* (1993) (see De Cecco and Parker 1995; Stein 1999).

In their analysis, De Cecco and Parker (1995) point out that the assumption in prior research studies of sexual orientation as “bequeathed by nature” had effects on how subjects were selected: “The belief that homosexuality inheres in the body led the biological investigators to be cavalier in the identification and selection of subjects since one ‘specimen’ was essentially equal to all others” (De Cecco and Parker 1995:10). Thus the assumption of essentialism creates a false belief in universality of expression of the trait of sexual orientation, suggesting that social or psychological differences between the



homosexual subjects studied and the larger populations are not detrimental to generalizability.

Similarly, the current analysis suggests that the belief that lesbian and bisexual orientations are biologically determined is what underlies the failure to consider seriously the limitations imposed by the sample recruitment procedures. By impacting the subject selection and subsequent assertions of generalizability, the assumption of lesbian and bisexual orientations as essential traits has implications for the validity of the results obtained in the research studies.

Stein (1999) explains that “in order to establish essentialism, a study cannot unquestionably assume essentialism” (205). In other words, the studies that start by assuming natural sexual orientation categories of heterosexual, lesbian, and bisexual and then studying them for differences from one another cannot then prove that there is (or is not) a “natural” basis for these groupings. Thus the implications of the assumption of essentialism for the research studies analyzed here include a fundamental invalidation of evidence for or against the research hypotheses.

### **Division of the Samples into Sexual**

#### **Orientation Categories**

The second aspect of the research samples in the 10 articles on biological origins of lesbian and bisexual orientations in women to be analyzed is that of the procedures used to assign subjects to sexual orientation categories for purposes of comparison in the study. The methods of assigning subjects to sexual orientation categories in research that compares data from samples of subjects distinguished by different sexual orientations are

clearly of extreme importance. If subjects are assigned to different categories of sexual orientation in ways that are inconsistent or inaccurate, the worth of any findings obtained is called into question. In addition, the procedures used by the researchers to divide their sample into sexual orientation categories can provide insights into what the researchers assume and believe to be true about sexuality.

Dividing the sample into categories according to sexual orientation that can then be compared to one another requires designating criteria to determine into which category each subject fits best. At the heart of this issue is the way in which researchers define that which they are studying: sexual orientation, as well as its presumed categories—heterosexual, bisexual, and homosexual (or lesbian). Good research methodology requires clear definitions of the constructs (in this case, sexual orientation categories) being studied (Neuman 1994). These criteria should be reliable—capable of classifying subjects dependably the same way each time that the criteria are applied—and valid, or an accurate measure of the construct in question (Neuman 1994). It is when these standards are met that we can have some sense that findings reflect an empirical reality—though perhaps not the *only* reality.

To this end, scholars have critiqued the ways in which other studies similar to those analyzed here have assigned their subjects to sexual orientation categories, claiming that at the very least, the criteria are often poorly defined and implemented; moreover, the criteria for assigning sexual orientations do not adequately capture human sexuality. Of the former charge, Stein (1999) writes:

It is crucial for scientific research on sexual orientation to carefully define its object of study in order to divide people into sexual orientations in a reasonable fashion and in ways that do not skew its results. A study of sexual orientation must start with some

(at least implicit) definition of sexual orientation: who will count as a homosexual or a heterosexual? (195)

If the definitions of sexual orientation categories and how people are to be assigned to them are not clear, reliability is called into question, in that it cannot be certain that sexual orientation is being evaluated in the same way for each subject. If the researchers are determining the subject placements, unclear definitions or poor implementation means that the same subject could be assigned to a different category by different raters or upon repeated ratings.

Criteria for assigning subjects to sexual orientation categories must be not only well defined, but also must depend upon good evidence that reflects the person's "real" sexual orientation. If this evidence is questionable, validity of results will be poor. This is the case for LeVay's 1991 study of gay men. Spanier (1995a) critiques this study on the basis that sexual orientation categories were assigned in such a way as to make findings almost meaningless:

Assumptions built into the categories (heterosexual men, homosexual men, presumably heterosexual women) LeVay chose for comparison raise fundamental problems with respect to the *experimental design* of this research. ... Equally problematic is LeVay's temerity in classifying both men and women as heterosexual simply because they were not otherwise identified. ... This in itself should have disqualified the article from publication, since the study purports to compare three categories, assignment to which was suspect for the majority of subjects. (63-64)

LeVay's subjects were deceased, and he determined to which sexual orientation category they would be assigned based on their documented medical histories. Patients who had self-identified as homosexual were classified as such, including one patient who had identified as bisexual. Patients who had not identified their sexual orientation were assigned to the heterosexual category, on the basis of the "numerical preponderance of

heterosexual men in the population” (Spanier 1995a:64). In this case, validity is questionable because of the great potential for inaccuracy in the categorizing of subjects as heterosexual on the basis of such limited information. From this example, the importance of valid categorizations for drawing meaningful conclusions from data is made clear.

Beyond such issues of flawed methodology is the charge that researchers are not adequately nor accurately capturing subjects’ full “sexual orientations.” There are at least two facets to this claim. First is that the way in which people experience their sexual orientation at the time a study is conducted is not necessarily indicative of their lifelong sexual orientation, and does not necessarily mean exactly the same thing for all people. This issue also calls the validity of the measurement criteria into question, as if people’s sexual orientations are changeable over the life course, or if people are defining their experiences differently from one another, the assignments to sexual orientation categories are suspect (Allen 1997).

The second facet to the issue of inaccurate representations of subjects’ sexual orientations concerns the unquestioning acceptance of the idea that sexuality is truly defined by the categories of “heterosexual,” “homosexual,” and “bisexual.” The studies of biological origins of sexual orientations often do not address the possibility that the categories themselves are artificial and indistinct, much less that the sex- and gender-based categories may not reflect anything inherent about sexuality at all. Allen (1997) writes:

Behind much of this work appears to lie an essentialist or typological view of behaviors as fixed and objectively defined entities, ignoring the wide variability in any behavior both within and between human societies ... Homosexual, like heterosexual, behavior falls across a

wide spectrum of responses, making it impossible to claim that something called “homosexuality” exists in the abstract. The problem of grouping what may be a variety of behaviors under one name is what neurobiologist Steven Rose (1995) has called “artificial conglomeration.” (255)

Stein (1999) points out, for example, that the assumption of the validity of the categories is made in LeVay’s 1991 study:

However, LeVay *starts* from the assumption that people can be sorted into heterosexuals and homosexuals, so his study cannot establish essentialism about sexual orientation. I am not claiming that it is impossible to do a neuroanatomical study that would provide support for essentialism about sexual orientation. For this to happen, evidence for the existence of natural human kinds must emerge from the empirical results. (206)

In other words, if researchers want to capture essential characteristics related to sexual orientation, they should start by examining how people’s sexuality is defined and distinguished empirically, rather than beginning with assumed, pre-set categories and setting up measures such that people will fit into them. This is not so simple as asking people to self-categorize, because our cultural ideas about sex, gender, and sexuality have already helped ensure that most people will see their sexual orientation in these terms. Also, although people are encouraged to define their own sexuality in sex- and gender-oriented terms, this does not mean that everyone interprets feelings, behaviors, and experiences in the same way. Asking people to self-categorize for purposes of dividing the sample into sexual orientation groups, then, in fact creates even less certainty about how the categories are defined and what is actually being studied (Allen 1997; Stein 1999). According to Allen:

The choice of categorizing oneself as *either* heterosexual or homosexual is thus socially contrived, artificial, and, from a biological and genetic point of view, meaningless. With a self-rating process as the means of identifying phenotypes, the artificiality of the definition is magnified manyfold. (1997:255)

All these issues, including researchers' acceptance of the established categories of sexual orientation, their failure to acknowledge the fluidity of sexual orientation over the life course, and their lack of recognition of the varied social influences that might cause people to interpret similar types of sexual feelings and experiences very differently, suggest that the assumption of the essential nature of sexual orientation categories is already present at the beginning of studies designed to test this hypothesis. As stated by De Cecco and Parker (1995):

Only if one presupposes that sexual preference is biologically mandated could one believe that a single label or number, even if self-applied, could adequately represent the range, variation, and nuance of an individuals' sexual expression and experience over a lifetime. (11)

The idea that essentialism of sexual orientation categories is a starting assumption of these research studies has implications, as suggested above by Stein, for the meaningfulness of results obtained.

Defining sexual orientations and classifying the research samples into different groups is extraordinarily complex and has far-reaching implications for the way a study's results may be interpreted. Because sexual orientation is that which is being "explained" in the scientific articles in the current study, it is essential to know how the various researchers are defining different sexual orientations and placing subjects into the various categories. In addition, the method of categorizing the samples in terms of sexual orientation provides insights into researchers' assumptions about the topic of study, an understanding of which is helpful to evaluating the research project as a whole.

### Method

The analysis of the categorization of sexual orientations in the research samples in the 10 articles on origins of lesbian and bisexual orientations in women is conducted following the examples of other feminist and critical analyses of sexual orientation research (Allen 1997; Byne 1995; De Cecco and Parker 1995; McGuire 1995; Spanier 1995a; Stein 1999). The examination is initiated by locating the section of each article that discusses the sexual orientation categorization procedures for the research sample. This description almost always occurs in the “Method” section of scientific articles. The statements from the articles that contain this information are selected out for analysis and included below, separated according to the article groupings discussed previously (Genetic group, the Brain/Cognition group, and the Neuroendocrine group). This division is utilized in order to organize the data more clearly, and to discern any differences in sample selection procedures across the three scientific approaches to biological origins of lesbian and bisexual orientations in women.

The description of the procedure for categorizing subjects’ sexual orientations is then read closely and critically in order to answer the following question: “What are the criteria for deciding in what sexual orientation categories subjects are to be placed, and what limitations related to reliability and validity might result from them?” Aspects of reliability and validity considered in this analysis are those discussed above including, for example, the consistency of the criteria applied and the accuracy and adequacy with which they capture subjects’ sexualities. These issues have implications for what aspects of sexuality might tend to be over- and under-represented by the research, as well as the meaningfulness of the findings.

Informed by the theoretical framework of feminist standpoint epistemologies as well as findings from previous critiques, I discuss potential limitations incurred by the sexual orientation categorization procedures and how they might influence findings (presented in the “Discussion” sections for each of the three article groupings). Finally, to conclude this section of the chapter I discuss the assumptions upon which the categorization procedures depend and their significance for the research project as a whole.

### Results

#### Genetic group: Article numbers 1, 2 and 3

##### Article 1:

Notices were placed in several local and national ‘gay’ periodicals requesting homosexual men and lesbians who were twins to contact us. ... Each subject who contacted us was posted a questionnaire on the following: ...

(c) sexual orientation and sexual behaviour of the respondent, and where known, that of the co-twin ...

Forty-five identified themselves as primarily homosexual and one as bisexual ... (408)

##### Article 2:

Of the probands, 126 (85.7%) described themselves as “lesbian/homosexual” and 21 (14.3%) described themselves as “bisexual.” Kinsey ratings were obtained for adult fantasy and behavior, combined. ... The mean ( $\pm$ SD) Kinsey rating, 4.8 ( $\pm$ 1.2), indicated a fairly high level of homosexual orientation for the sample as a whole, but individual Kinsey ratings ranged from as low as 1 to as high as 6. Because the Kinsey ratings reflected overall adult behavior and fantasy, a woman might give herself a low rating because she had assumed a homosexual identity later in life. Indeed, this accounted for most of the probands with relatively low Kinsey scores ( $<3$ ). However, three probands with low Kinsey scores admitted to relatively low levels of homosexual feelings, although they all considered themselves bisexual. (218)

##### Article 3:

Sexual orientation was assessed by self-report using the 7-point Kinsey scale ... The probands rated themselves on four individually administered scales: self-identification, sexual/romantic attraction, sexual/romantic fantasy, and sexual behavior. The four scores were averaged to yield a composite Kinsey self-rating as follows. Probands with averages  $<0.5$  were designated Kinsey 0; 0.5-1.49,



**Kinsey 1; 1.5-2.49, Kinsey 2; 2.5-3.49, Kinsey 3; 3.5-4.49, Kinsey 4; 4.5-5.49, Kinsey 5; and 5.5-5.0, Kinsey 6. A total of 25 probands declined to rate themselves on one or more of the attraction, fantasy, or behavior scales. For these cases an average of the available self-ratings was used.**

### **Discussion of Genetic group**

**Somewhat different methods of constructing categories of sexual orientation were used in these studies of possible genetic influence on sexual orientation. Specifically, in the first study subjects classified themselves as lesbian or bisexual, with no measure of what those identifications meant; in the second, subjects self-classified as either lesbian or bisexual, but measures were also taken to establish Kinsey ratings for the subjects; in the third, Kinsey ratings were established in order for the researcher to place subjects in a category of either heterosexual, lesbian or bisexual. Thus the first two studies were similar in placing subjects in dichotomous categories (lesbian or bisexual) based solely on the subject's own identification, while study 3 placed subjects in a category informed by their responses to questions measured on the Kinsey scale. In addition the categories were constructed differently in terms of usage for analysis among the three studies, in that the first two, while allowing subjects to classify themselves as bisexual, later collapsed that category into the category of lesbian for analysis purposes. The third study conducted analyses using all three categories originally established.**

**Four problems are apparent with the categorization of sexual orientation in these studies. First, the definitions of the categories are inconsistent across the studies. Without such consistency, meaningful comparisons cannot be made. For example, in study 1, it would appear that the working definition of a lesbian or a bisexual woman is someone who identifies herself as such. While there is certainly merit to this definition in terms of women's sexual agency, for issues such as behaviors, attractions, and fantasies**

(the items typically measured utilizing Kinsey scales) there is not necessarily any consistency of definition within or across categories. The Kinsey-scale results from study 2 actually provide evidence of this inconsistency, as it is noted that some subjects who identified as lesbian scored below 3 on their Kinsey rating, which in study 3 would have placed them into the bisexual or heterosexual categories, depending on how far below 3 the score was. Also study 2 notes that there were scores as low as 1 for women who identified as bisexual. These women would have been classified as heterosexuals in study 3.

This relates to a second problem with the category construction: the arbitrariness of the cut-off points used to construct sexual orientation categories in study 3. The researchers combined self-reported Kinsey ratings on four different measures related to sexual orientation, as described earlier. This composite score was then placed into a classification scheme as follows: "Probands with averages  $<0.5$  were designated Kinsey 0; 0.5-1.49, Kinsey 1; 1.5-2.49, Kinsey 2; 2.5-3.49, Kinsey 3; 3.5-4.49, Kinsey 4; 4.5-5.49, Kinsey 5; and 5.5-6.0, Kinsey 6" (409). Then classifications of heterosexual, lesbian, or bisexual were attached to ranges of Kinsey scores as described earlier. Therefore, a subject scoring as little as one-hundredth of a point different from another subject could be placed into a different category, depending on the proximity of each to one of the cut-off points.

For example, of the sample of 358 probands, 55 were rated a 1 (heterosexual) or a 2 (bisexual), 34 and 21 subjects in each category respectively; 119 were rated a 4 (bisexual) or a 5 (lesbian), 33 and 86 subjects respectively. Thus 174 probands (48.6% of the sample) were placed into sexual orientation categories by scoring fractions of a point

away from a different category entirely. A probable effect of this arbitrary cut-off is reported by the researchers when they note that 67.7% of their “heterosexual” women subjects reported having “ever experienced a romantic or sexual attraction to a female” (412). Similarly, 45.3% of the “lesbian” subjects reported having “ever experienced a romantic or sexual attraction to a male” (412). At the very least, this issue could be thought to primarily affect those women who fell very close to one of these cut-off points; at the most, it could cast doubt on the meaningfulness of the distinctions between sexual orientation categories at all. Either way, the significance bears upon the meaningfulness of the categories as established and the analyses performed on them. In addition the issue has relevance for the way these results are interpreted and compared to results from other studies, as discussed previously.

The third problem with the categorization of sexual orientation in these studies relates to the issue of collapsing categories for analytic convenience. The first two studies ran analyses in which bisexual subjects were counted as if they had identified as lesbian. Particularly given the fact that, as discussed earlier, some bisexual subjects in study 2 had Kinsey scores that would have rated them heterosexual, performing analyses in which bisexual subjects are counted as lesbian has the potential to make the results of those analyses meaningless. In addition, results of studies in which bisexual subjects are counted as lesbian (such as studies 1 and 2) should not be compared to results of studies in which bisexual subjects were counted separately (such as study 3). There is little consistency in the reporting of results from these studies of potential genetic contributions of what is being compared to what in terms of categories of sexual orientation.

One final problem is addressed to some extent but not sufficiently: the issue of changing sexual orientation identifications over the adult life course. In genetic-influence studies, the problem is two-fold because this issue must be addressed for not only the subject, but also for the family member or members whose sexual orientations are being classified and used as data. In cases in which the family members themselves are not contacted, information regarding possible changes over the life course is likely to be unknown to the subject and thus not taken into consideration. Study 1 was the weakest in this regard, as this issue was not addressed in discernable way for either subjects or their twins. In study 2 the Kinsey rating asking for information on subjects' overall adult identifications could help ameliorate the issue of change, but the ratings were not used in the categorization. Also in regard to their sisters, subjects were apparently asked only for their current sexual orientation identification, and although many of the sisters responded for themselves, they too were categorized according to current identification.

Study 3 also appears to have classified by current sexual orientation both for subjects and their family members. Subjects in this study were asked to rate the sexual orientations of many family members, not just sisters (all "first-, second- and third-degree relatives over the age of 18 years", excluding grandparents), and very few were contacted (13% of subjects were able to get one family member to participate) to confirm the information. Thus it is very possible that the subjects were unaware of changes in their family members' sexual orientation identifications over their adult lives. Also in this study 175 (76.8% of the sample) was contacted 12-18 months later to see if changes had occurred, which brings in some longitudinal aspect even if it doesn't address overall change possibilities. The researchers report that "the sexual orientation of the women in

this sample, for the period of time studied, was quite stable” (411). Yet in 12-18 months, 19.8% of the 175 subjects re-contacted had changed Kinsey rating: “most moved by only one Kinsey self-rating and no one changed by more than two. Although all Kinsey categories showed some movement, Kinsey 2 and Kinsey 4 exhibited the greatest variability, whereas Kinsey 6 was the most stable” (411). It is noted that bisexuals accounted for “slightly over one-half of the probands whose Kinsey self-rating changed”, and that the majority of them changed only to a different rating still within the bisexual range. Still these changes over 1 to 1 ½ years hardly seem trivial, and lead one to wonder about how to interpret the results if continued changes were to be seen over succeeding years.

#### Brain/Cognition group: Articles 4 and 5

##### Article 4:

... a person-to-person interview was conducted by a trained experimenter who inquired about past and current sexual behaviors and attitudes. The method employed utilized the semistructured interview instrument and technique of Meyer-Bahlburg and Ehrhardt (Sexual Experiences, Behaviors, and Attitudes Survey – Adult, 1983 version) and lasted approximately 1 h for each subject. In addition, the subjects completed several questionnaires regarding psychosexual milestones, sexual history, attitudes, and behavior, as well as demographic information.

As a result of information obtained in the questionnaires and interview, the subjects were categorized regarding their lifelong sexual orientation using the so-called Kinsey rating scale ... Only data from persons with either exclusive (*sic*) lifelong (since puberty) heterosexual or exclusive lifelong homosexual histories are reported here. (102)

##### Article 5:

Sexual orientation was assessed by a Sexual Orientation Scale (SOS) adapted from Klein *et al.* (1985). Participants rated themselves on a Kinsey-type scale (1-7) for Sexual Attraction, Sexual Thoughts and Fantasies, Sexual Behavior, and Sexual Identity. Participants were included in the HT group if they had averaged scores of either 1 or 2 on the SOS and in the HM group if they had averaged scores from 5 to 7. Six participants scoring in the bisexual range (3-4) were excluded from this sample. (95-96)

### Discussion of Brain/Cognition Group

The two studies differed in how they categorized sexual orientation in the following three ways: first, in study 4 the researchers rated subjects according to their responses using a Kinsey scale, while in study 5 the subjects located themselves along the Kinsey scale to answer the items; second, the categorization in study 4 considered changes in sexual orientation over the adult life course, while the categorization system in study 5 did not; and third, the items used to elicit responses regarding sexual orientation were not the same across the two studies. Thus as in the genetic-influence studies, inconsistencies that may limit comparisons of results are seen. For example, in study 5 scores ranging from 5-7 (which presumably should correspond at least somewhat to Kinsey's 4-6) are classified as homosexual, which almost certainly creates a different definition of that category from that used in study 4 ("exclusive lifelong homosexual histories").

This issue relates to another potential categorization problem: that of the exclusion of the middle range of scores in both studies. While in two of the genetic studies bisexual women were analyzed as if they had identified as lesbian, in these studies bisexuals are not included at all. This exclusion is limiting in two ways: first, it arbitrarily fails to analyze some people who may actually identify as being heterosexual or homosexual. As noted in studies 2 and 3, people's self-identifications do not always mesh perfectly with the way researchers would classify them by Kinsey ratings. Thus the results are limited in application to a subset of both heterosexual women and lesbians. Second, the practice of excluding bisexuals constructs a dichotomy of sexual orientation that does not exist in "real life," as evidenced by the report of potential subjects being

turned away from participation because of bisexual scores. This categorization of sexual orientation paints a falsely oppositional picture, making any differences found in the data appear more significant than they may be in the actual population.

It is perhaps interesting to note that at least in study 5, some of the “middle range” toward the homosexual end of the scale may have actually been included into the lesbian category. The researcher states that subjects were placed into the heterosexual category if they scored 1 to 2, and into the homosexual category if they scored from 5-7. Thus while the boundaries that define these numbers are not known, it appears that the homosexual classification may have been allowed a slightly more flexible definition than the heterosexual one, possibly accounting for some of the more “homosexually-oriented” of the bisexuals. If this researcher’s “5” corresponds to others’ “4” (because his modified Kinsey scale is numbered 1-7 instead of the typically-used 0-6), then subjects others would have classified as bisexual were counted as homosexual. However, the exact degree to which this researcher’s classification scheme matches with the Kinsey rankings is not known. The potential effects of this apparent discrepancy in defining the heterosexual category and the lesbian one are not immediately apparent, but one can speculate that they may serve a similar function as the collapsing of the bisexual and lesbian categories discussed previously; that is, constructing a dichotomy of heterosexual/homosexual orientations that includes a wider range of possibilities for “homosexuality,” but is a false dichotomy nonetheless.

#### Neuroendocrine group: Articles 6-10

##### Article 6:

Subjects were recruited from the membership of a local homophile organization. Seventy-four homosexual men and women volunteered to participate. The criterion for inclusion in the study was that the subjects rated

their sexual experience in both behavior and imagery as primarily homosexual, defined here by a score of 5 or 6 on the Kinsey scale (Kinsey *et al.*, 1948) and by a clear pattern of homosexual response on the Sexual Orientation Method questionnaire (Sambrooks & MacCulloch, 1973). Four subjects (two male, two female) with bisexual preference were excluded. (71)

**Article 7:**

All participants were asked their sexual orientation: *homosexual, bisexual, or heterosexual*. (705)

**Article 8:**

Subjects made a self-declaration of their sexual orientation and completed the Kinsey scales (Kinsey *et al.*, 1948) which rank sexuality from 0 (exclusively heterosexual) to 6 (exclusively homosexual). The Kinsey scales were completed privately and sealed in envelopes that were not opened until the experiment was completed. Only those homosexual subjects scoring 3.5/6 or higher on the Kinsey scales (both fantasy and experience) were included in the study (1 male and 2 females were excluded based on this criterion). All heterosexual subjects scored either 0 or 1. (398)

**Article 9:**

Sexual orientation was classified according to the following criteria. Women were classified as homosexual if they reported 'extensive' homosexual experience, defined by Gebhard & Johnson (1979) as more than 20 female sexual partners or more than 50 homosexual experiences (with one or more partners). Women were classified as heterosexual if they met two criteria: (1), they reported either 'no' or 'rare' homosexual experience, the latter defined by Gebhard & Johnson (1979) as 1 female sexual partner or 1-5 homosexual experiences, *and* (2) they did not respond that they experienced 'much' or 'some' sexual arousal to questions about sexual arousal from seeing or thinking about other females. Using these rather stringent criteria, 478 cases could not be classified as either heterosexual or homosexual. Of the remaining 5,476 cases, 275 were classified as homosexual (lesbian) and 5,201 were classified as heterosexual. (117)

**Article 10<sup>5</sup>:**

Sexual orientation was determined by consistency of response on several questionnaire items. One item asked directly whether the person was heterosexual, homosexual, or bisexual. Two others were the Kinsey items on

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<sup>5</sup> Article 10 reported very little about sampling procedures, instead referring readers to a previous report for that discussion. The article containing the sample information (McFadden and Pasanen, 1998) was written by the same researchers and reported different data gathered on the same subjects, apparently within the same research session. That article was included in the original sample of 35 from which the subsample of 10 was constructed. For these reasons, the decision was made for this project to use that information as if it had in fact been presented in article 10.



sexual fantasies and experiences modeled on ref. 31. [Kinsey *et al.*, 1948] The rare uncertainties about classification were resolved by consulting additional items asked about ongoing or previous relationships. All decisions about subjects' sexual orientation were made in ignorance of the subjects' emissions data. (2710)<sup>6</sup>

### Discussion of Neuroendocrine Group

There is wide variation among these studies in the construction of categories of sexual orientation for analysis purposes. The issue of inconsistency, discussed for the Genetic and Brain/Cognition groups, applies to this group as well. Subjects are classified differently in every study, and it cannot be presumed that they would be placed in the same category of sexual orientation across studies.

Subject self-identification appears to have been used for at least part of the categorization criteria in most of these studies, the exception being study 9 and possibly study 6, although the latter is unclear. In only one study (7) was self-identification used as the sole categorization criterion. In studies 8 and 10, self-identification was supplemented by further questions, although of the two, only study 8 excluded subjects who had (apparently) self-identified as lesbian, because their Kinsey scores fell below the criterion level of 3.5. In study 10 bisexuals were included as a separate category. Besides self-classification, the other widely-used categorization method in these studies is the researchers' evaluation of subjects' responses to questions about current and/or overall adult sexual behaviors, feelings, and fantasies. The questions, time periods covered, and rating methods are standardized within studies, but not across them. Thus the sexual orientation groups are relatively consistently defined within each study, but comparisons of results from different studies are questionable.

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<sup>6</sup> Page number is from 1998 article.

As a categorization method, self-classification allows for little in the way of standardization of category definitions, as it is not known if, for example, one “lesbian” necessarily has any similar characteristics to another, other than choosing to identify oneself as lesbian. Given this unknown factor, there can be no certainty regarding the consistency of definition in terms of the concepts usually used to classify sexual orientation, such as behaviors, feelings, and fantasies. However, allowing for self-definition ensures participants are placed in the categories with which they themselves most closely identify, allowing for a different kind of consistency (and validity) of category definitions. Thus comparisons made across studies using self-definition as the categorization criterion may be useful, but must limit their findings and comparisons to the population of “self-defined lesbians,” and the same holds true for heterosexual and bisexuals. The question of how to categorize those who do not self-define in any of those three categories remains unanswered in this scenario.

Issues discussed in regard to the Genetic and Brain/Cognition groups regarding the collapsing of bisexuals into the category of lesbian or the exclusion of them altogether hold true here for some, but not all, of these studies. Specifically, studies 6, 8, and 9 make decisions to exclude certain potential subjects based on their failure to meet criteria for categorization as heterosexual or lesbian. Interestingly, studies 8 and 9 potentially do both – excluding and collapsing of bisexuals – in different ways. Study 8 excludes two women from the “homosexual” category who scored below 3.5 on their Kinsey ratings, thus a dichotomy of “0-1” heterosexuals and “3.5-6” homosexuals was established. However, widening the range for the lesbian group down to 3.5 effectively included some women who could have been classified as bisexual (most often 2-4 is considered the

range of bisexuality). As in study 5 (discussed in the Brain/Cognition group), this categorization scheme widens the range of possibilities for the lesbian definition but not the heterosexual one, with implications that are as yet undetermined, other than the construction of a falsely dichotomous sample.

In study 9 bisexuals are also both excluded and potentially collapsed into the lesbian category, but in slightly different ways from how that is achieved in study 8. In this study, the responses of women whose case histories were included in the Kinsey Institute's database were examined for compatibility with several criteria established to define heterosexual and lesbian samples. Although the researcher classified the women dichotomously, excluding 478 women who did not fit the heterosexual or lesbian criteria, a careful reading of the inclusion criteria (reported earlier) reveals that bisexuals were not necessarily excluded; rather, they may have been included and classified as (most likely) "homosexual." This is because the criteria do not evaluate the women's attraction or behavior regarding any category other than "other females." By these criteria it is unknown how many male sexual partners the women in either classification had or the degree of their potential attraction to men; the "homosexual women" could in fact be bisexual and still fit the stated criteria, and the "heterosexual" women could be asexual. Thus the criteria for categorizing sexual orientation in this study create additional limitations on how the data can be interpreted or compared to results from other studies, because only the degree of sexual experience with, and/or attraction to, other women was evaluated.

### Discussion

Two general problems arise from the way in which sexual orientation is categorized in the scientific studies of biological origins of lesbian and bisexual orientations in women: those related to reliability and to validity. Issues of reliability refer to whether the categorization scheme is consistent in classifying subjects; validity, whether the categorization schemes classify subjects “correctly.”

In the studies analyzed here, perhaps the most important reliability issue is not related to consistency of categorization within a particular study, but across all of them. First, researchers tend to utilize different categorization methods in each study, which makes comparisons of results between studies difficult. If the same person might be placed in different sexual orientation categories in different studies, the distinction between the categories themselves is called into question. As shown above, the different criteria employed for assignment to sexual orientation categories make it very possible for a subject to be classified differently by different researchers.

The element of interpretation inherent in the social (and socially-defined) nature of sexuality is one of the most significant hindrances to reliability within each study. When subjects self-rate or self-classify, there is little assurance that the various subjects’ definitions of the categories are consistent. Having researchers assign subjects to categories based on their responses to questions about their sexuality assumes that not only are subjects’ interpretations of questions and ratings consistent, but that the application of assignment criteria are as well, yet it “has the advantage of insuring that roughly the same definitions of the various sexual orientations are being applied to all subjects” (Stein 1999:224). In addition, changes over the life course in one’s

understandings and interpretations of one's own sexuality (even in the absence of any change in self-categorization) call longitudinal reliability into question.

The validity of the distinctions between the sexual orientation categories is also limited to the extent that the categorization procedures may result in inaccurate labeling. An issue of particular interest here is the way in which bisexual subjects are handled by the researchers. For example, in some studies, they are collapsed into the category "lesbian" for analysis purposes, while in other studies the rating criteria for the "lesbian" category effectively include some women who are bisexual, and in yet other cases bisexual women are excluded from the study entirely. These differences suggest that the "lesbian" group in particular might contain bisexual women in some cases and not in others, creating an issue of validity for the "lesbian" label.

Besides potential inaccuracies in the categorizing of subjects, validity is limited by the assumption of the "reality" of the two or three distinguishable sexual orientation classifications in the first place. Because there is no reason to think that the way we have defined sexual orientation categories corresponds to anything that exists "in nature," it is possible that the labels are at best a biased and inadequate way of capturing subjects' "actual" sexualities. To the extent that the measures and criteria result in categorizations based on a limited subset of the range of human sexuality, there is extremely limited validity to the categories as representing different "types" of people.

The limitations of the assignment of subjects to sexual orientation categories in these studies impact the meaningfulness and applicability of the results obtained. It is questionable because of problems of the validity of the categories whether the results obtained from a sample of "lesbian" subjects can be said to be applicable to lesbian

women in general. Also, data from one study should not be uncritically compared to data from another, as the variations in categorization criteria make ostensibly similar subject groups (such as of lesbian women) potentially quite different.

In addition, the methods of assigning subjects to sexual orientation categories, as well as the limitations of those procedures, point to the assumptions made by the researchers regarding the nature of their topic. Assumptions are a necessary part of undertaking any research program and thus are not inherently problematic; the issue is *what* assumptions are made and how they structure the research questions, methods, findings and interpretations (Stein 1999). Stein points out that when a study of the biology of sexual orientation accepts dominant cultural views of sexual orientation as basically binary and based on “the sex-gender of the people to whom a person is attracted,” (196) as do all those analyzed here, it indicates that it is

significantly limited insofar as it assumes a simplistic—and perhaps mistaken—picture of what a sexual orientation is. That most people in our culture see sexual orientation simplistically does not provide an argument for using such a simplistic account to do science. (196)

In her critique of the work of LeVay (1991), Spanier (1995a) notes that LeVay defended his decision to simplify sexuality in this manner because “simplification is sometimes needed to make scientific progress” (63). She rightfully points out that this is not “fact” but belief, and in fact “is one of the key value judgments he makes that affect his willingness to stretch the boundaries of valid science” (63). Thus LeVay’s decisions about what assumptions about sexual orientation to allow in his work were based themselves on culturally-influenced beliefs. In this way the shape of the entire project is molded by the researcher’s assumptions and beliefs, and evaluating its findings requires understanding those influences.

In summary, it can be argued that the sexual orientation categorization procedures used in the studies analyzed here, as with the sample recruitment procedures, reveal the assumption of the sexual orientation categories—heterosexual, homosexual/lesbian, and sometimes bisexual—as natural divisions of human sexuality. Issues such as the lack of standardization of who “counts” as heterosexual, bisexual, and lesbian (combined with the comparison of results across studies as if the study groups were the same), the acceptance of self-classifications, and the lack of serious consideration to changes over the life course indicate a deterministic view of sexual orientation as being a fixed identity. In addition, the acceptance of sexual orientation as basically binary and based solely upon the sex/gender object of one’s sexual feelings and behaviors suggests a simplistic, culturally-influenced basis of assumption for the research projects. The problematic conceptualization of such a critical component of this research—the measurement of the sexual orientation variable—seriously limits how results may be interpreted and what conclusions the researchers may reliably draw.

### Composition of the Samples

The third and final aspect of the sample critique focuses on the composition of the samples: their size and their representativeness in terms of demographic variables including age, race and/or ethnicity, social class (or socioeconomic status), education levels, and geographic region. Samples that are small in size or that are not representative in terms of these important demographic variables of the population being studied are limited in terms of to whom the findings may be considered applicable. Bouma and Atkinson (1995) state: “Only if the sample studied can be shown to represent

a larger population can the results of a study of the sample be taken to give reliable information about the larger population. If the sample studied is not representative, the conclusions drawn from the research must be limited to the sample studied” (138). Thus sample compositions must be examined in order to be able to evaluate the findings of a research study.

Examining research samples is a common feature of evaluations of scientific research studies because of the importance of sample size and makeup to the eventual results obtained. My readings of feminist and other critical analyses of scientific research suggest that samples are typically read for problems with the ways in which they were selected (discussed in a previous section), limitations due to small size or lack of controls, and possible limitations incurred by using samples with specific characteristics that make their results unlikely to reflect the diversity of the larger populations (see, for example, Byne 1995; McGuire 1995; Spanier 1995a; Stein 1999) Spanier, for example, notes that a study “with improper or too few controls, with an inadequate sample size, with a nonrepresentative or nonrandom sample” indicates poor design, which may be “inadequate for scientific validity” (59-60).

Because none of the studies included in this analysis are true probability studies, determining an appropriate sample size for representativeness is not a precise matter. Still, the size of the sample is of importance because it affects the calculations of statistical significance of results obtained (McGuire 1995). The smaller the sample size, the smaller is the possibility that differences seen between the two comparison groups reflect an actual difference between those groups in the larger population. In other words, with a small sample, the results from just a few subjects can change the outcome



of the comparisons. This is especially true when the differences expected between groups are small to begin with (Schutt 1996). Thus sample sizes are important even when the samples are not trying to be representative in the probabilistic sense.

Similarly, sample composition in terms of different social identities is important because they may have an effect on the aspect of identity being examined (lesbian and bisexual orientations). A sample that contains little diversity on such variables may produce results that are specific to those with the characteristics over-represented in the sample. Regarding socially-based differences, Allen (1997) states the following: "In any behavior as complex and socially sensitive as homosexuality, cultural and geographic differences undoubtedly are important in diagnosing the phenotype, especially by a self-rating method" (255). In other words, the definition of the "phenotype" (expression) of lesbian or bisexual orientation can be expected to vary with differences in cultural influences. Of Hamer's 1993 genetic study, Allen notes the "sample included 92% Caucasian non-Hispanic, 4% African-Americans, 3% Hispanic, and 1% Asian subjects," and asserts the following:

While the small number of non-Caucasian subjects may not have significantly influenced the results, the fact that cultural differences were not factored in suggests the degree to which the authors tend to view sexual orientation as a single, abstract, phenotypic behavior, the same wherever it is found. (1997:255)

Thus the importance, or lack thereof, that researchers place on methodological issues such as size and diversity in the sample, can reveal something about what they assume to be true of the "behavior" being studied. De Cecco and Parker note this as well, saying of another study that "[t]he belief that homosexuality inheres in the body led the biological

investigators to be cavalier in the identification and selection of subjects since one 'specimen' was essentially equal to all others" (1995:10).

The analysis of the compositions of the samples used in the ten scientific studies of biological origins of lesbian and bisexual orientations is conducted, then, not only to evaluate the validity and applicability of findings; in addition, it also provides insights into the framework of assumptions and beliefs that inform and shape the project as a whole.

### Method

The analysis of the composition of the research samples in the 10 articles on origins of lesbian and bisexual orientations in women is conducted following the examples of other feminist and critical analyses of sexual orientation research (Allen 1997; Byne 1995; De Cecco and Parker 1995; McGuire 1995; Spanier 1995a; Stein 1999; Zicklin 1997). The examination is initiated by locating the section of each article that discusses the size and characteristics of the research samples. This description almost always occurs in the "Method" section of scientific articles. The statements from the articles that contain this information are selected out for analysis and included below, separated according to the article groupings discussed previously (the Genetic group, the Brain/Cognition group, and the Neuroendocrine group). This division is utilized in order to organize the data more clearly, and to discern any differences in sample composition issues across the different scientific approaches to the topic.

The descriptions of the sample size and composition are then read closely and critically in order to answer the following question: "What are the sizes and demographic characteristics of the research samples, and what limitations might they present in terms

of validity and generalizability of results?" My discussion of the answers to these questions based on the information from the articles is presented in the "Discussion" sections for each article grouping (the Genetic group, the Brain/Cognition group, and the Neuroendocrine group). Finally, to conclude this section of the chapter I discuss the assumptions and beliefs of the researchers regarding lesbian and bisexual orientations in women, as suggested by the characteristics of their research samples, and their significance for the research project as a whole.

### Results

#### Genetic group: Articles 1, 2 and 3

##### Article 1:

Notices were placed in several local and national 'gay' periodicals requesting homosexual men and lesbians who were twins to contact us. ... Forty-eight people responded to our notices, of whom 46 returned completed questionnaires. Our respondents were predominantly young men (38 males, 8 females; mean age 31.8 (s.d. 9.25) years, range 18-60) of middle to higher social class. Forty-five identified themselves as primarily homosexual and one as bisexual, 42 were single and four had been married at some time. (408)

##### Article 2:

Probands were recruited through advertisements placed in lesbian-oriented publications in several cities across the United States: Chicago, Ill; Dallas, Houston, Austin, and San Antonio, Tex; Boston, Mass; and Los Angeles, Calif. ... This procedure resulted in 147 proband interviews: 115 probands with female twins and 32 probands with adoptive sisters. Descriptive characteristics of the sample are included in Table 1. Probands ranged in age from 19 to 57 years, with a mean age of 31.3 years. [Table 1 reveals that of the 147 probands, 126 (85.7%) were homosexual, 21 (14.3%) were bisexual, and the mean Kinsey rating was 4.8 ( $\pm 1.2$ ).] 217-218)

##### Article 3:

Announcements seeking participants for the study were distributed to local homophile organizations and social groups and to Women's Studies programs at universities within the Washington, D.C., metropolitan area. ...

This recruiting strategy resulted in a population consisting of 358 female probands over the age of 18 years. ...

The participants were white non-Hispanic (84.6%), Hispanic (7.3%), African American (3.9%), Asian (3.4%), and Middle-Eastern (0.8%), with a mean ( $\pm$  SD)

family annual income of \$46,000  $\pm$  \$21,000, and a mean ( $\pm$  SD) educational level of 15.0  $\pm$  2.8 years. Probands ranged in age from 18 to 68 years, with a mean ( $\pm$ SD) age of 31.4  $\pm$  8.7 years. (409)

Table I shows the distribution of the subject population according to composite Kinsey score and the average age for each of the three groups. [Table I reveals that there were 62 heterosexual women subjects with a mean age of 31.4 ( $\pm$  9.7) years; 114 bisexual women with a mean age of 28.1 ( $\pm$  9.4) years; and 182 lesbian women with a mean age of 33.2 ( $\pm$  7.3) years.]

### Discussion of Genetic group

In Article 1, the sample of lesbians (8) is very small, and while some demographic data are reported (mean age, predominant social class), they are not separated out for the samples of gay men and lesbians. A predominantly white, middle- to upper-class sample is reported, with a wide age range. Geographic region of participants is not reported but recruiting strategies targeted “local and national” publications (the study was conducted in England). Limitations on applicability and validity based on a sample of this size should be expected to be quite serious.

Article 2 reports a better sample size, with 147 probands, of whom 126 are lesbian and 21 are bisexual. The age range is fairly wide, but other variables are not reported. From the location of the recruiting advertisements it can be inferred that subjects came from various large cities (or their surrounding areas) in the U.S. Concerns about issues of race or ethnicity and social class with respect to the findings must be considered, as this information is not available.

The researchers in article 3 report the most detailed information about their sample. In terms of age, their sample is similar to that of study 2 in reflecting a wide range of ages and a mean of about 31 years for the sample as a whole. Study 3 also demonstrates improvement in racial representation over previous studies of sexuality (i.e. Hamer, *et al.* 1993, cf Allen 1997), although races other than white are still

underrepresented. As the sample was gathered solely in the Washington, D.C. area, it must be considered that this sample may represent subjects from large urban areas.

Average income suggests a high representation of middle-class subjects. The size of the sample, including the representation of all three sexual orientation categories, suggests

Article 3 is the best-designed of all the Genetic studies, with potentially the fewest limitations on validity and applicability of results as imposed by the sample.

#### Brain/Cognition group: Articles 4 and 5

##### Article 4:

Only data from persons with either exclusive (*sic*) lifelong (since puberty) heterosexual or exclusive lifelong homosexual histories are reported here. Finally, attempts were made to match groups of subjects within gender for age, educational level, and current and desired occupation (Table 1). [Table 1 reveals that there were 15 heterosexual and 15 homosexual female subjects. The heterosexual females had a mean age of 27.5 ( $\pm 1.1$ ) years, with a range of 21-32 years; mean education in years was 14.9 ( $\pm 0.5$ ), with a range of 12-18 years. The homosexual females had a mean age of 26.7 years ( $\pm 1.5$ ), with a range of 21-32 years; mean education in years was 14.9 ( $\pm 0.4$ ) with a range of 12-19 years.] (102-103)

##### Article 5:

Heterosexual men (20) and women (20) were primarily volunteer undergraduate and graduate students solicited through university bulletin board notices and word of mouth. Gay men (20) and lesbians (20) were solicited through bulletin board notices posted at university homophilic organizations, electronic bulletin board notices, a university booth at the local annual Gay Pride festival, and word of mouth. ... Participants were not selected based on ethnicity; however, only native-English speakers were invited to participate. The sample was primarily Caucasian. ... Subject variables are described in Table I. [Table I reveals that the lesbian subjects had a group mean SOS (Sexual Orientation Scale) score of 5.7 (SD 0.14), a mean age of 32.6 (SD 7.1), and a mean education level of 17.8 (SD 2.7). The heterosexual women had a group mean SOS score of 1.3 (SD 0.09), a mean age of 24.5 (SD 5.4), and a mean education level of 16.4 (SD 3.1).] (94-95)

#### Discussion of Brain/Cognition group

Both these studies have small samples, with “15 heterosexual and 15 homosexual female subjects” in Article 4 and 20 subjects from each of those categories in Article 5.

In Article 4, demographic information (including race and class) is not reported except for age, which revealed the sample to be predominantly young adults, and education level, which when combined with the other information (age, matching for “desired occupation”) suggests the sample may be primarily undergraduate students. Article 5 reports the sample to be mostly university students. Sampling from university students, while common, brings with it certain limitations and potential limitations, which will be discussed later in this section of the chapter.

Article 5 reports the sample to be “primarily Caucasian,” but does not give details. In both studies, subjects are recruited locally only, which should be considered when applying results to populations from different regions (the articles reveal the research was conducted at North Dakota State University and the University of Minnesota in Articles 4 and 5, respectively). Neither article studied bisexual subjects, so results cannot be applied to bisexual populations. Perhaps the most important limitation in both of these studies is the small sample size, which severely limits generalizability.

#### Neuroendocrine group: Articles 6-10

##### Article 6:

Subjects were recruited from the membership of a local homophile organization. Seventy-four homosexual men and women volunteered to participate. The criterion for inclusion in the study was that the subjects rated their sexual experience in both behavior and imagery as primarily homosexual, defined here by a score of 5 or 6 on the Kinsey scale (Kinsey *et al.*, 1948) and by a clear pattern of homosexual response on the Sexual Orientation Method questionnaire (Sambrooks & MacCulloch, 1973). Four subjects (two male, two female) with bisexual preference were excluded. Thus, the final sample consisted of 70 homosexuals (38 men: median age = 30 yr, min/max age 19/60 yr; 32 women: median age = 26 yr, min/max age = 19/45 yr). (71)

##### Article 7:

One hundred forty-one completed, analyzable questionnaires were returned by GLB persons (119 from those associated with PFLAG, 22 from college students). Two hundred sixty completed, analyzable questionnaires were returned by HET

persons (254 associated with PFLAG, 6 related to GLB college students). ... Demographic characteristics revealed that most participants were well-educated White persons (Table 1). Of the HETs, 86.% had at least some college education, while 93.5% of the GLBs had at least some college education. Nearly all of the participants were White (96.5%). HETs were, not surprisingly, more likely to be married or to have been married (95.4%) than were their GLB family members (8.8%). Since most HETs were the parents of the GLBs, the HET group was also older than the GLB group. Participants were represented from 30 states of diverse geographical location: West/Pacific (22.9%); Plains/Mountains (7.5%); Midwest (23.9%); South (17.8%); and East (27.9%). Nine of the 10 bisexual participants were women. (706)

[Table 1 (p. 707) reveals that the heterosexual group contained 178 women (68.5% of heterosexual group). The demographic data is not broken down by gender. The heterosexual group had a mean age of 54.9 years (SD 10.9), with a range of 20-84 years. The homosexual/bisexual group contained 56 women (39.7% of homosexual/bisexual group). The mean age of the homosexual/bisexual group was 30.0 years (SD 8.0), with a range of 17-58 years.]

#### Article 8:

All subjects were paid undergraduate volunteers recruited through campus newspaper and poster advertisements. Subjects who applied to participate were tested until samples reached the following sizes: 20 heterosexual males, 20 heterosexual females, 20 homosexual males, and 18 homosexual females. ... Only those homosexual subjects scoring 3.5/6 or higher on the Kinsey scales (both fantasy and experience) were included in the study (1 male and 2 females were excluded based on this criterion). ... Groups were matched for age and program of study (5 heterosexual males and 4 homosexual females were excluded based on these criteria). ... Table I contains the subjects' ( $N = 94$ ) sexual orientation, average Kinsey score (fantasy and experience), sex, and dextrality. [Table I reveals that there were 20 heterosexual female subjects with an average Kinsey score of 0.29 (SD 0.30), and 12 homosexual female subjects with an average Kinsey score of 4.13 (SD 0.61).] (397-398)

#### Article 9:

From 1938 to 1963, 17,502 case histories were recorded by the Kinsey Institute for Sex Research using the interview schedule devised by Alfred C. Kinsey (Gebhard & Johnson, 1979). These data are currently stored in several files. The files containing adult white and nonwhite females with no convictions for felonies or misdemeanors (other than traffic violations) comprise 5,954 cases. ... 478 cases could not be classified as either heterosexual or homosexual. Of the remaining 5,476 cases, 275 were classified as homosexual (lesbian) and 5,201 were classified as heterosexual. ... The two groups were also assessed on a number of other demographic variables, including age, year of birth, education level, and parental socioeconomic status. ... As shown in Table 1, age and year of birth differed between the two groups.

Education also differed, but, as mentioned earlier, parental SES is a better index than education of social class because many of the probands were still in school when interviewed. On this parental SES measure, the two groups did not differ significantly.

[Table 1 reveals that the lesbian subjects had a mean age of 33.74 years (SD 10.01), a mean education level of 15.23 (SD 3.35), and a mean parental SES of 4.78 (SD 1.58). The heterosexual women had a mean age of 28.77 years (SD 11.05), a mean education level of 14.46 (SD 2.70), and a mean parental SES of 4.92 (SD 1.35).] (117-118) <sup>7</sup>

#### Article 10<sup>8</sup>:

The average ages (and standard deviations) were 21.7 (2.4), 23.6 (5.3), 21.5 (2.1) ... for the female heterosexuals, homosexuals, and bisexuals ...respectively. (2710) <sup>9</sup>

[The] overall number of subjects [was] 132, with the individual *N*'s being 46, 24, and 16 for the female heterosexuals, homosexuals, and bisexuals, respectively... (2404) <sup>10</sup>

#### Discussion of Neuroendocrine group

In Article 6, the lesbian sample is made up of 32 subjects of fairly young average age. No heterosexual subjects were studied, and bisexual subjects were excluded from participation. No other information is provided, except that subjects were recruited locally, which according to the article notes would be Hamilton, Ontario, Canada. Thus the sample size is relatively small, most demographic variables are unknown, and the sample is geographically limited to one area.

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<sup>7</sup> The demographic measures were explained as follows: "Educational level could range from 1 (1st grade or illiterate) to 20 (PhD, MD, LL.D). Parental socioeconomic status (SES) refers to the financial status of the proband's parents when she was 14 to 17 years of age. It was coded on an eight-point scale from 1 (extreme poverty) to 8 (extreme wealth). Parental SES is preferred to proband's education as a measure of social class because many of the probands were still in school (i.e., college and university) when interviewed and their current educational level would not reflect their ultimate education level" (117-118).

<sup>8</sup> As discussed previously, some information comes from McFadden and Pasanen, 1998.

<sup>9</sup> Quotation and page number are from 1998 article.

<sup>10</sup> Quotation and page number are from 1999 article.



In contrast, the researchers in Article 7 report a great deal of demographic information about their subjects, although most of it is not separated out by gender. There were 47 lesbian and 9 bisexual women subjects for a total of 56 “non-heterosexual” women. Of the whole GLB sample, there was a fairly wide age range, which was even wider for the heterosexual sample. Both groups were predominantly white and well educated. Class information is not reported. Geographically the subjects represented a diverse sampling of different regions of the US, with 30 states represented, although because most subjects were obtained from chapters of Parents and Friends of Lesbians and Gays (PFLAG), one might infer that urban areas are more highly represented.

It is an interesting side note that Article 7 provides data on “Current relational status,” reporting that “HETs were, not surprisingly, more likely to be married or to have been married (95.4%) than were their GLB family members (8.8%)” (p. 706). Yet in Table 1, it is stated that 41.2% of the GLB group reports being “Unmarried, cohabitating with mate” (p. 707). It is not clear for what purpose the relational status data were obtained, but describing the makeup of the GLB group in terms of married/unmarried appears quite biased if those data are meant to encompass “relational status.”

In Article 8, the lesbian sample as analyzed consists of 12 women and the heterosexual women sample, 20 subjects. While the Methods section initially mentions having 20 lesbian subjects, a careful reading of the exclusions and the information in Table I reveals that only 12 were actually studied. No other demographic information is available other than that the subjects were undergraduate students who “were matched for

age and program of study” with the other sample groups. Subjects were recruited locally from the university population (University of Western Ontario in London, Ontario, Canada). The small sample size composed entirely of undergraduate university students suggests serious potential limitations on validity of findings and applicability to larger populations.

Article 9 contains by far the largest sample as it utilizes case histories obtained from a database of the Kinsey Institute. The analysis was conducted on 275 lesbian women and 5,201 heterosexual women. Efforts were made to compare the two groups on several demographic variables including age, education, and parental SES. Other variable including race are not reported (except to say that the database is composed of “white and nonwhite” women). A potential issue of limitation to consider is the cultural effect of the time period in which the data were gathered, especially when comparing the data to results obtained more currently. Although this analysis was published in 1998, the case histories are reported to have been gathered from 1938-1963. Changes in cultural attitudes toward homosexuality in the time since then make differences in subjects’ interpretations and definitions of sexual feelings and behaviors likely.

The researchers in Article 10 reported very little information about the makeup of their samples. Sample sizes of lesbian ( $N=24$ ) and bisexual ( $N=16$ ) women were rather small. Subjects were young, possibly resulting in part from at least one of the recruiting methods targeting university populations. It can be presumed that subjects were all recruited locally (Austin, Texas). No other demographic information is provided, making it very difficult to evaluate representativeness beyond those characteristics already mentioned.

### Discussion

What is interesting about the studies overall is at least as much what they do not report about their samples as what they do. In several cases, basic characteristics are simply not reported or are reported incompletely. Table 2 contains information for each article regarding whether demographic characteristics are reported (labeled “yes”), are not reported (labeled “no”), or are reported to some extent, but are in some way not fully explained (labeled incomplete). What the information in the table shows is that of the ten articles, four reported race data, but two of those were very incomplete; nine reported age data, with one doing so incompletely; three reported class data, with one doing so incompletely; and five reported data regarding education levels of the sample.

Articles with incomplete reporting of race data are Article 5, which reports only that the sample was “primarily Caucasian,” without numerical data or information about other races, and Article 9, which reports only that subjects were “white and nonwhite.” In Article 1, age information is described as incomplete because it is not broken down by gender, and class data are incomplete in that it is reported only that the sample was of “middle to higher social class,” without any numerical data or explanation of criteria.

Schutt (1996) notes that “evaluating the sample used in a study requires knowing exactly what the elements and the population were” (153). Evaluating the adequacy of the samples used in the studies analyzed here is hampered by not knowing what the characteristics of lesbian and bisexual women “in general”—the population—are for certain. If we assume that the basic demographic characteristics of lesbian and bisexual

**Table 2. Breakdown of articles' reports of demographic information about their subjects.**

<b>Article #</b>	<b>Age reported?</b>	<b>Class reported?</b>	<b>Education reported?</b>	<b>Race reported?</b>
1	incomplete	incomplete	no	no
2	yes	no	no	no
3	yes	yes	yes	yes
4	yes	no	yes	no
5	yes	no	yes	incomplete
6	yes	no	no	no
7	yes	no	yes	yes
8	no	no	no	no
9	yes	yes	yes	incomplete
10	yes	no	no	no

women are similar to those of the population as a whole, then the samples can be evaluated for the extent to which they are representative of the population at large. This step is hindered by the lack of full reporting of demographic characteristics found in most of the articles. The characteristic most frequently reported is age (usually mean age and age range), with 90% of the articles providing this information. Race information (beyond the two very incomplete descriptions), in contrast, was provided by only 20% of the studies.

The demographic data are important in particular to studies of sexual orientation because, as noted previously in a quotation from Allen (1997), they represent social identities that may bear upon how one comes to understand and experience highly-stigmatized same-sex sexual feelings or behaviors, and the ways in which such feelings or behaviors may (or may not) coalesce into a lesbian or bisexual "identity." Babbie (1996) notes that "[s]amples need not be representative in all respects; representativeness is limited to those characteristics that are relevant to the substantive interests of the study, though you may not know which are relevant" (192). One could argue that the limited

reporting of race, class, and to some extent, education data on the sample suggests that the researchers do not consider those characteristics to be “relevant to the substantive interests of the study.” This suggests a quite limited conceptualization of how sexual orientations develop.

Another issue for sample composition, raised previously in the “Sample Recruitment” section of this chapter, is the widespread use of undergraduate students. While exact counts of undergraduate subjects cannot be made, analysis of reported recruiting measures demonstrates that 57.14% of studies containing a heterosexual sample reported recruiting heterosexual subjects on their local campuses, and 50.0% of the studies containing lesbian subjects recruited them on local campuses. Of social-science research, Babbie (1996) writes:

It seems very likely that most social scientific laboratory experiments are conducted with college undergraduates as subjects. Typically, the experimenter asks students enrolled in his or her classes to participate in experiments or advertises for subjects in a college newspaper. ... In relation to the norm of generalizability in science, it is clear that this tendency represents a potential defect in social science research. Most simply put, college undergraduates are not typical of the public at large. (237)

Though the articles analyzed in this project are located in the realm of the natural sciences, it can be argued that they are also social-science research. The sexual orientations being studied, regardless of possible biological origin, are social identities impacted by culture and by their intersections with other social identities. Thus concerns about issues such as generalizability for this type of research are similar to the concerns in social-science research.

Samples composed largely or exclusively of undergraduate students are likely to over-represent specific categories of race, social class, and age relative to the general

population. Thus these samples cannot truly be considered representative nor the results obtained from them generalizable. Perhaps a more important concern than generalizability with regard to undergraduate students is that of the effect of their mean age on sexual orientation development. Allen (1997) notes that

human behaviors, including sexuality, can undergo significant change in the course of a lifetime. A twenty-year-old and a fifty-year-old are likely to view their sexuality, including the nature of their sexual attraction, quite differently. The fact that such changes are often related to, or even directly influenced by, changing social mores underscores the fluidity and variability of the human sexual response. This fluidity means, among other things, that the age at which someone's sexuality is studied is critical to both interpreting and classifying the behavior. (256)

Thus the typically young mean age in samples composed of undergraduate students may be important for sexual orientation research in terms of an inability to consider changes over the life course. Researchers must either note that the results obtained are primarily reflective of people in their twenties, or risk assuming that sexual orientation is "set in stone" from very early on. This assumption, as discussed in the previous section of this chapter, places the research in the position of being unable to provide evidence in support of the essential nature of sexual orientation.

The final issue to discuss is sample size. As noted earlier, there cannot be mathematical calculation of appropriate sample size for purposes of representativeness, because these articles are not using probability samples. That is not to say that sample size is not important. The researchers' determinations of whether their findings are statistically significant are impacted by sample size. With small samples, relatively small changes in the data obtained can sway statistical significance calculations. Also, explanatory statistical models are affected by sample size; of behavior-genetics studies,

McGuire (1995) notes: “Sample size is important not only for assigning standard errors to estimates of traits (something seldom calculated) but also for determining the complexity of the genetic model that one can test” (121). Thus the sample sizes used in the research on lesbian and bisexual orientations in women are worth noting for generally assessing potential validity of findings and interpretations.

**Table 3. Size of sample groups for each article.**

Article #	# of lesbian subjects	# of bisexual women subjects	# of heterosexual women subjects
1	8*	0*	0
2	126	21	0
3	182	114	62
4	15	0	15
5	20	0	20
6	32	0	0
7	45	9	178
8	12	0	20
9	275	0	5,201
10	24	16	46

\*While 8 women are included in the sample, one subject is noted to be bisexual without mention of whether that subject was a man or woman. Thus, there may have been 7 lesbians and 1 bisexual woman rather than 8 lesbians and no bisexual women, but this cannot be determined from the article.

The sample sizes for women subjects included in the studies are listed in Table 3.

As discussed in the previous section of this chapter (on assignment to sexual orientation categories), the numbers of subjects in each category in any given study should be evaluated in light of potential problems with assigning those labels. For example, in Article 9, databases from the Kinsey Institute were evaluated on the basis of criteria implemented by the researcher to determine in which sexual orientation category to place subjects. The limited focus of the criteria may have caused subjects to be placed in a

category different from that which they would have chosen for themselves, and possibly an inaccurate one.

As Table 3 shows, with the exception of Article 3 (with 114 bisexual women), samples of bisexual women were often excluded from analysis or else were so small as to be extremely questionable. Results obtained for bisexual subjects, then, should be considered very cautiously. For lesbian subjects, Article 9 had by far the largest sample, having used a Kinsey Institute database, and two of the behavior-genetics studies (Articles 2 and 3) had the other largest samples, with 126 and 182 respectively. The remaining seven articles all used samples of fewer than 50 subjects, with four of those consisting of 20 or fewer. While there is no “magic number,” these small sample sizes suggest that results must be evaluated carefully. It is hard to imagine that samples so small could produce meaningful information about lesbian women in general, particularly given the extreme heterogeneity of the population of lesbian women. However, as will be discussed in the section that follows, results from these studies are often interpreted as if they are significant contributions to the body of knowledge regarding sexual orientation, despite the limitations of sample size.

In conclusion, what is notable about the studies analyzed is that in large part, samples tend to be relatively homogeneous in terms of demographic characteristics, tending to be mostly white, of middle to upper-middle class, rather well-educated, and of fairly young mean age. For many studies, however, not all these characteristics are reported. Researchers tend to recruit frequently from university populations, despite the nonrepresentative nature of typical undergraduates and the specific effect of young age



on sexual orientation development issues. Sample sizes are frequently so small as to cast serious doubt on the validity and applicability of results for lesbian and bisexual women.

The composition and size of the samples used by researchers, as well as the interpretations they consider justifiable from their samples, provide insights into the assumptions of researchers about the nature of sexual orientation. The fact that small, relatively homogeneous, relatively young samples are used in sexual orientation research suggests that researchers may consider “one ‘specimen’ [to be] essentially equal to all others” (De Cecco and Parker 1995:10). The complexity of sexual orientation and its intersections with other social identities should not be ignored in this research. At the very least, researchers need to report more of the characteristics of their samples so that they may be better evaluated. In some respects, the sample reporting in Articles 3, 7, and 9 can be possible models for other researchers regarding reporting of sample characteristics.

#### Part IV: Critique of Interpretations of Data and

##### Conclusions Drawn

##### Introduction

The final element of the methodological critique in this project concerns the researchers’ interpretations of the data and conclusions drawn about them in the 10 scientific articles on biological origins of lesbian and bisexual orientations in women. The focus of this analysis is whether the conclusions drawn regarding biological origins of lesbian and bisexual orientations in women are a) consistent with the limitations imposed by the study sample, and b) interpreted in ways that are consistent with the

evidence and not worded to appear more significant than the evidence supports. Both these issues not only bear upon the validity of the scientific research itself, but also provide insights into the assumptions and beliefs of the researchers and their scientific communities.

In a field of scientific inquiry dominated by a certain paradigm of thought, as the analysis of the explanatory frameworks of these articles suggests is this case here, it is not only more likely that researchers may be careless in interpreting data in ways that support their hypotheses, but also that such flawed interpretations and conclusions may be published in scientific journals (Byne 1995; Spanier 1995a, 1995b). In addition, findings supporting dominant or popular views about “human nature” may be more likely to be picked up by major media outlets and achieve widespread acceptance (or at least public awareness), even if some of the interpretations of data and conclusions drawn are flawed (Bleier 1988b; Fausto-Sterling 1992b; Zicklin 1997).

In her critique of LeVay’s 1991 work, Spanier (1995a) points out “ways that LeVay’s article incorporates judgments biased toward a biological-determinist interpretation of sexual orientation and skewing his interpretations of his data” (67).

Spanier goes on to say:

LeVay simply joined other scientists in the not uncommon error of overlooking the limitations of his research to push for an unjustified conclusion. This case is a classic example of the search for some kind of physical difference to account biologically for phenomena that result from complex, multilayered sets of processes clearly influenced if not structured by macro- and microculture. (67)

Biologically-deterministic science that attempts to account for complex human phenomena such as sexual orientation is likely to run up against problems like contradictions in data, data that do not clearly support the hypotheses, and severe

limitations on how data may be interpreted and generalized. While some might argue that these issues are indications that the research design is poorly equipped to explain things like sexual orientation, “[f]or others, particularly those who accept the explanatory framework of a whole field, the uncertainties are the price paid for investigating complex or ill-understood phenomena” (Spanier 1995a:66).

In other words, interpretations of data that are biased toward supporting the dominant explanatory framework, despite the absence of solid, non-conflicting evidence are not necessarily uncommon. Because such research may receive less scrutiny from scientific peers (who are operating with the same explanatory paradigm), as discussed previously, it is important for those concerned about the impact and ramifications of such research to be able to challenge such scientific interpretations and conclusions. For feminists and others concerned about biological determinism in explanations of gender and sexuality, this means evaluating original scientific research to understand its findings, claims, and limitations (Fausto-Sterling 1992a; Spanier 1995a).

My decision to analyze the articles’ interpretations and conclusions is informed and inspired by the work of feminist biologists such as Ruth Bleier (1984, 1988b), Anne Fausto-Sterling (1992b, 2000), and Bonnie Spanier (1995a, 1995b). These scholars have applied their scientific knowledge to evaluating the validity of scientific claims in light of actual findings and limitations imposed by their samples and experimental design. Also, however, the decision to conduct the analysis, as well as its emphases, arise inductively from initial readings of the texts. These initial readings suggested specific areas of analysis in the interpretations and conclusions that I would likely not have thought of outside of the context of reading the articles themselves.

My analysis focuses on two issues, both of which have this inductive origin: first, an examination of whether and in what ways the sample limitations are considered in the interpretations and conclusions drawn from the data; and second, examination of whether and in what ways presentations and interpretations of findings occur in ways that are inconsistent with the available evidence—either the actual data obtained in the study itself or evidence cited from other studies. Both the prior critiques conducted by feminist scientists and my initial readings of the articles in my sample suggested to me that analyzing for these two issues might provide insights into not only the validity of the claims made in these articles but also the assumptions made by the researchers.

The first aspect of the analysis focuses on whether the limitations of the research samples, discussed in the previous section of this chapter, are taken into consideration when conclusions about the findings are being drawn. While using samples obtained non-randomly is accepted practice for difficult-to-reach populations in particular, researchers should be cautious in their interpretations of results obtained and in generalizing from non-random samples (Babbie 1996). Results obtained from samples that are small or that have characteristics that make them in some meaningful aspects unlike the larger populations they are meant to represent cannot be assumed to be valid for any group beyond the actual sample itself. Such results should not be used to generalize research findings to the larger populations from which the samples were drawn or to other populations. (Schutt 1996) Of behavior genetics studies of sexual orientation, McGuire (1995) writes: “If a representative sample is not available, the behavior-genetic researcher must attempt to assess the effects of non-random recruitment and report how they limit the generalizability of results” (121). In this section of the methodological

critique, I examine whether the researchers considered the limitations of their samples in interpreting results and drawing conclusions. The method for this analysis will be discussed shortly.

The second aspect of this analysis focuses on whether the discussion and interpretations of findings are consistent with the data that inform them. As Spanier (1995a) explains:

*Data can also be manipulated improperly and misrepresented. For example, the effects of increasing dosages of a drug may be presented numerically but not displayed on a graph, when graphing would show a dose-response curve inconsistent with a study's conclusions. In this and other ways, the conclusions stated about the data can be wrong or limited in ways not addressed by the author. Often the conclusions summarized in the abstract are simplified or overstated and are not supported by data buried in tables and diagrams. (60)*

Fausto-Sterling (1992b) provides many examples of how scientists' presentations of data can be manipulated in ways that go beyond actual findings. For example, of one study of the relations among sex differences, IQ, and brain size, she notes:

*They found a barely significant correlation between high IQ and greater brain size but no significant sex differences. They do not actually show most of their data, preferring to give their statistical results and conclusions, so it is hard to second guess their analysis. (1992b:227-228)*

Aside from presenting data in ways that obscure actual findings, researchers may simply make claims that their data do not support. Of a study of sex differences in the splenium (a portion of the corpus callosum), Fausto-Sterling asserts that "they claimed there is a sex difference in splenial surface area, but their own calculations showed it to be statistically insignificant" (1992b:232). Awareness of such misrepresentations is clearly of great importance to evaluating the validity of scientific claims.

Similarly, Spanier (1995b) notes that researchers may word interpretations in ways that, while not making overtly false claims, are misleading with regard to actual results. She notes the example of a summary statement in an article published in *Science* that states that a role of prenatal hormones in sexual orientation and in sex differences in cognition “has not been conclusively demonstrated,” which, according to Spanier, “implies that a hormonal role in sexual orientation or cognition has been demonstrated, but not conclusively, when it has not been demonstrated *at all*” (74, emphasis in original). This type of wording allows for interpretations of results that go beyond actual evidence and misleads readers into accepting the researchers’ poorly-supported interpretations.

Also, in interpreting what their data might mean, researchers’ commitments to their explanatory frameworks may blind them to the inconsistencies in their data or how they fit with data from other studies. Spanier critiques LeVay for “selective use of data,” pointing out that LeVay asserts his findings to be consistent with the work of Allen and Gorski (1990), when in fact some of his data are discrepant with that previous study (1995a). She also notes that in hypothesizing the links between the parts of the brain he studied and sexual orientation, LeVay cites empirical findings that support his assertions, but ignores studies that contradict them.

Such omissions suggest that researchers may make their findings appear more significant than they actually are. Again, it is only by being aware that such inconsistencies exist that one can make a fully-informed assessment of a study’s actual contributions to the body of knowledge. In addition, as discussed previously, researchers’ apparent blindness to inconsistencies between their data and their claims and

interpretations, as well as the fact that studies with these flaws are published in scientific journals, points to how “cultural values and beliefs that shape the predominating explanatory frameworks in science hold sway over scientific evidence” (Spanier 1995a:56).

To analyze the researchers’ interpretations, I compare the discussion and interpretation of research findings with the actual reported data, where possible, to determine if they are consistent. I also examine researchers’ use of other studies’ findings as evidentiary support, as suggested by the work of Spanier (1995a, 1995b). The procedure for this analysis will be discussed shortly.

It should be noted that this section of the analysis will necessarily be much more limited than the previous analyses that have informed it. The most thorough feminist analyses of interpretations and conclusions in scientific research studies have typically been done by those working in the natural sciences, such as Bleier (1984, 1988b), Fausto-Sterling (1992b, 2000), and Spanier (1995a, 1995b). Not only is my own scientific training limited relative to these scholars, but the scope of my project covers several different scientific fields and sub-fields, a detailed knowledge of all of which would not be possible. In acknowledging my own limitations, I aim to construct an analysis that is strong within its boundaries. This strength, I assert, comes from conducting a consistent, systematic analysis across all articles in the sample, and being accurate in my description and examination of the elements in my analysis.

### Method

My analysis of the articles’ interpretations and conclusions is composed of two elements. First is the examination of the researchers’ own assessments of the impact of

sample limitations when interpreting their data and drawing conclusions. This analysis is initiated by locating the portions of the article in which the researchers interpret their data and draw conclusions from them, typically the “Discussion” section. These portions of the article are read for any mention, direct or indirect, of the impact of the study sample’s limitations on the interpretations and conclusions of the research. Where such mention is located, the statements are selected out and quoted below.

Such mention, or lack thereof, is then assessed for the extent to which all three forms of sample limitation discussed in previous sections of this chapter —recruitment of subjects, assignment to sexual orientation categories, and composition—are given consideration by the researchers in interpreting their results and drawing conclusions. The assessment of researchers’ consideration of sample limitations is then interpreted for its effect on the evaluation of the validity of the interpretations and conclusions. In addition, I discuss insights gleaned about researchers’ assumptions and beliefs regarding sexual orientation from the way in which sample limitations are handled in the interpretations and conclusions.

The second element of this portion of my analysis is an examination of whether the research findings are interpreted and conclusions drawn in ways that are consistent with the data reported in the “Results” section, and with the other evidence cited. The “Discussion” section of each article is read for claims made regarding findings, and those claims are compared with the data presented in the “Results” section. Following the examples set in work by Bleier (1984, 1988b), Fausto-Sterling (1992b, 2000), and Spanier (1995a, 1995b), for example, as well as informed by my initial readings of the articles, the interpretations and conclusions are then evaluated for the following issues: 1)



interpretations based on statistically non-significant data as if they were significant, or based on supporting data while ignoring contradictory findings; and 2) interpretations and conclusions drawn that suggest greater support from other studies than is warranted, often through the use of vague or misleading language (Bleier 1984; Spanier 1995a, 1995b).

The results of reading for these two issues are presented below and assessed for how they impact the evaluation of the scientific validity of the study. In addition, I discuss possible interpretations of what the presence of these forms of selective interpretations of data may suggest about researchers' assumptions and beliefs about their topic of study.

### Results: Analysis of Researchers' Acknowledgment of Sample Limitations

#### Genetic group: Article 1, 2, and 3

In study 1, the two following statements are reported regarding limitations: "There are important limitations to the study, however, since this was a self-selected group examined by postal questionnaire and no confirmatory information was sought from their co-twins;" and "This result occurred despite possible biases towards concordance, such as homosexual probands exaggerating the chances that their twin might also be homosexual, or those having a homosexual co-twin finding the research more salient." Thus ascertainment bias regarding the self-selection of the participants is acknowledged, as is the issue of how the co-twins' sexual orientations were categorized. Potential problems with the sexual orientation categorization of the participants themselves are not addressed, nor are issues regarding the composition of the sample.

Researchers in study 2 included an entire subsection on potential ascertainment bias in their study in their concluding section (called “Comment”). The following issues are noted:

The primary threat to the validity of the central finding, that genetic factors may play a role in the origin of female sexual orientation, is ascertainment bias. Because probands were not obtained through systematic sampling, and particularly given the evidently low probability of ascertainment, it is possible that patterns of volunteering yielded misleading results. ... Twin probands in the present study were aware of its focus on twins and, hence, might be expected to consider their co-twins' sexual orientation in deciding whether to participate. ... One kind of ascertainment bias evident in our study was the overrepresentation of MZ probands, who constituted approximately two thirds of our sample. ... Another kind of ascertainment bias that occurred in the present study concerns the fact that probands were recruited via advertisements in homophile publications. (221)

In addition a later subsection on “Implications for the Causes of Sexual Orientation” restates the concern:

Given the serious methodologic concerns, particularly that of ascertainment bias, the inconsistency of some past research, and the small number of related studies, we urge that our results be evaluated cautiously. Although our results are highly suggestive of nonzero heritability, they are not conclusive. (222)

Regarding the issue of twins self-selecting for concordance, the researchers conducted analyses to test for “concordance-dependent bias,” and determined that it “was not large” (221). However, the high rate of compliance of subjects granting permission to contact their sisters (91.9% of living relatives), as well as the relatively high questionnaire return rate from subjects' sisters (89.7% of questionnaires mailed), suggests the probability of some self-selection on the basis of sibling relationship, although this in itself may not be related to concordance. The other two ascertainment biases, those of the high percentage of MZ probands and the process of recruiting through LGB publications, are of unknown implication. Neither issue necessarily produces error, but

in all likelihood probably reflects certain characteristics about the subjects in relation to sexual orientation that differentiate them in some way from the lesbian population at large. For both issues, the researchers suggest that it would be desirable for future studies to find ways to reduce these forms of ascertainment bias. Thus for study 2, issues of recruitment of participants are well addressed in the discussion of interpretations and conclusions. Issues of categorization of sexual orientation and sample composition are not discussed.

In study 3, as in study 2, the researchers include a discussion of ascertainment bias issues in their concluding section. They note:

Ascertainment is a particular problem when studying marginalized and secretive populations such as lesbians or bisexuals, making it virtually impossible to obtain a truly random sample. Thus, the data reported in this analysis do not necessarily apply to all lesbian or bisexual women, but only to the particular cohort that we studied. (416)

They also mention the problem of “ascertainment of heterosexual samples,” stating that it can be expected that a number of heterosexual women volunteering for a study of sexual orientation will “have some degree of same-sex orientation” (416). The researchers do not directly address limitations of sexual orientation categorization, although it is indirectly addressed in the discussion of the “stability of sexual orientation” component of the study, in which subjects were recontacted 12-18 months after the initial study. Researchers interpreted this data as demonstrating tentatively that there tends not to be change in orientation between heterosexual and nonheterosexual identities, but that there is some fluidity between bisexual and lesbian self-identifications. Issues of sample composition are not addressed.

**Brain/Cognition group: Articles 4 and 5**

In Article 4 the only issue related to the sample recruitment discussed is raised in reference to the study's failure replicate past findings of large differences between heterosexual men and women on the "water jar test" and on the Everyday Spatial Activities Test (ESAT). The authors state:

Hence, it is likely that some aspect of the procedures used to recruit subjects in the present study (matching of vocational interest) resulted in the selection of groups of heterosexual men and women that did not differ in their exposure to 'real-world' spatial activities or in their performance on the water jar task. (107)

This is relevant to the interpretation of the findings for lesbian subjects in that without a finding of sex differences, the basis for labeling lesbians' performance as being more like that of heterosexual men and less like that of heterosexual women is absent. To this point, the researchers note that "[i]nterpretation of the results of the water jar test is complicated by our failure to observe a significant sex difference among heterosexuals" (106). (The interpretations will be discussed in more detail in the next section of this study.) Thus the selection of subjects is addressed in one aspect, but not in such a way that acknowledges any limitations. Sexual orientation categorization and sample composition are not addressed.

Similarly, in Article 5 the only sample-related issue noted is the failure to control for menstrual cycle differences that may have caused the lack of findings of difference between heterosexual and lesbian women. The researcher states:

Given that menstrual cycle was not controlled in the current study, it is possible that differences between the female groups in menstrual-cycle phase may have confounded the detection of group differences in the neuropsychologic tests. Subsequent studies should collect menstrual phase data to safeguard against this potential confound. (105)

While it relates to the sample selection, this is really more of methodological issue, and doesn't address other important limitations of the sample.

#### Neuroendocrine Group: Articles 6-10

In study 6, no issues related to limitations of the sample are discussed in the interpretations of the results. In contrast, in article 7 several potential sample-related limitations are reported. The researcher notes the following:

The present study has several shortcomings. First, while larger than samples in many previous reports ... the sample size in this study was small ( $N = 401$ ). Second, the sample – predominantly (sic) White of mixed northern European heritage, well-educated, voluntary, and whose familial homosexuality had been disclosed to immediate family members – does not represent the true diversity of populations of heterosexuals and non-heterosexuals in the United States.

Third, it is not known to what extent, if any, participants in this study were forcibly “switched” as children into becoming right-handed. ... Fourth, while twins and persons who reported prior head injury (factors known to be associated with nonright-handedness) were excluded from data analysis, this information was not available from all participants. ... Fifth, only a small number of bisexual individuals participated (viz., nine females and one male). Therefore, until more complete data are obtained, definitive conclusions about handedness distribution and sexual orientation cannot be made.

Keeping the methodological shortcomings in mind, the findings suggest a reduction of right shift in gay and lesbian populations. (710)

Thus the researcher notes recruitment issues (ascertainment bias) when he mentions that the sample is comprised of those who volunteered and have disclosed their sexual orientation to their families. Also acknowledged are some of the limitations of the composition of the sample, including the size, lack of racial and educational-level diversity, and the small number of bisexuals. Issues of the categorization of sexual orientation, however, are not mentioned.

Unlike study 7, in study 8 the researchers do not acknowledge any sample-related limitations with the exception of a brief reference to the small sample size in the discussion of the results of lesbians' performance: “To our knowledge, this is the first

evidence suggesting that lesbians may have a more male-typical ability for a spaciomotor task, which in our small sample is not at the expense of female-typical superiority on another fine motor task” (404).

In article 9, the opposite is noted: twice in the concluding section the researcher notes the large size of his sample (the Kinsey Institute case histories). He writes: “In one of the largest samples of its kind in the world, lesbians were found to report being heavier and taller than comparable heterosexual women” (118), and:

Given the size and resulting power inherent in the present sample, and the fact that another study with adequate power (Bell et al., 1981) indicates no significant difference between lesbian and heterosexual women on age of puberty measures (e.g. age at menarche), it may not be premature to suggest that lesbians and heterosexual women do not differ in age of puberty onset. (119)

It may be pointed out, however, that the statistical power resulting from the very large sample size (5,476) is primarily due to the number of heterosexual women (5,201) and not the lesbian sample of 275 subjects. No other sample-related issues are discussed. Likewise, no possible limitations of the sample are discussed in article 10.

### Discussion

This analysis suggests that in the scientific articles studied, results are often interpreted and conclusions drawn with very little consideration of the potential impact of limitations caused by the sample recruitment, the categorization of sexual orientation in study subjects, and the composition of sample in terms of factors that affect representativeness. Specifically, five of the ten studies (Articles 4, 5, 6, 9, and 10) have no real mention of any of these sample-related potential limitations in the interpretations

and drawing of conclusions regarding their results.<sup>11</sup> Another study (Article 8) has an extremely brief mention (“our small sample”) of the fact that only 12 lesbians were analyzed.

Four of the studies (Articles 1, 2, 3, and 7) discuss issues related to the selection of subjects. Of these, only one (Article 3) specifically states that because of ascertainment bias, the findings should not be considered generalizable beyond the actual study group. In terms of article groups, it is interesting to note that all three of the genetic-influence articles (1, 2, and 3) discuss (or at least mention, in the case of Article 1) the potential influence of ascertainment bias on the interpretation of results, comprising three of the four studies to do so at all in the sample. This apparent greater awareness and willingness to acknowledge possible effects may be because ascertainment bias is more of a problem for genetic influence studies than for other types of studies (Allen 1997). Still, bias in the selection of subjects is present in other studies and the reporting of it in the genetic research could represent a model for others. One neuroendocrinological study (Article 7) also reports some ascertainment issues and is the only non-genetic study to do so.

In addition, Article 7 was the only one of all 10 to address the potential limitations of the sample composition – its non-representativeness in terms of race, education level, and number of bisexuals. Many studies do not even report these demographic variables, suggesting that they do not consider them of importance (as discussed in the previous section). Representative samples in sexuality studies are important, need to be reported

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<sup>11</sup> One of those (Article 4) mentioned an issue related to “procedures used to recruit subjects” that was not a limiting factor; another (Article 5) mentioned the methodological issue of the lack of menstrual-phase control among the female subjects. Neither issue relates to the discussion in the current study.

and where necessary, acknowledged as a potential cause of non-generalizability. Article 7 demonstrates that this can be done within the context of a scientific article.

Last, none of the studies directly addresses the issue of limitations in the way subjects' sexual orientations were categorized in the research. Article 1 mentions the potential for error caused by accepting subjects' questionnaire responses regarding their co-twins' sexual orientations without obtaining confirming information, but does not address the subjects' own sexual orientations. Study 3 indirectly addresses the issue of changing sexual orientation self-categorizations over the life course by conducting follow-up interviews with approximately half the original subjects 12-18 months after the original study, concluding that the subjects' sexual orientations were "quite stable" (411). Yet as the researchers themselves point out, "reassessment 12-18 months after the initial interview can hardly be considered a longitudinal study" (416).

The ways in which subjects' sexual orientations are ascertained and categorized create important questions of any findings and interpretations, as discussed in the previous section of this chapter, so it is necessary for the researchers to address these issues in a more substantial way. The limited way in which this is done in these studies may be indicative of the assumption that sampling limitations do not affect the "phenotype" under study.

### Results: Analysis of Inconsistency and Selectivity in Interpretations and Conclusions

#### Genetic Group: Articles 1, 2, and 3

In Article 1, 38 gay men and 8 lesbians who had a twin were studied for concordance of sexual orientation in twin pairs. The researchers report:



To our knowledge, this group of homosexual men and women who are members of twin pairs is the largest reported to date. There are important limitations to the study, however, since this was a self-selected group examined by postal questionnaire and no confirmatory information was sought from their co-twins. Nevertheless, there are two principal findings. First, the discordance for sexual orientation in both monozygotic and dizygotic pairs is striking and confirms that genetic factors are insufficient explanation of the development of sexual orientation. This result occurred despite possible biases towards concordance, such as homosexual probands exaggerating the chances that their twin might also be homosexual, or those having a homosexual co-twin finding the research more salient. ...

How do these findings inform future research into the origins of sexual orientation? It is clear that our current genetic and psychological theories are untenable. The co-twins of men and women who identify themselves as homosexual appear to have a potential for a range of sexual expression. (409) <sup>12</sup>

What is most noticeable in this article is the failure to discuss interpretations relative to men and women distinctly. In fact, in this article, the data are not reported separately, so interpretations cannot even be made separately post hoc. There is no way to know if the data for the female subjects support the researchers' interpretations. However, given that only eight of the subjects are women, strong statements about findings such as those in the passage just quoted are as yet unwarranted.

In study 2, no evidence of inconsistency is noted using the criteria discussed.

Researchers suggested caution in interpreting their results. For example, they wrote:

Given the serious methodologic concerns, particularly that of ascertainment bias, the inconsistency of some past research, and the small number of related studies, we urge that our results be evaluated cautiously. Although our results are highly suggestive of nonzero heritability, they are not conclusive. This caveat applies even more strongly to the parameter estimates, which are strongly dependent on assumptions of unknown validity. Our results should be considered the first word on this subject, rather than the last. We hope this study will inspire further, more definitive studies in the area. (222)

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<sup>12</sup> The second of the study's two findings is omitted here because it does not relate to biological origins of lesbian and bisexual orientations in women.

Thus these researchers demonstrate the type of situatedness in terms of assumptions that has been suggested by feminist science scholars.

In article 3, no evidence of inconsistency is noted. The researchers point out that their findings, because of ascertainment bias, “do not necessarily apply to all lesbian or bisexual women, but only to the particular cohort that we studied” (416). Their interpretation on the main issue examined is that “clear evidence of a familial component to female sexual orientation was obtained in our sample,” and they are careful not to overstate the genetic possibility for this familial component: “Despite the evidence for familial clustering of female sexual orientation, the source of this aggregation remains enigmatic”(417).

#### Brain/Cognition Group: Articles 4 and 5

In Article 4, the researchers report the following: “The present comparison of visuospatial performance among heterosexual and homosexual men and women reveals a significant relationship between sexual orientation and spatial ability, although the relationship is subtle and appears more prominent in men than women” (105). This interpretation could be read as suggesting more to the findings than actually existed. By making a interpretation ostensibly regarding “[t]he present comparison of visuospatial performance,” it suggests all or at least some of the tests demonstrated a significant findings. In actuality, for the lesbian group only one (the water jar test) of the four tests conducted showed a statistically significant difference in performance from heterosexual women, and even there, the finding of difference was only for one of the two measurement criteria. While the researchers do state that the “relationship is subtle,” they also imply that the very limited findings of difference in women may not be

reflective of reality by saying that the relationship “*appears* more prominent in men than women” (emphasis added). This tentativeness is made more noticeable when compared to the relatively apparent certainty one clause earlier (“reveals a significant relationship between sexual orientation and spatial ability”). The importance of this kind of construction of a “tone” through language will be discussed in more detail in Chapter 5.

In addition the researchers go on to interpret statistically nonsignificant results as possible evidence that lesbians are “more female-like” than heterosexual women:

Furthermore, and contrary to an expectation that that homosexual women would show ‘male-like’ performances, the scores of these women were either no different or poorer than those of their heterosexual peers. This was also evident on the self-report ESAT and geographical knowledge measures, where homosexual women indicated less spatial ability, although the differences were not statistically significant. (106)

The researchers use the statistically nonsignificant data from the latter two measures (self-report ESAT and geographical knowledge) to bolster results from an earlier measure that demonstrated results “poorer than those of their heterosexual peers” on one of two measurement criteria by stating the poorer performance is “*also* evident” (emphasis added) using the statistically nonsignificant data. By combining results in this way, both are made to appear more meaningful than is warranted.

This suggestion of meaningfulness is made use of when the researchers go on to interpret these results as suggesting that “quite possibly, in terms of cognitive ability (the present study) and aggressive behavioral characteristics (Gladue, unpublished observations), lesbian women may represent the more “female” region of such masculine-feminine continua” (106). In this quotation, the suggestion of meaningful results from the current study is added to results from “unpublished observations” to

draw a conclusion based on a combination of conflicting, nonsignificant, and unknown (to readers) data.

In article 5, two statements of interpretation of the findings relative to lesbian subjects may reflect some inconsistency. First, the researcher reports the following: “Over all the tests, gay men primarily scored in a female-direction compared to HT men and lesbians scored in a male-direction compared to HT women. Though these trends are not all significant, the consistency by which they occurred is noteworthy” (103). A reading of the results reveals no measure on which lesbians performed in a manner statistically significantly different from heterosexual women. By making an interpretative statement that effectively combines the results from gay men and lesbians, the researcher can state that “these trends are not all significant,” when in fact the only statistically significant trends relevant to sexual orientation were for men. In addition, the assertion of the “noteworthiness” of results that did not achieve statistical significance because of their “consistency” could be considered misleading, as it is suggestive of the potential importance of nonsignificant data.

The second possibly misleading statement regarding the lesbian subjects’ performance in Article 5 is the following: “Sex atypicality in lesbians’ performance was much less pervasive than that seen in gay men. A nonsignificant trend towards male-typical performance was revealed in measures of MR ability.” (104). In the first sentence the assertion that “sex atypicality ... was *much less pervasive* than that seen in gay men” (emphasis added) suggests that it was present, and possibly even pervasive, just *less* pervasive than the results from the gay men, when in fact there were no statistically significant “sex atypical” results. The second sentence notes this nonsignificance, yet

still implies importance through tone by reporting the “nonsignificant trend” as having been “revealed.”

#### Neuroendocrine Group: Articles 6-10

In study 6, one issue of inconsistency is noted. In the discussion, the researchers report the following: “The results for women were as predicted: Homosexuals showed a higher prevalence of left-hand preference than did the normative sample” (72). Statistical significance is implied. However, in the reporting of the results, the following is reported:

The proportion of homosexual women who showed non-CRH (22/32, 69%) was significantly greater than that of the general population (35%) ( $z = 3.55$ ,  $p = 0.0005$ , two-tailed). If the most common definition of hand preference was considered – hand used for writing – the female homosexuals showed only a trend toward greater left-hand preference (6/32, 19%) than in the general population (10%) ( $z = 1.71$ ,  $p = 0.09$ , two-tailed). (72)

Two slightly different terms are in use here: that of “non-CRH” (non-consistently right-handed), defined by “left-hand preference for at least one of the 12 tasks [evaluated], regardless of hand used for writing”; and “left-hand preference”, which the researchers state is most commonly defined by the writing hand. In the results, the researchers note that only non-CRH was statistically significant; left-hand preference in writing hand demonstrated only a nonsignificant trend. Yet the interpretative statement asserts that lesbians “showed a higher prevalence of left-hand preference,” not “non-CRH.” This could be read as an inconsistency, by interpreting findings based on data that were not statistically significant, or as misleading, by substituting “left-hand preference” for “non-CRH.”

In article 7, no evidence of inconsistency in interpretation is noted using the criteria for this study. In study 8, however, there are three related interpretative

statements of interest. First is the following: “Men and women also demonstrated a sexual orientation-dependent difference; gay males threw less accurately and lesbians tended to throw more accurately than their heterosexual counterparts” (403). The researcher reports that lesbians “*tended to throw more accurately*” rather than (in the case of gay men ) “*threw less accurately*” (emphasis added) because the difference for lesbians did not actually achieve statistical significance. Rather, it was a non-statistically-significant trend. While it could be argued that in this difference of wording the researchers are acknowledging that the difference is only a nonsignificant trend, in later interpretative statements no such acknowledgment can be found; interpretation continues on as if the difference were in fact significant. It should be noted at this point that on the other of the two tests (a fine motor task), lesbians demonstrated no measurable difference from heterosexual women at all. The next discussion of lesbians’ performance states the following:

To our knowledge, this is the first evidence suggesting that lesbians may have a more male-typical ability for a spaciomotor task, which in our small sample is not at the expense of female-typical superiority on another fine motor task. Thus, the motor task performance of lesbians does not seem to parallel that of heterosexual men. Rather, like gay males, it appears to be a composite of some male-typical and some female-typical abilities. (404)

At issue here is the labeling of lesbians’ performance on the throwing-accuracy task as “male-typical.” A reading of the results section shows that lesbians’ performance was in fact not statistically significantly different from that of heterosexual men; however, it also was not statistically significantly different from that of heterosexual women: “Lesbians did not differ significantly from heterosexual men, and moreover, *trends appeared* for lesbians to outperform both heterosexual women,  $t(30) = 1.96, p < 0.06$ , and gay men,  $t(44) = 1.77, p < 0.09$ ” (400, emphasis added). Therefore it is no

more accurate to call the lesbian subjects' performance "male-typical" than to call it "female-typical" regarding the comparison to heterosexual men and heterosexual women. In addition, the question is necessarily raised about the definition of "male-typical," when half the men—the gay men—averaged a worse performance than those of the lesbians. Clearly "male-typical" in actuality means "heterosexual-male-typical," although it is not stated as such. The use of these types of analogies will be discussed in more detail in Chapter 5.

In the first sentence of the passage just quoted it is interesting to note the placement of the phrase "in our small sample." Its location introduces and sets the tone for the clause regarding the test that showed no differences between lesbians and heterosexual women, rather than the one that showed the trend toward such differences. By this placement, the results showing no differences appear to be qualified or even questionable because of the "small sample" (12 lesbian subjects), but the findings of some differences do not appear to be qualified in the same way. Again, Chapter 5 will discuss these language-use issues further.

The third interpretative statement concerning lesbians' performance is the following: "Homosexual women show enhanced extrapersonal motor performance that is not at the expense of intrapersonal motor skill..." (405). In this re-stating and interpreting of the same findings noted above, what is noticeable is the lack of any mention of the limiting factors that have at least been mentioned briefly before: the statistical nonsignificance of the results, and the small sample size. Having set the stage by minimizing the importance of those limiting factors in previous statements, the researchers now draw this conclusion as if the two issues discussed were of no matter.

While it may at first seem unimportant to point out when researchers are overstating their results by using language in a way that subtly minimizes contradictions, in this example, the end result – the drawing of conclusions based on a complete ignoring of serious limitations – demonstrates the importance of this type of critique.

In Article 9, there are three potential issues of inconsistency present. The following is reported:

In one of the largest samples of its kind in the world, lesbians were found to report being heavier and taller than comparable heterosexual women. No difference in onset of puberty was observed. Although previous studies are few in number, and some lacked appropriate controls and/or had samples that were relatively small, the height and weight differences have been found before. Thus, some degree of generality should be attributed to these findings. These results, then, add to a small body of research indicating that homosexual women may score in the male-typical direction on some sex-dimorphic somatic and cognitive characteristics (e.g. Hall & Kimura, 1995; McCormick *et al.*, 1990; Holtzen, 1994). (118)

The first issue of interpretation inconsistency that is never mentioned in the discussion is that the subjects' weights were recorded only in 10 lb. increments (mentioned in Method section). The lesbians averaged a score of 13.16 and the heterosexual women 12.57, where 12 = 120-129 lbs. and 13 = 130-139 lbs. There is no way to tell from the data where in those ranges the women's weight actually fell (assuming they were honest in their self-reporting of weight). For example, 129 lbs. would be a score of 12, while 130 lbs. would be a 13. Thus the difference in weight between lesbians and heterosexual women, already small, could in fact be practically non-existent. The researcher does not raise this issue at all.

The second issue concerns the sentences in the passage quoted above in which the researcher makes two claims that could be read as functioning to make the results of this study seem more important than they may actually be. First, the importance of the



current results is asserted due to their concordance with past, similar findings, despite the note that there were important limitations to those past findings (“some lacked appropriate controls and/or had samples that were relatively small”). This serves to boost the apparent significance of the current work (“some degree of generality should be attributed to these findings”) by suggesting that it replicates similar findings. It could be considered misleading to propose that several potentially flawed studies together produce a body of important knowledge. Second is the claim that the current results “add to a small body of research indicating that homosexual women may score in the male-typical direction on some sex-dimorphic somatic and cognitive characteristics,” which makes a facile connection between findings that are not necessarily related (“somatic and cognitive characteristics”). Without any cognitive data, the results of this study do nothing to add to results from cognitive studies, yet by lumping them together, not only this work, but also the “small body of research,” is made to appear more significant.

The final issue in Article 9 concerns the researcher’s efforts in the interpretations to offer alternative explanations to the conclusion of biological differences between lesbians and heterosexual women by suggesting potential psychosocial explanations for why taller height might result in lesbianism. He suggests two main possibilities: that girls who are bigger might be less attractive to men, and that bigger girls might be more apt to play sports, both potentially resulting in the development of same-sex attractions. While critiquing these theories is beyond the scope of this discussion, it should be noted that the height difference found in the sample was an average of 0.35 inches (averages: lesbians = 64.62 inches, heterosexual women = 64.27 inches); and weight, while not accurately ascertainable (as discussed previously), scored a 0.59 difference on a scale in

10-lb. increments, suggesting that at most the average difference was 5.9 lbs. For the differences to be so small, the lesbian and heterosexual women's heights and weights must have been largely overlapping. Thus, the interpretations of how the differences in height and weight might lead to a lesbian orientation could be considered inconsistent with the actual data.

In Article 10, the no evidence of inconsistency is noted in the interpretations of the data obtained in the study. However, the interpretations and conclusions go on to assert mechanisms that might explain the results obtained. These interpretations suggest the support of other evidence that is not warranted. The authors state that the "logic of the argument is as follows:"

- (1) For mammals, it is commonly believed that the default phenotype is female, and the production of a male fetus requires exposure to high levels of androgens during the second trimester of prenatal development (cf. Fitch *et al.*, 1998).
- (2) Among the many masculinizing effects of androgens on the body, brain, and behavior of a male fetus is a change in the choice of sexual partner from the default choice of male to that of female. The fact that homosexual females also prefer females as sexual partners is in accord with the idea that some brain site(s) responsible for sexual preference have been masculinized at some point in development, perhaps prenatally. (2411)

At issue is part (2) of this argument, which builds from part (1) as if there were an unquestioned linkage, when in fact there is none. Part (1) is stated with a small degree of tentativeness ("it is commonly believed"), and contains a citation for evidence to support the assertion. In contrast, part (2) is stated with no such tentativeness ("[a]mong the many masculinizing effects ... is a change in the choice of sexual partner") and suggests the support of the study cited immediately prior, when in fact there is no such evidence. The construction of this set of interpretations could be considered a misleading use of prior data.

In addition, in the last sentence quoted above, the assertion is made that the evidence fits the model that “some brain site(s) responsible for sexual preference have been masculinized,” which combines two distinct unknowns: that there are sites in the brain that control sexual preference/orientation, and that masculinization can cause lesbian orientation. While the lack of evidence could be considered to be acknowledged in the tentativeness of “*some* brain site(s)” (emphasis added), as noted in the previous example, this tentativeness does not carry over into subsequent statements. The researchers go on (in part 3 of the argument) to say:

Accordingly, the existence of OAEs that are displaced in the male direction in homosexual and bisexual females suggests that the same processes that masculinized whatever brain centers are responsible for sexual preference also partially masculinized the cochleas of the nonheterosexual females. (2411-2412)

Thus despite not having evidence for “brain centers” in women that are “responsible for sexual preference,” the researchers claim these centers exist, but that what they are (e.g., “whatever brain centers”) has simply not yet been discovered. In addition, in this argument, those centers have been masculinized in lesbians, and somehow during that process, their cochleas were “partially masculinized” as well. The area of research focus (that which is unknown and being studied) has been turned back to the subjects’ cochleas, placing the other information (that masculinization causes lesbian orientation, and that there are brain sites that determine sexual orientation) in the realm of groundwork for the hypotheses regarding OAEs, as if those things are actually already known or can simply be assumed to be true. Such suggestions of other evidence that supports the researchers’ interpretations, when the “evidence” is actually only speculation, are misleading.

### Discussion

These findings suggest that in the scientific study of biological origins of lesbian and bisexual orientations in women, there are many cases of interpretations and conclusions being constructed in ways that draw on selective or misleading uses of evidence. In all but three of the articles analyzed, examples are found of interpretations drawing on statistically nonsignificant data, data from other sample groups or from other measures, or interpretations written in ways that imply more support from other evidence than is actually warranted. In contrast, two of the behavior-genetics studies (Articles 2 and 3) and one neuroendocrine study (Article 7) demonstrate examples of constructing interpretations in ways that do not overstate the data.

The construction of interpretations and drawing of conclusions from the data in scientific studies are of tremendous importance for several reasons. When scientific research is picked up by news media or evaluated by those not in the natural sciences, many times it is only the scientists' interpretations that get reported, not the cumbersome data (Fausto-Sterling 1992b; Spanier 1995a). Because of the highly-specialized nature of scientific sub-fields, even natural scientists are often not well equipped to analyze data from areas outside of their own specialization or to know all of the relevant literature.

Of sex-differences research, Bleier (1988b) writes:

This field is fraught with unexamined or untested assumptions, with inconclusive or contradictory findings and misleading interpretations that become incorporated into belief systems called *theories*, and with the reckless use of language designed to appeal to the news media and a reading public highly susceptible to scientific pronouncements, especially those that confirm common beliefs. (147)

Bleier's assertions could easily apply to the study of biological origins of sexual orientations as well, especially since many of the ideas overlap. The charges suggest that

the socially-sensitive topic of biology's role in sex differences and sexual orientation is complicated further by the many problems in the research being conducted.

Yet as noted by Spanier (1995a), it is quite possible that many scientists do not take issue with interpretations that may be skewed toward the dominant explanatory paradigm, instead seeing "the uncertainties [as] the price paid for investigating complex or ill-understood phenomena" (66). In this way, it can be said that the methodological problems relating to flawed interpretations point to researchers' assumptions about the nature of scientific progress and that these assumptions influence the course of scientific research itself.

Clearly the stakes are high in evaluating the validity of scientific interpretations of data obtained relating to biological origins of sexual orientations. The fact that the majority of the articles analyzed here contained some form of interpretations inconsistent with data or with prior evidence suggests that continued, close monitoring of scientific claims regarding biological origins of lesbian and bisexual orientations in women is necessary.

### Summary

My analysis consists of close readings of the scientific research articles on biological origins of lesbian and bisexual orientations in women in order to uncover methodological limitations. These limitations in the scientific methodologies help point to assumptions held by the researchers from which the limitations might logically follow. Evaluating the scientific claims made by researchers requires an understanding of the background assumptions that inform the research, in terms of what the science can

validly say about the topic. An understanding of methodological limitations also is necessary to assess the reliability, validity, and generalizability of results.

My findings demonstrate that the body of research analyzed in this project contains important limitations in its approaches to the topic, its sampling procedures, and its interpretations of data. First, the dominance of the masculinization hypothesis in the explanatory frameworks of the research implies that researchers assume sexual orientation to be biologically determined and related in an essential way to sex and gender. The cultural and historical specificity of these views of sexual orientation suggests limitations on interpreting the research findings outside of the context of those assumptions.

Second, limitations in the sampling procedures also suggest that researchers view sexual orientation as innate and not significantly affected by different experiences or interpretations of either sexual orientation itself or other social identities. The sampling procedures place serious limitations on to whom the results can be generalized. The categorization procedures for sexual orientation in the samples additionally create some reliability and validity problems.

Last, the interpretations of the data and conclusions are often drawn in a manner that overstates the actual research findings. The researchers often do not mention the limitations of their samples when interpreting findings and drawing conclusions, which overstates the degree of generalizability of the findings, and in some cases overstates the reliability and validity as well. Failure to consider sample limitations could indicate the assumption of essentialism of sexual orientation, because it suggests the idea that even limited samples are representative of everyone in a given sexual orientation category.

Also, the significance of findings of differences between heterosexual women and lesbian and/or bisexual women is frequently exaggerated in various ways. This finding provides insights into how the scientists may view the research field, as discussed by Spanier (1995a). For example, it may suggest that researchers are predominantly convinced that the masculinization hypothesis is correct, and thus consider even non-significant trends to be evidence in support of the explanatory framework.

In sum, my findings demonstrate some limitations of the scientific research methodologies. These limitations affect various aspects of the validity, reliability, and generalizability of the scientific research findings. In addition, they suggest background assumptions held by the researchers, primarily that sexual orientation is a biologically determined and essential characteristic, and that sexual orientation follows from sex and gender in a specific way. Awareness of these assumptions is important contextual information for evaluating the scientific claims.

## **CHAPTER 5**

### **ANALYSIS OF THE SCIENTIFIC DISCOURSE**

#### **Introduction**

**In this chapter I will present a discourse analysis of the underlying meanings associated with women's lesbian and bisexual orientations in the previously-constructed sample of scientific articles. The goal is to uncover researchers' ideological assumptions embedded in the scientific discourses on lesbian and bisexual orientations and their intersections with ideologies of gender, sexual orientation, and race. Previous critical analyses of scientific discourse, such as those discussed in Chapters 2 and 3, suggest that hegemonic ideologies infuse supposedly objective and value-neutral science in increasingly latent ways (Harding 1986; Spanier 1995). Feminist science studies scholars have argued that we need good, systematic methods to uncover the implicit meanings and assumptions in science, because they often serve to maintain social inequalities (Longino and Doell 1983; Harding 1986; Keller 1993; Spanier 1995b).**

**Analyses of scientific discourses are one way to bring cultural ideologies of gender, race, class, and sexuality to light. Feminist science scholars have proposed the importance of reading actual scientific texts, such as scholarly articles, to examine the ways in which the scientific discourse reveals and perpetuates hegemonic biases (Longino and Doell, 1983; Fausto-Sterling, 1991; Spanier, 1995a). As Harding notes:**

**In textual criticism, metaphors of gender politics in the writings of the fathers of modern science, as well as in the claims made by the defenders**



of the scientific world view today, are no longer read as individual idiosyncrasies or as irrelevant to the meanings science has for its enthusiasts. Furthermore, the concern to define and maintain a series of rigid dichotomies in science and epistemology no longer appears to be a reflection of the progressive character of scientific inquiry; rather, it is inextricably connected with specifically masculine – and perhaps uniquely Western and bourgeois – needs and desires. (Harding 1986:23)

Thus in feminist science studies, discourse analysis (“textual criticism” in Harding’s words) is a critical methodology used to expose the ways in which the meanings science constructs are often borne of sexist, racist, classist, and heterosexist standpoints. These standpoints are reproduced in the very language the scientists use to investigate and describe the natural world. Spanier writes: “A feminist analysis of scientific discourse is based on the theory that language can both create and reflect—and thus perpetuate—gendered concepts that reproduce sexist, racist, and classist biases” (1995b:44). The natural world thus described is not the only “reality,” but rather is one “reality” as seen through the eyes of the socially privileged.

This current study utilizes these insights in order to uncover the ways in which scientific knowledge about biological origins of lesbian and bisexual orientations in women is shaped by cultural ideologies concerning gender, sexual orientation, and race. Because the focus of this analysis is a scientific discourse on lesbian and bisexual women, issues related to sex, gender, sexuality, and their intersections are of clear interest. Jacobus, Keller, and Shuttleworth (1990) describe similar work as

contesting the inevitability or naturalness of supposedly ‘scientific’ definitions of women’s bodies by showing how the discourses and narratives of science not only construct but depend on the very institution of gender which scientists claim to discover or observe. (Jacobus, Keller, and Shuttleworth 1990:7)

This analysis seeks to understand the ways in which the scientific discourse is infused at all levels with culturally-specific constructions of gender and sexuality. An analysis of race is conducted as well, because of the assertion of feminist standpoint epistemology that gender and race intersect and mutually construct one another (Collins 1990).

The analysis itself takes the form of identifying and interpreting the usage of language, concepts, and imagery related to sex, gender, sexual orientation, or race that either recur or fit together with other, similar usage in order to form what I call “themes” in the discourse. While the decision to analyze issues related to sex, gender, sexual orientation, and race was made based on the feminist standpoint epistemology that informs this project, the themes are generated inductively by reading the texts looking for uses of these concepts. First, the articles are read with a focus on locating whether terminology related to gender, sexual orientation, and race is in fact present in the texts, and if so, what meanings can be inferred from the contexts of their use. Second, concepts and their contexts are then subjected to additional, close readings in order to discern explicit, implicit, denotative, and connotative meanings

Five themes emerged as a result of my critical reading of the sample articles. They are: 1) the impreciseness of definitions given to key concepts related to sex, gender, and sexuality; 2) the equivalence of “sexual orientation” and “homosexuality” in the framing of the central issue, combined with a lack of actual investigation of heterosexual identity; 3) the conflation of the concepts of sex, gender, and sexuality; 4) language reflecting the understanding of lesbian and bisexual orientations as either a) somehow problematic or b) deviant; and 5) language related to race. The first four themes represent recurring issues derived from the ways in which the concepts of gender and

sexual orientation are used in the texts. The fifth theme, dealing with race in the texts, is different in that it reveals a relative absence of such language.

The remainder of this chapter is organized as follows: first, an explanation of the discourse analysis procedure used in the project, including a brief explanation of the similarities and differences between the two main scientific approaches within the general discourse under study. Next, the five themes are interpreted and their significance is discussed. The chapter concludes with a discussion of the ways in which the themes intersect and interact within the discourse as a whole.

### Explanation of the Methodology

Informed by feminist standpoint epistemologies, this analysis seeks to understand the ways in which ideological understandings of sex, gender, sexual orientation, and race are constructed and reproduced in the scientific discourse on lesbian and bisexual orientations in women from 1990-2000. To do so, I must first ascertain whether these concepts are present in the discourse at all, and if so, how they are presented. By “how they are presented,” I refer to the meanings given them in the discourse—explicitly or implicitly, by denotation or by connotation. When not present in manifest form, these meanings can be inferred from the contexts in which there is terminology related to sex, gender, sexual orientation, and race.

The first step in the analysis is to determine what terminology is to be counted as a use of a sex, gender, sexual orientation, or race concept. For this step, lists of words and phrases are generated, with the option left open to include terminology encountered in the texts that had not been anticipated, but that refers to gender, sexual orientation, or

race. The initial readings look for terminology describing biological sex, such “male” and “female”; gender concepts such as “masculine” and “feminine,” as well as gendered pronouns; “sexual orientation” discussed in itself or by descriptive categories (including heterosexual, homosexual, bisexual, lesbian, and gay); and race, discussed as a concept in itself, by categories (including ethnicity categories often used as “races,” such as “African-American”), or by phrases related to how races are often thought to be distinguished, such as “skin color.” The texts are read separately for each of the four general concepts and coded by marking their occurrences (with different colors of highlighter pen) so that they may be analyzed further within their textual context.

Once the various uses of the central concepts are identified, the analysis of their contextual meanings begins. At this point, the grammatical positionings of the concepts are noted and coded, including whether they are used as modifiers (such as adjectives) or whether they are modified themselves (and if so, by what), whether they exist as the subject or object of some action (and what action). From these uses and contexts, meanings are interpreted. The rationale for this method comes from discourse analysis literature; for example, Gee states the following:

Speakers and writers use these grammatical devices to shape their texts ‘as if’ they (the speakers and writers and the texts) had certain ‘goals’ and ‘purposes.’ As listeners and receivers we ‘recover’ these goals and purposes by paying attention to the uses to which these grammatical devices are put. (Gee 1999:161)

This step in the analysis is to make conscious and explicit the latter step Gee mentions, by “paying attention” in a systematic and methodical way.

From reading the different ways in which the four main concepts of analysis are used, meanings are interpreted and patterns or themes emerge inductively from the texts.

Once themes are identified, the contexts of the thematized uses of gender, sexual orientation, and race concepts are subjected to close readings to interpret “goals and purposes.” The analyses are discussed later in this chapter and focus on ideological functions served by the meanings constructed for gender, sexual orientation, and race.

As a discourse analysis is only as good as the analyst who conducts it, I cannot claim to have uncovered all of the important elements in these texts. What I argue is that by focusing on the ways in which gender, sexual orientation, and race concepts are used and the contexts surrounding these uses, I have uncovered some themes with significance to this feminist science studies project. By employing a systematic method, I believe that another researcher with similar commitments could reproduce this analysis and find similar themes, although that is not to say that we would necessarily find all the same things or have the same things to say about them.

Another caveat concerns the scientific discourse studied. Because scientific fields of study represented in the sample of articles are quite different (behavioral-genetics and neuroendocrinology), it could be argued that the articles do not together construct a single scientific discourse despite their commonalities. To address this caveat requires elucidating the ways in which the seemingly different explanatory frameworks in the genetic and biological studies actually work together.

#### Overlapping Arguments: Genetic and Neuroendocrine Approaches

To avoid the criticism of having lumped together very different discourses, it is important to show more specifically how it is that the approaches based on behavioral genetics and neuroendocrine theories do in fact overlap. It can be shown that the studies

seeking genetic influences tend to incorporate the neuroendocrine approach into their theoretical framework. For example, in one genetic study, the following is stated:

The dearth of genetic data on females is unfortunate, as there is no strong reason to expect that genetic findings for males will be similar to those for females. The most influential biologic theories of sexual orientation posit that the development of attraction to males results if relevant neural structures do not masculinize. Thus, different processes are hypothesized for male and female homosexuality, suggesting that if genetic factors contribute to female sexual orientation, they may differ from those for male sexual orientation. (2:217)

In this passage, the authors hypothesize that the “genetic factors [that] contribute to female sexual orientation” may operate by influencing the “masculinization,” or lack thereof, of “relevant neural structures”. This “masculinization” is thought to result from the release of androgens at certain periods in fetal development. In this article, then, it is clear that genetic and neuroendocrine explanatory frameworks are not separate at all, but rather represent attempts to explain different aspects of the same process. Another example of this is the following:

The clearest evidence linking genetics and sexual orientation in a subset of women comes from studies of female patients with congenital adrenal hyperplasia (CAH), a group of enzymatic deficiencies in cortisol biosynthesis transmitted by autosomal recessive genes. The most common form, accounting for 95% of the cases, is a deficiency in 21-hydroxylase activity mediated by the cytochrome P450c21 gene located within the human HLA major histocompatibility locus on the short arm of chromosome 6. Insufficient cortisol production results in an increased accumulation of androgens, causing a masculinization of the genitalia to varying degrees. Influences on the developing brain are also believed to occur but are not well understood. However, a ‘masculine’ pattern of gender-role behavior has been reported ... [as have] higher rates of homosexual orientation, behavior and fantasy couple with lower rates of heterosexual activity... These results suggest that excess prenatal androgens can predispose some women toward the development of a homosexual orientation. (3: 408)

Thus, the effort to find genetic factors in the development of lesbian and bisexual orientations in women utilizes the neuroendocrine model as an explanation of how the genetic factor may come to be expressed as a lesbian or bisexual phenotype. In these

genetic studies, not surprisingly, the hypothesized “genetic factors” are conceptualized as those that influence, if not create, the conditions in which “excess prenatal androgens” occur. The genetics studies, then, are in the position of explaining an “earlier step” in the same neuroendocrinological process thought to result in the development of lesbian or bisexual orientations in women.

The studies utilizing a neuroendocrine approach often do not explicitly state the genetic component, yet it is implicitly understood. The process of sexual differentiation of sexual orientation thought to be altered by the introduction of “excess prenatal androgens” is genetically triggered. For example, one article states:

The observation that neuroanatomy (Swaab and Hofman, 1990; LeVay, 1991; Allen and Gorski, 1992), neuroendocrine functioning (Gladue *et al.*, 1984; but see also Hendricks *et al.*, 1989), and some cognitive abilities (Sanders and Ross-Field, 1986a; but see also Tuttle and Pillard, 1991) differ with respect to sexual orientation may further support a neurohormonal theory of sexual orientation. A genetic relationship has been demonstrated with sexual orientation (Hamer *et al.*, 1993) in at least some males. It is possible that genetic material is associated with sexual orientation by introducing variation, directly or indirectly, to the early hormonal environment. (8:396)

By understanding the ways in which these two frameworks are thought to work together, it can be shown that they overlap and produce what can be considered a single discourse on the scientific study of biological origins of lesbian and bisexual orientations in women. The genetic studies often use neuroendocrine theories to explain how the hypothesized genetic influence comes to result in a lesbian or bisexual phenotype, and the neuroendocrine studies make use of a genetically-influenced process of sexual differentiation as a framework for explaining the process by which hormones can affect sexual orientation outcomes.

Logically, the neuroendocrine studies cannot be separated from those hypothesizing genetic bases because they propose a prenatal, endogenous route by which sexual orientation develops. In other words, there must be some genetic influence creating “excess prenatal androgens” because no external cause is proposed. The genetic studies, on the other hand, do not have to rely on a neuroendocrine model of sexual orientation development. They could propose entirely different pathways by which a genetic influence is exerted upon sexual orientation. Yet the hormonal paradigm so dominates the current scientific discourse on origins of lesbian and bisexual orientations in women that, as shown, genetics researchers often make use of this explanatory scheme as well.

The neuroendocrine model also guides where the genetics researchers focus their attention. For example, the belief in “overmasculinization” as the cause of lesbian and bisexual orientations in women is exemplified by the fact that one behavioral genetics study in this sample evaluates “childhood gender nonconformity” – “interest in stereotypically masculine and feminine activities during childhood as well as childhood gender identity (ie, comfort being a girl vs the desire to be a boy)” as a potential marker of “genetic loading” for homosexuality (2:219). Thus despite differences in the scientific field in which the research studies are conducted and in research focus, the discourse is integrated by the common search for biological causes of lesbian and bisexual orientations, and in large part by the dominant framework of explanation. The scientific discourse is also woven together by several themes relevant to the construction of meanings regarding lesbian and bisexual orientations in women, which are the subject of the next section of this chapter.



### **Results: Themes in the Discourse**

The results of the analysis of the scientific discourse are divided into five main themes. The themes reflect similarities or recurrences seen in reading the texts for meanings associated with the concepts of gender, sexual orientation, and race. They are discussed separately, yet there are areas in which the themes overlap and intersect. The ways in which they work together are elaborated upon in the discussion section that concludes the chapter, after the five themes have each been discussed.

#### **Theme 1: Impreciseness in Defining**

##### **Sexual Orientation Concepts**

The first theme concerns the lack of specificity encountered in the definitions applied to the central concepts relating to sexual orientation. I argue that despite the contested, culturally-specific nature of “sexual orientation” and its categories, the scientific articles tend not to specify or explain exactly what meanings the terms are given for the purposes of the research. The concepts are left open to many potential meanings, some of which are relevant to the actual experimental data and some of which may not be. This lack of precision runs counter to what is expected of scientific research, and suggests ideological functions of the scientific discourse.

Discussion of this issue is divided into two sections, reflecting the differences in the two major parts of the articles in which the impreciseness is noted. The first part focuses on the introductory section of the articles, and discusses how, from the beginning, there is a lack of explicit definition combined with use of associations and equivalences to create implicit definitions. In other words, the articles tend to introduce their central

topic of sexual orientation without explicitly explaining how they are using the term, instead leaving the reader to figure out what is meant from the contextual cues. The second part focuses on the methods section of the articles, in which sexual orientation is categorized for the purposes of creating groups of subjects. What is noted in this section is an apparent assumption of natural categories of heterosexual, homosexual, and bisexual, without defense or support, casting doubt on the value-neutrality of the scientific discourse and on the validity of the project.

**Introducing the Concepts: What's  
the Matter Here?**

Close readings of the introductory sections of the articles in the sample suggest the relative absence of manifest, stated definitions of sexual orientation concepts. In other words, concepts that are absolutely central to the scientific discourse, such as “sexual orientation,” “lesbian,” “bisexual,” and “heterosexual,” are put forth in the texts without explanation of the meanings being attributed to them. Because these concepts are so central to the scientific project, and because their definitions are so complex and contested in the current sociohistorical context, the way in which these concepts are defined for use in this scientific discourse is of crucial importance. Thus, the absence of stated definitions has a great deal of significance, not only in terms of reproducing heterosexual privilege, but also concerning the validity of the study. Specificity is necessary to defining the subject of scientific research so that there is certainty regarding “what is being compared to what,” as well as for comparing results across studies. As Stein notes:

It is crucial for scientific research on sexual orientation to carefully define its object of study in order to divide people into sexual

orientations in a reasonable fashion and in ways that do not skew its results. A study of sexual orientation must start with some (at least implicit) definition of sexual orientation: who will count as a homosexual or a heterosexual? (1999:195)

While the variables and concepts central to the research are typically explained or defined when they are introduced, I have found that in this literature it is rare to have any such manifest explanation or definition. Implicit meanings, however, are constructed throughout. These implicit meanings are created by associations in the language used in discussing sexual orientation concepts, and by the positioning of the reader in terms of assumptions necessary to make sense of the discussion. At the same time, the appearance of intention in the use of implicit meanings and ideological understandings can be avoided by the researchers; as Keller points out, “[t]he use of a term with established colloquial meaning in a technical context permits the simultaneous transfer and denial of its colloquial connotations” (Keller 1992:121). The implicit meanings allow the “standpoint” or the epistemology of the researchers to frame the discourse but to remain invisible in the process.

The introductory paragraph of one article in the sample follows:

More than 50 years ago, Hirschfeld noted that both male and female homosexuality appeared to be familial. Only recently, however, have researchers rigorously begun to test Hirschfeld’s observations and systematically explored the nature of the familiarity. Pillard and Weinrich found a significantly higher rate of homosexuality among brothers of homosexual men than among brothers of heterosexual men. Using a combination of twin and adoption methods, Bailey and Pillard found evidence that male sexual orientation is moderately heritable. Female homosexuality also appears to be familial. Pillard found 25% of sisters of homosexual female probands to be homosexual (including bisexuals), compared with 11% of the sisters of heterosexual female probands. Bailey and Benishay found that, depending on the criterion, from 12% to 35% of sisters of homosexual probands were homosexual compared with 2% to 14% of sisters of heterosexual probands. Although familiarity may arise from shared environmental as well as genetic factors, these findings support the desirability of testing genetic hypotheses directly. (2:217)

From these opening lines, it can be discerned that the central topic is the familiarity of homosexuality. What is meant by “homosexuality” or “homosexual” is not explained; however, several meanings are implicitly associated. For example, no results of research into heterosexuality are cited, yet in the midst of a clear focus solely on homosexuality, it is stated that “Bailey and Pillard found evidence that male sexual orientation is moderately heritable.” This wording works together with the assumed understanding that the heritability of heterosexuality is not in question—that it is common sense—to produce an implicit equation of “sexual orientation” and “homosexuality.” This issue will be discussed in more detail later, but for now it should be noted that this equation sets the tone for later discussion, in which sexual orientation’s basic interchangeability with homosexuality helps make the lack of study of heterosexuality appear natural.

Another point is that while “homosexuality” is not manifestly defined in any way, by citing as evidence cases in which it has been quantified in rates and percentages, it is implicitly defined as something that can be accurately identified, distinguished, and measured. This definition is certainly not without challenge, but dissension is avoided by the absence of discussion.

A final issue that arises from the introductory paragraph cited above is the notion that the category of “homosexual” is one that can encompass another – that of “bisexual”: “Pillard found 25% of sisters of homosexual female probands to be homosexual (including bisexuals)...”. With the category of “homosexual” being inclusive of “bisexual,” it is established that these two are effectively the same thing. This impreciseness reveals a carelessness that is supposedly not present in “good science.”

Additionally, heterosexual identification is again naturalized, as the mark of same-sex sexuality in bisexual subjects completely overrides the “normalcy” of their opposite-sex sexuality. This issue also will be discussed in more depth later.

Another example of an introductory paragraph follows:

Recent neuropsychologic studies have been employed as a means of understanding the etiology of sexual orientation. This approach supplements neuroanatomic and neurophysiologic approaches which have examined differences in brain structure and brain function between homosexual (HM) and heterosexual (HT) individuals (e.g., LeVay, 1991; Reite *et al.*, 1995). Some of the neuropsychologic data suggest that the cognitive patterns of gay men differ from those of HT men on measures that generally elicit sex differences (Gladue *et al.*, 1990; McCormick and Witelson, 1991; Sanders and Ross-Field, 1986). However, at least two studies have failed to reveal effects of sexual orientation (Gladue and Bailey, 1995; Tuttle and Pillard, 1991). Little is known about cognitive abilities of lesbians, though the four published reports suggest that lesbians do not differ significantly from HT women. (Gladue and Bailey, 1995; Gladue *et al.*, 1990; Hall and Kimura, 1993; Tuttle and Pillard, 1991). (5:91-92)

As in the previous example, neither sexual orientation nor its presumed categories of heterosexual and homosexual are defined, yet implicitly, the “homosexual” classification is established as that which is in need of explanation. Notable in this example is the use of “gay men” and “lesbians” as interchangeable with “homosexual individuals” without any explanation of this usage; it introduces an additional layer of “colloquial meaning” as in the Keller quote above. The equivalent colloquial term for heterosexuals – “straight” – is never used in this discourse. While none of the terms is necessarily good or bad, the difference in their use suggests disparity across the groups discussed.

In only one article in the sample was the introduction of the central concept of “sexual orientation” accompanied by an explanation of its meaning. Interestingly, the

explicit, parenthetical definition of the concept of sexual orientation was accompanied by multiple implicit and analogous meanings:

Similar psychosocial and biological arguments have been advanced to account for differences in psychosexual development; that is, differences in sexual orientation (i.e., erotic partner preference) among men are considered to result from either biological influences on brain organization and subsequent sexual behavior ... or critical psychosocial childhood or early adolescent events. (4:101)

There are actually several levels of meaning construction occurring in this example. To begin, there is an explicit analogy being made that refers to the discussion in the preceding paragraph, which is the first paragraph in the article itself. It begins: “Although controversial, gender differences in certain cognitive abilities have been widely reported.” The “[s]imilar psychosocial and biological arguments” introduced in relation to sexual orientation are placed in a context of likeness to such explanations for “gender differences”. “Gender” is not defined, but appears to be meant to be interchangeable with “sex,” as in the next sentence: “In general, adult *males* are reported to have superior visuospatial abilities, whereas *women* outperform *men* on certain verbal tasks” (4:101, emphasis added). No distinction is made between “males” and “men,” terms which are often used to distinguish between biological sex and the social concept of gender, respectively. Also the comparison of performance between women and men makes clear what is not stated outright – that gender (or sex) is being used as a binary construct. Understanding this implicit duality is necessary to make sense of what meaning of “differences” is being applied to the concept of sexual orientation. Thus the first mention of sexual orientation establishes that a) it is a category that is “like” gender, a concept itself not specified but implicitly asserted to be binary and equivalent to “sex,”

and b) that, as with gender, it is “differences” that have been examined and are of interest, rather than similarities.

Next an analogy is made between “differences in psychosexual development” and “differences in sexual orientation” by the use of the “that is” construction. By creating such an analogy, the reader is encouraged to see “differences in psychosexual development” and “differences in sexual orientation” as being equivalent or interchangeable. Equating psychosexual development and sexual orientation may be seen as a strategy to naturalize the meanings of sexual orientation being constructed. In addition, the interest in “differences” is reiterated by repetition, as well as by the framing of differences as something “to account for.” By the time the parenthetical definition of sexual orientation is reached (“i.e., erotic partner preference”), a framework of meaning is already in place that contextualizes the manifest explanation.

Some of the articles give hints in their introductory sections as to how sexual orientation concepts are being defined. Because scientific studies of reproductive behaviors of laboratory animals (often rats) are the primary support for neuroendocrine theories of origins of lesbian and bisexual orientations, several of the studies discuss animal evidence in framing their research. From these discussions the researchers’ working definition of human sexual orientation can be gleaned to some extent. The following is an example of introductory sentences in which animal reproductive behaviors are subtly equated to human sexual orientation:

Geschwind and his associates (Galaburda, Corsiglia, & Rosen, 1987; Geschwind and Behan, 1982, 1984; Geschwind and Galaburda, 1985a, 1985b, 1987) have theorized that prenatal hormones, especially testosterone, might affect four seemingly unrelated phenomena: hemispheric specialization (viz., language functions and handedness); immune functioning; learning (viz., reading); and sexual orientation. Their speculations have generated much research. One line of

inquiry has examined whether or not these four broad areas are directly related to hormone levels *in utero*. Stereotypic female sexual behavior (lordosis), for example, has been found to occur in male animals exposed to high levels of intrauterine testosterone (Ward, 1984). (7:702)

Here, the context indicates that the researcher is equating “sexual orientation,” which is not manifestly defined, with sexual behaviors of laboratory animals. The reader is encouraged to make this association by the presentation of the animal evidence in a context in which it is implied to support the theory regarding the effect of “hormone levels *in utero*” on human sexual orientation. Additional examples follow:

The etiology of homosexuality is not known. Recently, the search for possible biological factors has gained prominence, partly due to results of experimental work of the last few decades which show that much of the sexual behavior of nonhuman animals is driven by sex hormones (for review cf. Goy and McEwen, 1980). (6:69)

In this quotation, the “sexual behavior of nonhuman animals” is presented (not so subtly) as evidence for “biological factors” – related to hormones – in the “etiology of homosexuality.” In so doing, the researchers bypass the need to demonstrate why this is a valid comparison. This avoidance is facilitated by the lack of definition of, in this case, “homosexuality.” The same article goes on, in the following paragraph, to assert a partial definition: “Given that sexual orientation, typical or atypical, is a behavioral phenomenon, it may be more fruitful to investigate the organ of behavior, the brain, with respect to differences between homosexual and heterosexual people” (6:69). (There is, of course, no question what the “typical” and the “atypical” sexual orientations being referenced are, and which one is which – a topic that will be discussed later.) The definition of sexual orientation as a “behavioral phenomenon” makes the equation with animal sexual behavior appear consistent. Similarly:



Differing hormonal environments *in utero* are associated with differing neurohormonal functioning in adulthood. Animal studies have shown that pre/perinatal hormone-mediated changes in the central nervous system lead to behavioral changes. This was first observed with specific sexual behaviors: Neonatally castrated rats mount estrous females less often, and exhibit lordosis in response to a stud male rat more often, than do non-castrates (Goy and McEwen, 1980). Partner preference for same or opposite sex, as measured by the amount of time a rat chooses to spend in the proximity of either a stud male or estrous female, is affected by early sex hormone manipulation in both males and females (Brand *et al.*, 1991; Brand and Slob, 1991).

...

Similarly, in humans, both sexual and nonsexual behaviors are influenced by the pre/perinatal hormone environment. Some clinical evidence suggests a relationship between sexual orientation in women and the prenatal hormonal milieu (Money *et al.*, 1984; Dittmann *et al.*, 1992). (8:396)

This article, while again not overtly defining the central sexual orientation concepts, provides clues as to how they are being used, by discussing sexual behaviors of laboratory rats and then constructing analogies to humans. The first suggested meaning is that of “behavioral changes.” This helps to set up the framing of homosexuality as “different from,” as the “changes” are implicitly changes from what would normally be occurring. Next there is a subtle equation of rat sexual behavior (the choice to be “in the proximity of either a stud male or estrous female”) with sexual orientation, by labeling the operationalization of this behavior as “partner preference for the same or opposite sex.” (Female rats choosing more time near an estrous female rather than a stud male rat are, in this logic, lesbian rats.) This shift is mirrored in the human analogy, in which the shift is from discussing “sexual and nonsexual behaviors” to “sexual orientation.” This is similar to the previous quotation, in which sexual orientation was partially defined as a “behavioral phenomenon.”

In terms of analyzing these equations at the level of discourse, it should be noted that the equation of reproductive behaviors of animals with human sexual orientation is

made through subtle associations and the presentation of evidence as if it is understood to be relevant. In this way, the equation does not have to be defended. The ideology put forth is one of heterosexuality's normality, as animal sexual behaviors are understood in terms of a normal (reproductive)/ abnormal (nonreproductive) dichotomy. Yet methodologically, the associations made between animal behaviors and human sexual orientation are not supported. As feminist biologist Ruth Doell notes in her critique of such equations:

But of course the insurmountable problem with this analogy is that the mating behaviors of rats and the sexual behaviors of humans are not homologous. The former are reflex-like and the latter are complex, intentional behaviors mediated by higher (cortical) brain mechanisms rather than by the reflex centers of the lower brain. (1995:349)

Put differently, Stein notes that a “person’s sexual orientation has to do with sexual desires and dispositions, not simply his or her behavior” (1999:196). The failure to be fully explicit about the equation of animal behaviors and human sexual orientation facilitates and partially masks a sort of scientific dishonesty about the validity of the theoretical framework.

In all of these examples, what is made visible by close reading is the lack of specificity regarding the central issue under study, combined with implicit association, equivalences and analogies that serve to further ideological understandings of sexual orientation. A few, isolated cases of this lack of definition of sexual orientation and its categories could be blamed on “bad science”—researchers failing to adhere to good scientific procedure. What I have found, however, is that this lack is not a rare occurrence but rather is standard practice. This suggests that the failure to define the central concept is a defining characteristic of this scientific discourse. In other words, the

discourse of the scientific study of biological origins of lesbian and bisexual orientations in women is partially dependent upon vague definitions and implied associations.

The presence of an undefined “default sexuality”—heterosexuality—that is accepted as normal means that not only does it escape scrutiny, but also that the “abnormality” of that which is not heterosexual does not have to be proven, it merely has to be different. A similarity is apparent to historical medical/scientific discourses (discussed in Chapter 2) in which the “pathology” of lesbian and/or African-American women’s intellects and bodies was defined as their perceived difference from heterosexual, white women. The bodies of “normal” women were unmarked while the bodies of “abnormal” women were marked by evaluative descriptors (such as “large” or “protruding”). In this case, heterosexuality is implicitly established as the norm, undermining the scientific claim to value-neutrality.

### Sexual Orientation Categorization and

#### “Natural Human Kinds”

The lack of explicit definitions of concepts related to sexual orientation has been noted in other scientific studies of biological bases of homosexuality, by researchers such as Stein (1999). He writes:

Scientific studies need to make their definitions of sexual orientation explicit, and they need to provide a rationale for these definitions. When assessing research in the emerging scientific program, one must uncover the implicit definition of sexual orientation and ask whether it is adequate. Since most of the biological studies of sexual orientation do not spell out their definition of sexual orientation, one way to tease out their definition is by looking at how they assign sexual orientations to their subjects. (1999:196)

As Stein suggests, the meanings given to sexual orientation concepts can to some extent be inferred from the part of the methods section in which researchers describe how they

decided to place subjects into different sexual orientation categories. In operationalizing the concepts into quantifiable measures, implicit definitions of sexual orientation concepts are revealed. The context for defining categories of sexual orientation, then, is a goal-oriented one. The goal is to create mutually exclusive identity categories to serve as variables—ideally ones that are accurate in capturing the subjects’ “true” sexual orientations. Key features of the definitions are those that can be empirically measured and that are distinguishable from, and mutually exclusive of, one another.

This categorization of sexual orientations presents several problems. First is that the modern, Western-societal framework for conceptualizing sexual orientation—that it is a category based on the sex or gender of a person and her or his desired partner—is utilized for categorization without any evidence for why this should be the case. There is a range of factors used in the scientific articles to operationalize sexual orientation, as every article operationalizes sexual orientation in a different manner. The possibilities in this scientific discourse include combinations of sexual “attitudes,” “attraction,” “behaviors,” “experiences,” “fantasies,” “feelings,” “identity,” “orientation,” and “thoughts” – all presumably related to the sex and/or gender of another person (as the researchers largely use variations on Kinsey ratings). In addition, it is not made clear in the articles whether the subjects are given instruction as to “what counts” for all these concepts used to operationalize sexuality. If it is left to each subject to interpret what, for example, constitutes a “sexual experience” or a “sexual attraction”—or the division between sexual and nonsexual—coherence of the sexual orientation categories is in question.

The following is the paragraph describing sexual orientation categorization for one study:

Sexual orientation was assessed by a Sexual Orientation Scale (SOS) adapted from Klein *et al.* (1985). Participants rated themselves on a Kinsey-type scale (1-7) for Sexual Attraction, Sexual Thoughts and Fantasies, Sexual Behavior, and Sexual Identity. Participants were included in the HT [heterosexual] group if they had averaged scores of either 1 or 2 on the SOS and in the HM [homosexual] group if they had averaged scores from 5 to 7. Six participants scoring in the bisexual range (3-4) were excluded from this sample. (5:95-96)

Thus the categorization is done either by how the subjects respond to questions about their sexuality—questions based on choice of sexual partner—or, less commonly, by having subjects self-categorize into one of the three (sometimes only two) approved categories – heterosexual, homosexual, or (sometimes) bisexual. As an example of the self-categorization approach, in one article the following was stated: “All participants were asked their sexual orientation: homosexual, bisexual, or heterosexual” (7:705). In some cases, participants both self-categorized and were rated on a Kinsey-type scale; in the examples that follow, the first article used subjects’ self-classifications (as did the previous example quoted) no matter how “low” the Kinsey rating, while the second used “too low” Kinsey ratings to exclude participants who had self-classified as homosexual:

Of the probands, 126 (85.7%) described themselves as ‘lesbian/homosexual’ and 21 (14.3%) described themselves as ‘bisexual.’ Kinsey ratings were obtained for adult fantasy and behavior, combined. These scores range from 0 (both fantasy and behavior completely heterosexual) to 6 (both fantasy and behavior completely homosexual). The mean ( $\pm$  SD) Kinsey rating, 4.8 ( $\pm$  1.2), indicated a fairly high level of homosexual orientation for the sample as a whole, but individual Kinsey ratings ranged from as low as 1 to as high as 6. (2:218)

and:

Subjects made a self-declaration of their sexual orientation and completed the Kinsey scales (Kinsey *et al.*, 1948) which rank sexuality from 0 (exclusively heterosexual) to 6 (exclusively homosexual). The Kinsey scales were completed privately and sealed in envelopes that were not opened until the experiment was

completed. Only those homosexual subjects scoring 3.5/6 or higher on the Kinsey scales (both fantasy and experience) were included in the study (1 male and 2 females were excluded based on this criterion). All heterosexual subjects scored either 0 or 1. (8:398)

The articles analyzed for the most part present research results regarding biological origins of lesbian and bisexual orientations in women as if collected in a systematic, objective manner, producing a coherent and consistent body of evidence. One obvious implication of this reading of the methods of sexual orientation operationalization is that the failure to be fully explicit about definitions of sexual orientation concepts creates different subject groups in each study. A “homosexual” in one study is not necessarily a “homosexual” in another study. Methodologically, this lack of specificity casts doubt on the meaningfulness of data obtained and comparisons of data from different studies.

In addition, asking subjects to self-categorize does not equate to finding out their “true” sexual orientation. As Stein notes, the fact that “most people in our culture see sexual orientation simplistically does not provide an argument for using such a simplistic account of sexual orientation to do science” (1999:196). The categories of heterosexual, homosexual, and bisexual are culturally and historically specific. While it is socially meaningful to identify with one category and not another, that is no guarantee that these particular categories are inscribed in biology. Thus subject self-categorization into two or three pre-determined choices is a poor method of operationalizing sexual orientation for the purposes of locating biological origins.

A final issue arising from the operationalization of sexual orientation concerns the use of Kinsey scales or variations thereof. As already demonstrated, this is a common practice in these scientific articles, done to create two or three mutually exclusive sexual

orientation groups for study. Yet this practice contradicts the data that led Kinsey to construct the scale in the first place, in two ways.

First, Kinsey “did not conceptualize homosexuality-heterosexuality as a way to classify persons – only behaviors” (Mondimore 1996:87). In his 1953 volume *Sexual Behavior in the Human Female*, Kinsey writes: “It should again be pointed out ... that it is impossible to determine the number of individuals who are ‘homosexual’ or ‘heterosexual.’ It is only possible to determine how many persons belong, at any particular time, to each of the classifications on a heterosexual-homosexual scale” (cited in Mondimore 1996:87). This scientific discourse is very much concerned with sexual orientation categories as defining different types of people, established in part by the equation of “behavior” and “orientation” or “identity” discussed previously.

Second, it is reported that Kinsey’s construction of the 0-6 scale was done in response to his findings that discrete, mutually exclusive categories of sexuality did not exist: “During the years that Kinsey and his associates were gathering their data, it had become apparent that attempting to identify individuals as either ‘homosexual’ or ‘heterosexual’ was simply impossible” (Mondimore 1996:84). In other words, Kinsey’s findings led him to construct the continuum to reflect the idea that the majority of people could not be clearly and unproblematically placed into two (or even three) mutually-exclusive sexuality categories. Terry (1999) notes that the work of Kinsey and of Henry’s Sex Variant study in the preceding decade had “obliterated the idea of a clear-cut homosexual type, [and] effectively erased the possibility of such a thing as a distinctly homosexual body” (1999:303). Yet not only are both of these notions revived in the

current biological discourse, but Kinsey's work is frequently used in the effort to prove them true.

The results of this reading suggest that the construction of sexual orientation categories in these scientific articles is conducted in ways that are imprecise, inconsistent, and probably inaccurate. Sexuality is operationalized with indefinite terms such as "sexual experiences" that have different meanings for different people, and the boundary between the sexual and the nonsexual does not appear to be questioned. Discrete categories are constructed using different criteria for membership across studies, assuming mutual exclusivity and stability over the life course.

An underlying pattern appears to be the assumption of the existence of relatively clear and unproblematic sexual orientation categories that are defined by the sex and/or gender of one's sexual object choice. This assumption is interrelated with the implicit equations of animal reproductive behaviors with human sexual orientation, and of sexual behaviors with "identities" or "orientations." As discussed by Stein (1999), an assumption of essential categories cannot be used to prove the essentialness of those categories. Rather, "evidence for the existence of natural human kinds must emerge from the empirical results" (1999:206). By allowing for two (or sometimes three) very specific possibilities of sexual orientation identification, any other possible mode of sexual self-identification is precluded. Also, the possibility that sexual desire may not represent an "orientation" or an identity at all is precluded.

I argue that that the idea that sexuality is best described as an "orientation," and that that orientation reflects an inherent identity, is granted the status of established fact in this discourse, because it goes without discussion, definition or debate. With regard to



gender, Judith Butler (1990) notes that our understandings of ourselves and others as “being” a specific kind of person are founded on notions of stability and coherence that are socially produced and reinforced. She asks:

To what extent do regulatory practices of gender formation and division constitute identity, the internal coherence of the subject, indeed, the self-identical status of the person? To what extent is ‘identity’ a normative ideal rather than a descriptive feature of experience? And how do the regulatory practices that govern gender also govern cultural intelligible notions of identity? (1990:16-17)

The assumption that sexuality represents an identity, and that this identity is best described by the categories of heterosexual, homosexual, and bisexual, distorts the scientific effort to describe “nature” in a manner free of cultural bias. Methodologically these practices reveal irresponsibility on the part of researchers and a willingness to “use whatever evidence is available,” in Spanier’s (1991) words.

## Theme 2: Equivalences and Absences in the Discussion and Study of Sexual Orientation, Homosexuality, and Heterosexuality

The second theme is composed of two inter-related issues: first, the apparent equivalence of “sexual orientation” with “homosexuality,” and second, the absence of discussion or study of heterosexuality. The two issues reinforce one another to form a pattern in the discourse, through which, I argue, the normalization and naturalization of heterosexuality is maintained.

The former issue refers to a pattern noted throughout much of the discourse, which consists of the discussion of “sexual orientation” when close reading indicates that

in fact what is meant is homosexuality. I will demonstrate why this appears to be the case, and why it is significant. The second issue, heterosexuality's relative absence, is part of the first issue but also stands on its own. By this, I mean that the absence of real discussion or study of heterosexuality is part of the evidence for my assertion that there is a strategy of equivalence seen in the discussion of "sexual orientation" and "homosexuality," yet this is not its sole importance.

In these scientific texts, a strategy of equivalence can be seen in the discussions regarding the central topic, specifically, "sexual orientation" and "homosexuality." By this I mean simply that the discussion uses "sexual orientation" as if it were discursively interchangeable with "homosexuality," and tends to slip back and forth between the two. This was ascertained through close readings of the contexts in which these phrases were used. Since clearly the two terms are not generally considered equivalent, their use in such a way requires attention.

Since one of the defining characteristics of this discourse and a criterion used to establish the sample of articles was that the subject of the scientific research be on biological origins of lesbian and bisexual orientations in women, it might be expected that heterosexual identities, and "sexual orientation" more generally, might not be necessarily well represented in the discourse. Yet a reading of the titles, abstracts, and introductions of these articles reveals that many of them establish their research as being on the topic of origins of "sexual orientation." (The initial sampling process revealed there to be no articles studying origins of heterosexual identity in women separate from these kinds of studies in the time frame under investigation.) In fact a reading of the titles shows that only two of the ten sample articles analyzed states "homosexuals" alone to be

the topic of investigation. Thus it seems reasonable to expect that studies of biological origins of “sexual orientation” would discuss a broader topic area than origins of “homosexuality” alone.

In the studies whose topic is the origins of “sexual orientation,” heterosexual subjects are in fact included in the research. Yet what becomes clear from close readings of this research is that the heterosexual subjects are not under the same sort of investigation as the lesbian and bisexual women. Rather, while this language is generally absent from the discourse, I argue that the heterosexual subjects are included for the purpose of serving as controls. Results obtained from them are used as standards by which to evaluate results obtained from the lesbian and bisexual women. The purported research topic—the origins of sexual orientation—is clearly in actuality the origins of lesbian and bisexual orientations. The discussion of the topic as being “sexual orientation,” then, can be considered a discursive equivalence of sexual orientation with homosexuality. In addition, in many cases a “slippage” is evident in which the discussion moves back and forth from discussing the topic as sexual orientation and as homosexuality, which is also a mechanism of equivalence. Both of these have effects on how the reader is positioned to interpret the study.

For example, in one article (titled “Heritable Factors Influence Sexual Orientation in Women”) the following was stated: “The study reported herein has two broad goals: first, to determine if there is a genetic contribution to female sexual orientation, and second, to investigate the behavioral expression of this contribution” (2:217). A careful reading of the study reveals that a “genetic contribution” to *heterosexuality* is not part of the study, and the “behavioral expression” elements refers strictly to expressions thought

to be related to lesbian/bisexual orientations. The study very clearly is focused solely on the possibility of a “genetic contribution” to lesbian and bisexual orientations in women, not to “sexual orientation” more generally, despite the discussion of “female sexual orientation” throughout (the two final subsections are titled “Implications for the Causes of Sexual Orientation” and “Female vs Male Sexual Orientation,” respectively). The final subsection on “sexual orientation” starts with the following:

Probands reported significantly more homosexual sisters than brothers, suggesting that male and female homosexuality are at least somewhat independent etiologically. Furthermore, because female homosexuality appears to be substantially less common than male homosexuality, the relatively high frequency of homosexuality among sisters compared with brothers is especially striking. This findings supports the necessity of studying female homosexuality directly rather than assuming that findings for males can be extended to females. (2:222-223)

While bisexuality is mentioned briefly later in that subsection, heterosexuality never is. Yet the subsection goes on to compare its results to a previous study of men and concludes that “both male and female sexual orientation appeared to be influenced by genetic factors” (2:223). A logical expectation of the conclusions about “sexual orientation” would be that genetic influences on all categories of sexual orientation had been studied, yet nowhere is this discussed. While homosexuality is analyzed in detail, in terms such as “rates,” “base rate,” “proportions,” and “frequency,” heterosexuality is evaluated only to the extent of establishing the subjects who are not of interest in determining all of the above measures.

In other studies, data are obtained from heterosexual subjects, yet it becomes clear that it is the similarities or differences of the lesbian and bisexual subjects from the heterosexual ones that are under scrutiny. For example, the following passage is from the discussion section of one article:

For women, a different situation was found: although homosexual women erred more on the water jar test, the performance of these women on other tasks of spatial ability did not significantly differ from those of their heterosexual female peers. This is especially noteworthy since, to the best of our knowledge, this is the first report of spatial ability assessment in closely match homosexual and heterosexual women. Furthermore, and contrary to an expectation that homosexual women would show 'male-like' performances, the scores of these women were either no different or poorer than those of their heterosexual peers. (4:106)

As suggested by the "expectation that homosexual women would show 'male-like' performances," the majority of this research, as discussed in Chapter 4, is founded on variations of prenatal hormone theories. Most commonly in these articles, the hypothesis involves the idea that lesbian and bisexual women were to some extent "masculinized" by prenatal hormones, causing their sexual orientation to be that more expected of males. Following this logic, researchers look for other, supporting evidence of the lesbian and bisexual women's anatomical or physiological "masculinization" – in the example above, that of spatial abilities. Spatial abilities more like those of "males" (actually heterosexual men) than those of heterosexual women would constitute such evidence.

What this demonstrates is that the data obtained from heterosexual subjects are used only for control or comparison purposes. The only evidence these data can provide are to support or fail to support the hypothesis regarding prenatal masculinization (or conversely, to reject or fail to reject the null hypothesis, as is more appropriate in scientific methods). Thus, the only way this study can provide insight into the "biological origins of sexual orientation" is to provide evidence for or against prenatal masculinization as the cause of lesbian and/or bisexual orientations in women. Only

origins of lesbian and bisexual orientations are under consideration here, yet throughout the article, the researchers refer to studying “sexual orientation.”

These examples demonstrate that in this discourse, while the central issue is the biological origins of sexual orientation, it is actually only the biological origins of lesbian and bisexual orientations that are examined. The use of “homosexuality” and “sexual orientation” as if they were interchangeable, in this context, suggests that it is already “understood” that heterosexuality is biologically based (as is the unstated assumption in research based on prenatal hormonal theories). It also could be read as implying that “sexual orientation” is only of concern as it relates to “homosexuality,” which would also be consistent with the dominant framework, as it assumes the default status of heterosexuality.

A related aspect of the relative absence of heterosexuality is that while “heterosexuals,” “heterosexual men” and “heterosexual women” are present in the discourse, for the most part “heterosexuality” is not. By this I mean that the word “heterosexuality” is very rarely used; in contrast, “homosexuality” is used with some frequency. This is consistent with the observation that while heterosexual subjects are usually included, their sexual orientation is not what is being studied. A discursive effect of this relative absence is heterosexuality’s erasure from consideration, question, or challenge as a construct comparable to “homosexuality” or “bisexuality.” The absence of the word both reveals and perpetuates a more pervasive conceptual absence from the scientific discourse. In this way is the naturalization and normalization of heterosexuality supported.

Overall, this pattern works to frame the discourse in such a way as to perpetuate ideological understandings in an implicit fashion. By suggesting that “sexual orientation” is being “explained,” the true focus on explaining homosexuality is made covert.

Heterosexuality’s status as “natural” is assumed and thus reproduced. As stated by one feminist theorist:

However, in order to make the workings of heterosexuality visible, we have to be able to name it. Naming it tends to denaturalise it (the power of the heterosexual imperative largely rests on its self-ascribed ‘natural’ status) and, in the words of Gill Dunne, exposes ‘the arbitrary nature of gender-specific experiences and patterns of living’ (Dunne 1992:86), which the naturalisation of heterosexuality conceals. (Wilton 1996:133)

### Theme 3: Conflation of Sex, Gender, and Sexuality

In reading for the meanings given to lesbian and bisexual orientations in the texts, a theme of equivalence emerges among terms related to sexual orientation, gender, and sex. Patterns in language use are revealed in which not only is sex equated with gender, but both are discussed in ways that reveal the conceptual equivalence of normative sex/gender with normative sexual orientation – that is, heterosexuality. I argue that the conflation of sex, gender, and sexuality is infused throughout the discourse primarily because the dominant explanatory framework relies upon the assumptions that sex is binary and sexual desire for the “opposite sex” is biologically “natural.” In so doing, lesbian and bisexual orientations in women are not only implicitly contrasted with a normative sexual orientation, but they also are constructed as Other relative to what is “normal” for “their” sex and gender. The examples to be discussed are the equivalence of “masculine” with “male” and with “gynephilic,” and the equivalence of “heterosexual women/females” with “women/females” in general.

### The Multiple Meanings of “Masculine”

Close reading for terms related to gender—masculinity and femininity—in contexts of discussing lesbian and bisexual orientations in women reveals that the concepts of “masculine” and “feminine” in this discourse are inseparable from concepts of sex (“male” and “female”). In addition, analysis of the contexts in which these concepts are used reveals that sexual attraction to women (gynephilia) is conceptualized as a male/masculine trait. These results from reading for gender concepts demonstrate that sex, gender, and sexuality are completely intertwined, even equated, in this scientific discourse.

To explain, the scientific explanatory framework is reliant on an understanding of two differentiated sexes that have dualistic sets of characteristics defining their bodies, personalities, and behaviors. A “man” is created as a result of a chromosomal XY fetus being exposed to “high amounts” of “androgenic” or “masculinizing” hormones prenatally. The chromosomal XX female fetus is also exposed to androgens, but not in sufficient quantities to “masculinize” her; thus she develops into a female/woman. As a result, their brains are different in certain ways, as are certain other somatic sites, as well as some cognitive, personality, and behavioral attributes.

From this it can be seen that that which is “masculine” (having been masculinized) is also considered “male”—or in the case of a masculinized female, “male-like.” Thus “masculinity” in this discourse cannot be conceptualized apart from “maleness,” demonstrating a lack of epistemological separation of sex and gender. Similarly, femininity and femaleness are equated, though unlike “masculinization,” they are rarely mentioned. The following quote from one of the articles demonstrates such an



equation: "...quite possibly, in terms of cognitive ability (the present study) and aggressive behavioral characteristics (Gladue, unpublished observations), lesbian women may represent the more *'female'* region of such *masculine-feminine* continua" (4:106, emphasis added).

Partly at issue in the underlying logic is the evidentiary basis for the sex differences being asserted. Feminist science scholars have published many critiques of the very existence of many such sex differences, or at least of their hypothesized biological explanations.<sup>1</sup> However, a critique of most of these issues is beyond the scope of this project. Of concern to this analysis is the association of "masculinization" with sexual orientation. The logic of this line of reasoning requires that one of the areas of sexual dimorphism is, in fact, sexual orientation, with "masculinization" resulting in sexual attraction to women (gynephilia). Lack of "masculinization," such as what occurs to a "normally" developing female, brings with it the "default" sexual attraction to men (androphilia). It is explained as follows in one article:

The most influential biological theories of sexual orientation posit that the development of attraction to females requires the masculinization of relevant (hypothalamic) brain structures and that attraction to males results if relevant neural structures do not masculinize. (2:217)

Thus "masculinization," or the process of androgen exposure triggered in the chromosomal XY fetus that creates a "normally-functioning" male body out of the "default" somatic status of female, is in this discourse imputed as the cause of sexual attraction to women. Specifically, the masculinization process is thought to create a "male brain," and somewhere in this male brain is the site of gynephilia or heterosexuality:

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<sup>1</sup> For example, Bleier 1984, 1988b; Fausto-Sterling 1992b.

**This additional evidence of functional differences in the cochleas of nonheterosexual females bolsters the interpretation that their peripheral auditory systems have been masculinized, possibly at the same stage of development when whatever brain structures are responsible for sexual orientation also were masculinized. (10:2403-2404)**

**From these examples it can be seen that the site in the brain in which sexual orientation resides is not known (“relevant neural structures”; “whatever brain structures are responsible for sexual orientation”). As mentioned, the hypothalamus is often considered the most likely candidate to house this “sexual orientation structure” because of its role in other sexual functions. Yet it is important to remember that the existence of such a site—one that makes a “masculinized brain” gynephilic and a “female brain” androphilic—is only speculation. The association of “masculinization” with brain structures “relevant to” or “responsible for” sexual orientation not only serves to sex (and gender) bodily sites that are not conclusively sexually dimorphic, but also, importantly, to sex (and gender) sexuality itself. In this formulation, sexual attraction to women (gynephilia) is inherently, naturally, and essentially a male and masculine characteristic.**

**The sexing/gendering of sexual desire betrays heteronormative roots. The framework for evaluating “masculinization” of sexual desire, it is often suggested in the discourse, comes from animal studies in which “masculinized” female rats or other laboratory animals display “mounting” behaviors—the presumed sexual province of the male rat, as it is from this position that a male rat engages in reproductive sexual behavior. The “masculinization” framework, however, does not begin with animal observations, but rather was transplanted to them. There is no reason to believe that “mounting” is a definitively “male” behavior, unless reproduction is assumed to be the**

only purpose for sex. Thus a heteronormative expectation drives the “masculinization” hypothesis even as it is applied to animal studies. As discussed by Zita (1998):

As in rat sex, a human heterosexual script – the mounting male animal and the submissive female animal – is used as a reference point for determining human sexual kinds. While in contemporary human life, sexual orientation categories are based on sexual object choice rather than style, the specter of humping females and males in anal surrender to members of their own sex amplifies a scientific anomaly and mammalian analog calling for explanation. Such a category of deviance is apparently based on misplaced sex parts. (158-159)

The other evidence for asserting that biological masculinization results in gynephilia comes from studies of women and girls with disordered conditions that cause a prenatal overexposure to androgenic hormones. The following quotation demonstrates this linkage:

Since women exposed to ‘masculinizing’ hormones are more likely to report lesbian or bisexual orientation in adulthood (Ehrhardt et al., 1985; Money, 1987) and a somewhat masculine pattern of cerebral lateralization (Hines & Shipley, 1984), we expected homosexual women would outperform heterosexual women on spatial tasks. (4:102)

The studies of such women and girls have been critiqued by several scholars (Byne 1995; Fausto-Sterling 1992; Longino 1990) on the basis of conceptual and methodological limitations. I mention these studies in order to demonstrate the asserted evidence for the sexing/gendering of sexuality. Girls and women exposed to “excess” amounts of “masculinizing hormones” are to varying extents “masculinized” physically. Their reported higher-than-average frequency of same-sex desire, is, then considered an effect of masculinization on “whatever brain structures” create sexual orientation. Thus a circular framework is applied in which evidence of sexed/gendered (masculine) sexual desire is thought to support the hypothesis of biological masculinization as the cause of this desire.

From these examples it can be seen that “masculine,” in this scientific discourse, has meanings that go beyond socially-constructed gender expectations. Because hormones that help create an anatomical and physiological “male” are referred to as “masculinizing,” and the bodily sites and processes that differ from what is expected of a “female” are then called “masculine” or “masculinized,” it is nearly impossible to separate sex from gender in this discourse. The key aspect is “what is expected”—for most attributes, there is no simple opposition between that which is male and that which is female; rather, arbitrary, socially-influenced boundaries are put in place that reflect cultural expectations. Therefore, that which is called “masculine” or “masculinized” is determined not by simple biological distinctions, but by a culturally gendered framework.

The fact that hypothesized “brain structures responsible for sexual orientation” are considered “masculinized” in women who have same-sex attractions reveals an equivalence of gender with sexual orientation—one in which masculinity equals gynephilia, and femininity equals androphilia. The gendered conceptual framework used to evaluate lesbian and bisexual women that underlies these discursive associations and equivocations exposes the workings of hegemonic gender ideologies in this science.

### Heterosexual Women Equated with

#### “Women” in General

The second example of the conflation of sex, gender, and sexuality in this discourse concerns the apparent equivalence of heterosexual women (and “females”) with women (and “females”) in general. I point out that the term “females” is a part of this example because it is used interchangeably with “women” in this discourse, but for simplicity I will refer only to “women” in the remainder of this discussion. This

equivalence suggests a conceptual failure to distinguish between the gender category of women and the combined gender/sexual orientation category of heterosexual women, which serves to reproduce the heteronormative expectation of all women as “naturally” heterosexual.

The equivalence of heterosexual women with all women is present epistemologically in the very logic of the explanatory framework, but can also be discerned from the ways in which language is used. I argue that conceptually, the explanatory framework for determining biological origins to lesbian and bisexual orientations in women is based on the presence of “sex differences” between women and men in general, as distinct “sex” groups, in various physiological, cognitive, and personality attributes. These “sex differences,” according to the explanatory logic, have been established through previous research on groups of women and men. Research studies are then often designed to compare data obtained from heterosexual and homosexual subjects of both sexes such that intra-sex differences between heterosexual and homosexual women are evaluated by the standard of the inter-sex differences between heterosexual women and heterosexual men.

While these evaluations are often described as determining differences between heterosexual and homosexual subjects, the logic of the design suggests that it is not simply these differences that are of interest in and of themselves. Rather, heterosexual subjects are used as substitutes for the women and men in general, for whom a standard of “sex differences” has already been determined. As such, the data is already “gendered” (and sexed) before it is even obtained, and “normally gendered” ranges (comprised of the heterosexual groups) have been established. The data obtained from

the lesbian (and occasionally bisexual) women are evaluated using this sexed/gendered framework, and considered normally “female” if in line with the data obtained from the heterosexual women. Using this sexed/gendered framework to evaluate differences of sexual orientation reveals that sexual orientations are themselves conceptualized as gendered (and sexed), with heterosexuality in women being appropriately feminine/female and homosexuality being masculine/male. Thus heterosexual women are conceptualized as being paradigmatic of, or equivalent to, all women (in substituting for the “women” of the sex-differences studies).

Because of this conceptual equivalence, there are “slippages” in the language used in describing the relevant subject groups. These slippages only appear strange, however, if one doesn’t consider heterosexual women to be the paradigmatic representatives of their sex. For example:

Interpretation of the water jar test is complicated by our failure to observe a significant sex difference among heterosexuals. Heterosexual females averaged 6.0 (out of 8) problems correct, compared to 6.4 for heterosexual males. In an earlier study in which subjects were not identified by sexual orientation, Beatty and Duncan (in press) reported that females averaged 4.2 correct, versus 6.1 for males. Thus, the discrepant results arise largely as a consequence of the much better performance by females in the study. (4:106)

In this example, the performance of “heterosexual females” is compared to that of “females” in a previous study with the clear expectation that the data should have been very similar, as the differences in the results obtained between the two are described as “discrepant.” In addition, the final sentence in this passage demonstrates the lack of distinction even more clearly, as the “much better performance by *females*” (emphasis added) refers to the performance of the heterosexual females.

Similarly, the following example demonstrates a lack of specificity regarding which “men and women” are being described, which reveals a conceptual equivalence: “While one neural structure that differs between men and women is reportedly similar in homosexual men and heterosexual women (LeVay, 1991), two others are not (Swaab and Hofman, 1990; Allen and Gorski, 1992)” (8:405). While it is not made obvious by the structure of this sentence alone, in context it is clear that the “heterosexual women” are equated to the women mentioned earlier, as the “homosexual men” are those being evaluated for difference from the established norm of “sex difference.” If read outside the lens of sex differences, the same sentence would be nonsensical.

Conceptually, the equivalence of heterosexual women with all women is implied by the fact that results obtained from heterosexual women are considered representative of the results of “women” in “sex differences” research, while lesbian and bisexual women’s results are considered “Other” to those of “their sex.” In addition, the very fact that the research is designed to utilize these supposed distinct “sex differences” as an explanatory scheme while predicting that lesbian and bisexual women’s scores will fall in between those of heterosexual men and heterosexual women suggests that only heterosexual women’s scores are considered to be “women’s” scores on the measures being evaluated. If in fact lesbian and bisexual women’s scores do fall between those of heterosexual men and women, and if they are still considered to be “women’s” scores, then the supposed “sex difference” cannot truly exist in any distinct way.

For example, one article explains that “psychosexual differentiation theory would predict that the intrasex difference would be more subtle than the intersex difference” (5:104). That lesbian and bisexual women might produce results that fall squarely within

the realm of the supposed sex-difference gap is the predicted outcome within this scientific discourse. Thus the epistemological structuring of the scientific discourse is reliant upon the equivalence of heterosexual women with all women, revealing the conflation of gender and sexuality. The resulting “deviant” status of lesbian and bisexual women will be the subject of the following section of this chapter.

#### Theme 4: Lesbian and Bisexual Orientations as Problematic or Deviant

A reading of the language used in discussing the scientific study of biological origins of lesbian and bisexual orientations in women reveals, I argue, a conceptualization of finding such origins as a problem to be solved, and the orientations themselves as being deviant or abnormal. Both of these conceptualizations argue against the scientific research as being objective or value-free, suggesting rather that the discourse is one that serves to reproduce heteronormative ideals.

Recognizing that scientific and medical discourses view homosexual orientations as deviant is not a novel observation. For example, it is discussed at length in Terry's (1999) historical study of such discourses in the US. She notes: “Though some authorities dissented from the prevalent idea that homosexuality is a pathological condition, even they agreed that this anomaly must be explained and accounted for” (1999:8). The current study suggests that the view of lesbian and bisexual orientations as “anomalous” is still fundamental to the scientific discourse of the 1990s, though less overt. I will demonstrate some of the ways in which this view is achieved and represented in the current scientific discourse.



### The “Problem” Model: Elusive,

#### Enigmatic Etiologies

The first part of this theme concerns the conceptualization of the research effort to uncover evidence of biological bases of lesbian and bisexual orientations in women. This analysis suggests that the language used in describing this effort point to this scientific discourse as being one of a “search”—of seeking out the answer to a mystery or problem. While one might say that much of scientific research is presented in a similar manner, I argue that this model both reveals and perpetuates the notion of the “object” of such “searches” as problems, and that this “problematic” status deserves investigation. The belief that science simply seeks to “understand” differences in an objective and value-free way is an ideological belief that ignores the extent to which science and society construct and give meaning to the “differences” science is explaining. This belief has served the interests of powerful groups in society by justifying many forms of sexist, racist, classist and heterosexist science.

Understanding how this model serves to reinforce heterosexist ideals requires an understanding of the theme discussed previously—the equivalence of “sexual orientation” and “homosexuality.” This equivalence very commonly intersects with the problem model, requiring interpretations not only of each issue but also of the ways in which they support one another. I argue that one way to interpret this intersection is that saying “sexual orientation” when “homosexuality” is what is really meant allows for a perpetuation of the ideology of science’s value-free quest for absolute truth, in that the view of lesbian and bisexual orientations as specifically problematic is made covert.

For example, in the following quote, it appears scientists are trying to understand “female sexual orientation” in general: “Assuming, however, that our finding of significant heritability is valid, an elaboration of the nature of the genetic variance could be an important step to unraveling the origins of female sexual orientation” (2:222). Prior readings of this section indicated that the context (for example, the “finding of significant heritability”) reveals that only lesbian and bisexual “origins” are being spoken of in this quote; therefore, it is only the origins of those orientations that are being “unreveled.” This suggests that it is not “sexual orientation” that is considered so problematic, but rather only certain kinds of sexual orientation, which reveals the power imbalance.

In a similar example from another article, the following is stated: “Despite the evidence for familial clustering of female sexual orientation, the source of this aggregation remains enigmatic” (3:417). Again, since only “familial clustering” of lesbian and bisexual orientations was studied, it is the aggregation of these orientations that is the real “enigma” being discussed. Both the “unraveling” in the previous example and the “enigmatic” nature of origins of lesbian and bisexual orientations in women speak to the idea of something not understood. While it could be described as simply true that variations in sexual orientation are not understood, because lesbian and bisexual orientations are being examined in this discourse and heterosexuality assumed, it becomes clear that what is truly mysterious and problematic are not all “variations” equally, but variations from an implied norm, or deviations.

Relatedly, the conceptualization of the scientific research as a “search” for factors “causing” lesbian and bisexual orientations in women, placed in the context of the

absence of interest in finding what “causes” heterosexuality, reveals the assumption of deviance. For example one article begins with the following statement: “Studies of homosexuals who are twins has centred almost exclusively on a search for genetic factors” (1:407). In this quote, it is made plain that what is being referred to is the “search” for causes of homosexuality. Often the discussions are framed in terms of progress toward the goal of this search, but never is it addressed why the search is being conducted.

In addition, heterosexual orientations are never called upon to explain themselves in the same way. Another example of an opening statement follows:

The etiology of homosexuality is not known. Recently, the search for possible biological factors has gained prominence, partly due to results of experimental work of the last few decades which show that much of the sexual behavior of nonhuman animals is driven by sex hormones (for review cf. Goy and McEwen, 1980). (6:69)

As in the previous example, the significance of this “search” is not addressed, but rather is assumed. In addition, this example combines the equation of sexual behaviors of animals and human sexuality, as discussed in the first theme, with an unquestioned “search,” and with the equation of “possible biological factors” and “etiology.” The connotation of pathology or disease that accompanies “etiology” helps reinforce the absence of any need to explain why there is a “search” happening at all.

The discussion of “causes” of lesbian and bisexual orientations in terms of “etiologies” occurs several times in the texts analyzed. Webster’s Dictionary defines “etiology” as “the cause assigned, as of a disease.” While one might argue that this word is without pathological connotation in purely scientific usage, as with previous examples its location solely in the context of “homosexual” orientations reflects lesbians’ status as

deviant in this discourse. In one article, the following is stated: “Probands reported significantly more homosexual sisters than brothers, suggesting that male and female homosexuality are at least somewhat independent etiologically” (2:222); and in another: “Several papers have addressed the question of whether the familialities of female and male homosexuality are etiologically independent or overlapping, but the results and interpretations are ambiguous” (3:408). In both these examples it can be seen that the “etiology” of “female homosexuality” is not placed in a context of comparison or discussion relative to an etiology of “female heterosexuality,” but rather “male homosexuality.” One might interpret the use of “etiology” over “cause” or “origin” as a further attempt to medicalize “homosexuality” and to naturalize the “search.”

### “Deviance” Model: One of These Things Is

#### Not Like the Other

Close readings of the contexts in which lesbian and bisexual orientations are discussed in these texts suggests that they are conceptualized as being “deviant.” The evidence for this is reflected in the following ways: first, in the language associated with explaining the mechanism of the hypothesized neuroendocrinological production of lesbian and bisexual orientations; second, in the ways in which the opposition of “typical/atypical” is applied; third, in the opposition of “heterosexual/nonheterosexual”; and fourth, in the notion of and meanings given to “extreme lesbianism.” “Extreme” is a concept applied in the discourse that associates certain aspects of lesbian orientation with pathology. I will discuss these four issues separately in the subsections that follow, although I argue that they work together to reinforce the implicit idea of lesbian and bisexual orientations as being deviant.

### The Neuroendocrine Model:

#### When Hormones Attack

The first indication in the language used in this scientific discourse that lesbian and bisexual orientations are considered “deviant” comes in the descriptions of how prenatal hormones are thought to influence sexual orientation. The explanation of the hypothesized mechanism of hormonal production of lesbian and bisexual orientations contrasts sharply with that for a heterosexual orientation in terms of creating discursively marked and unmarked statuses. For heterosexuality, the description of the hypothesized hormonal action is not marked with modifiers, while for lesbian and bisexual orientations, the process is qualified by evaluative terms and phrases, such as “excess”, “elevated”, and “high exposure” with respect to prenatal androgens.

Lesbians’ neuroendocrinological status is also frequently described as “masculinized.” This description is based on a model in which it is asserted that biological females are “naturally” attracted to males, and males are “naturally” attracted to females as one of the results of having been “masculinized.” Because fetuses start out biologically “female” and are “masculinized” through exposure to androgenic hormones to produce males, using this model requires no explanation of how women come to be heterosexual— they are simply not masculinized.<sup>2</sup> Thus the description of lesbians (and bisexual women, where applicable) as masculinized represents a marked status that is inherently “deviant.”

For example, one article concludes from its data that “[o]verall, it seems parsimonious to assume that some structures in the brains and cochleas of homosexual

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<sup>2</sup> However, this discursive association of female development with “lack” or “absence” in biology has been contested as well.

and bisexual females were masculinized prenatally as a consequence of overexposure to androgenic agents” (10:2412). Recognizing that all females are exposed to some level of “androgenic agents,” the logic here requires that lesbian and bisexual women have received an “overexposure.” The abnormality connoted by “overexposure” is associated with the “abnormality” of women having sexual desires for and relations with other women.

The same article goes on to hypothesize further regarding possible mechanisms by which this overexposure might produce lesbian and bisexual orientations in women:

When contemplating possible mechanisms for the hormonal effects being proposed, it may be tempting to imagine a developing female embryo, or its mother, producing too much androgen (or converting too much testosterone to estradiol) at some state in development, which masculinizes the fetus’ cochleas, whatever brain centers are ultimately responsible for sexual preference, and presumably other parts of the brain and body. As an alternative to higher androgen concentrations *per se*, it is possible that certain brain sites in some developing female embryos are, for some reason, hypersensitive to androgen at some stage(s) in early development, and take up too much of it. (10:2412)

In this passage there are several examples of abnormality, both anatomical and physiological, being asserted as possible causes for lesbian and bisexual orientations in women. Phrases such as “too much testosterone”, “hypersensitive to androgen”, and “take up too much of it” make clear that the presumed outcome – sexual desire for women – is considered a state of deviance from what is normal. It can be inferred that heterosexual women produce testosterone in appropriate amounts, are appropriately sensitive to androgen, and take up just the right amount of it.

The logic of the theory that underlies almost all the research on origins of lesbian and bisexual orientations in women assumes that sexual desire for women is not a “natural” characteristic of biological females. There are, in this framework,

**“appropriately” masculinized females, the definition of which is (assuming no anatomical “abnormalities”) solely based on their heterosexuality, and “inappropriately” or “overly” masculinized females, so defined because of their lesbian or bisexual orientation. The language used in describing the hormonal processes thought to produce lesbian and bisexual orientations, then, is reflective of this conceptualization of deviance.**

### **“Typical/Atypical”**

**The presumed deviance of lesbian and bisexual women is also reflected in the frequent opposition of “typical” and “atypical.” One feminist science scholar has suggested that negative judgments about social groups which were previously more manifest in scientific discourses, such as “abnormal,” are in more current science written in less overtly negative terms, such as “atypical,” but carry the same associations (Fausto-Sterling 1992b). Typical and atypical are in this discourse most often used to describe the degree to which research results obtained from lesbian and bisexual women match up to those “typical” for either “females” or “males,” questioning the completeness of their biological female status.**

**However, close readings of the contexts within which the judgments of “sex-typical” occur reveals that the assumption of deviance is present before the comparison occurs, in the meanings given to these terms. In this discourse, the range of results obtained from heterosexual women is called “female-typical,” and the range of results obtained from heterosexual men is called “male-typical.” It is never mentioned whether there are any heterosexual subjects who fall out of the range of “typical” for their sex, suggesting that all results obtained from heterosexual subjects are defined as “sex-typical.”**

Data from lesbian and bisexual women, then, are placed in comparison to this range, which reveals that the very definition of “sex-typical” is all-inclusive of heterosexual subjects while at the same time excluding all lesbian and bisexual women. It should be noted too that the “male-typical” range really refers only to heterosexual men, as gay men are similarly placed in comparison to both these ranges (female- and male-typical) as well. Thus while these “typical” ranges really should be called the “heterosexual female range” and the “heterosexual male range,” they are not. Lesbians and bisexual women, in these comparisons, are by definition located outside the range of what is defined as “sex-typical.”

Clearly, then, the use of these types of comparisons indicates that lesbian and bisexual women are already conceptualized as being “deviant” from the “norm” composed of heterosexual women, regardless of how they score. An example follows:

To our knowledge, this is the first evidence suggesting that lesbians may have a more male-typical ability for a spatiomotor task, which in our small sample is not at the expense of female-typical superiority on another fine motor task. Thus, the motor task performance of lesbians does not seem to parallel that of heterosexual men. Rather, like gay males, it appears to be a composite of some male-typical and some female-typical abilities. (8:404)

It helps in reading this passage to be aware of the actual data to which the “more male-typical ability for a spatiomotor task” refer. The data for the motor task in question show the performance of lesbians to be better (more “male-typical”) than that of heterosexual women. However, they also show the performance of gay men to be worse than that of lesbians. Thus, the only way to call the lesbians’ results “more male-typical” is if that phrase refers to only heterosexual men. Similarly, “female-typical” in this example can refer only to the heterosexual women.



This issue is noted by Spanier (1995b) in her discussion of one researcher's gendered labeling of aspects of male Bighorn sheep interactions: "Here the sex/gender paradigm of binary maleness and femaleness is superimposed by arbitrarily designating differential behavior of males as male-like or female-like" (1995b:21). The same could be said to be true of the supposedly sex-differentiated characteristics that are used in this scientific discourse to label lesbians and bisexual women as "male-like" or "female-like." Characteristics that are not in fact sex-specific are nonetheless gendered, such that exhibiting them marks one as "unlike" members of their sex. Clearly, aside from the conceptualization of lesbians and bisexual women as deviant, this issue reveals a thorough conflation of sex, gender, and sexual orientation. This conflation will be discussed in more detail in a later section of this chapter.

#### "Heterosexual/Nonheterosexual"

The construction of the dichotomy of "heterosexual/nonheterosexual" is used in this scientific discourse in order to denote when bisexuals are being included in the discussion, but not separated out from lesbians. The marker "non" points to that category considered unusual, while the unmarked status is made clear. For example: "Replicating the present study with a much larger sample will refute or confirm the within-family handedness distribution difference found between heterosexual and non-heterosexual men and women" (7:711).

It is only when same-sex desire is conceptualized as a marker of deviance that it makes sense to construct the dichotomy of "heterosexual/nonheterosexual." If it were simply a way to simplify the managing of data (by reducing three categories to two), one might expect to also encounter the oppositions of "lesbian/nonlesbian," or

**“homosexual/nonhomosexual.” Inverting the marked and unmarked statuses would necessarily place bisexuals in the same grouping with the heterosexuals. In this process, the meaning of the mark of difference or Otherness would move from same-sex to opposite-sex sexual orientation.**

**For example, one article reports the following findings:**

**The SOAEs [spontaneous otoacoustic emissions] of homosexual and bisexual females were less numerous and less strong than those of heterosexual females, and were intermediate to those of heterosexual females and heterosexual males. This additional evidence of functional difference in the cochleas of nonheterosexual females bolsters the interpretation that their peripheral auditory systems have been masculinized, possibly at the same stage of development when whatever brain structures are responsible for sexual orientation also were masculinized. (10:2403-2404)**

**Bisexuality is equated with the “deviant” homosexuality in the creation of the category “nonheterosexual,” rather than with heterosexuality in that dichotomous construction. While one might argue that the heterosexual/nonheterosexual opposition does not inherently construct either label as deviant, the location of the dividing line suggests otherwise. Bisexuality, by definition being composed of both same-sex and opposite-sex attractions, is marked in the dichotomy “heterosexual/nonheterosexual” only by that which is not heterosexual. For the bisexuals studied above, regardless of how much opposite-sex sexual attraction or behaviors they may have experienced, it is their same-sex ones that indicate the “masculinization” of “whatever brain structures are responsible for sexual orientation.”**

**Deconstructing the opposition of heterosexual/nonheterosexual reveals that even in research that studies bisexual women but does not lump them into a “nonheterosexual” category with lesbians, to the extent that they are still compared to heterosexual subjects, the assumption of same-sex desire and/or behaviors as a mark of deviance still exists. In**

other words, while many studies exclude bisexual participants altogether, constructing a false dichotomy of sexual orientation, the ones that include bisexuals treat their data as belonging with the data from lesbians rather than that from heterosexual subjects. This assumed coherence of groups that exhibit any amount of same-sex attraction or behavior, along with their assumed divergence from the group that does not, is faulty reasoning based on a view of any degree of (admitted) same-sex sexual orientation as being deviant.

Sometimes the use of this assumed dichotomy is pointed out, as in the following quote from an article that included bisexual subjects: “However, for most of the following analyses, we employed a dichotomous measure of sexual orientation: heterosexual vs homosexual, with bisexuals being included in the homosexual group” (2:219). Other times it is simply understood that they go together: “Lesbian and bisexual women also demonstrated a significantly different distribution compared to their HET [heterosexual] counterparts in that they evidenced a greater degree of non-exclusive right handedness” (7:707). In a move that is not unusual in these studies, the latter article goes on to erase the bisexual subjects completely: “Keeping the methodological shortcomings in mind, the findings suggest a reduction of right shift in gay and lesbian populations” (7:710).

Methodologically, the heterosexual/nonheterosexual (and heterosexual/lesbian&bisexual) dichotomy reflects bias in the construction of subject categories for comparison purposes that results in flawed experimental design. The categories can only be seen as mutually exclusive if one considers a bisexual woman to be unlike a heterosexual one, but like a lesbian woman. This understanding is based on a culturally-

influenced view of heterosexuality as normal, and anything deviating from it as anomalous. Results obtained using these categories are thus of questionable meaning.

In a different context, the methodological implications of this issue are raised in the same article quoted most recently above. In the introductory section, the researcher criticizes some other studies (including one in my sample) for having “compared homosexual data to general population data, ...[which] violates a fundamental principle of statistics (i.e., sampling from mutually exclusive populations)” (7:703). In other words, because there are “homosexuals” in the general population, such samples would not be mutually exclusive. In that case, the potential effect would be to reduce or even eliminate findings of difference between the two samples. Yet when findings of difference stand to be bolstered, issues of mutual exclusivity are commonly ignored.

#### “Extreme” Homosexuality

Though it does not occur frequently, a noteworthy concept in some of the articles is that of “extreme homosexuality.” Extremity of homosexuality in subjects is a concept brought into the discourse to capture the idea that some people may express their genetically- or biologically-influenced same-sex orientation in ways that can indicate the presence of “stronger” such influences than are present in other people. It is associated with “early onset” or “early precursors” of homosexuality as ways of evaluating the “strength” of the factors producing homosexuality. I argue that the use of these concepts reveals and perpetuates the implicit understanding of lesbian and bisexual orientations as being deviant. Also, variations on this idea can be found in the discourse even when the “extreme” terminology is not used.

The following passage introduces the analysis of “early onset” and “extremity”:

Two broad sets of variables have been proposed as potential markers of genetic diathesis in other domains, such as some forms of psychopathology: those related to early onset and those indicating phenotypic extremity (in psychopathology, severity). In the present study, measures indicating early onset of relevant behavior included CGN [childhood gender nonconformity], the adolescent Kinsey score, and the age of first homosexual feelings. Neither CGN nor age of first homosexual feelings differed significantly between MZ [monozygotic] probands from concordant pairs and MZ probands from discordant pairs ( $P > .40$  for all comparisons). Measures indicating relatively extreme homosexuality included the adult Kinsey score, the absence of positive sexual feelings for men, and the self-designation of lesbian/homosexual as opposed to bisexual. (2:221)

Right away it can be seen that the context for considering the “variables” of early onset and extremity is one manifestly associated with pathology. Even if the argument can be made that these variables are used in research on “normal” conditions, the researchers themselves use psychopathology as their example, serving to establish that as the context. The terminology itself—markers of “early onset,” which is later equated with “early precursors of adult homosexuality,” and “phenotypic extremity (in psychopathology, severity)” —is filled with connotations of disease.

The deviant status of lesbian women is reinforced by the “measures indicating relatively extreme homosexuality.” Like the separation of heterosexual/nonheterosexual with the defining characteristic being same-sex sexual attractions or behaviors, in this example, identifying as lesbian rather than bisexual marks one as an “extreme homosexual.” Additional aspects of the definition of the “extreme homosexual” women is the “absence of positive sexual feelings for men,” which is later recast as “degree of current heterosexual feelings,” and the “adult Kinsey score,” the criterion for which is not specified. Were this concept equally applied, it would mean that heterosexual women would be judged on the basis of identifying as heterosexual rather than bisexual, on the

“absence of positive feelings for women,” and on their Kinsey score—an evaluation that would almost certainly result in the designation of nearly every heterosexual subject as demonstrating “phenotypic extremity.” Typically, though, such “extreme heterosexuals” are just considered “normal.”

The use of measures to indicate “early onset” and “extremity” relative to same-sex sexual orientation is not discussed using that phrasing in any other article in this sample. However, there are thematic similarities noted elsewhere. In another article looking for genetic influences, “more stringent” criteria are implemented in a similar manner:

We therefore asked if the rates of nonheterosexual relatives in our family pedigrees would change if a more stringent criterion for nonheterosexuality were applied. Thus a post hoc analysis was performed imposing the following two additional requirements for probands in our selected sample to be considered nonheterosexual. First, attraction to a female had to occur at  $\leq 14$  years, the upper level confidence limit determined for bisexuals in this study (see Table III, 1b). The second requirement was that attraction to a male, if present, must have occurred within the same time frame or at a later age than first attraction to a female. (3:415)

In this article, the context for the passage quoted is the discussion of results that did not match predictions for how the familiarity of “nonheterosexuality” “should” work. Thus the application of “more stringent” criteria—which are only more stringent in the sense of better revealing “early onset” of same-sex sexual orientation—is done in the context of trying to get the data to better fit the hypothesis. Not surprisingly, implementing criteria designed to detect “early onset” created a smaller sample of subjects who “exhibit patterns” related to early onset, which the researchers defined as being “consistent with sex-limited genetic factors”: “Thus by employing information obtained from the developmental analysis we were able putatively to identify a subset of

probands in our nonheterosexual sample who exhibit patterns consistent with sex-limited genetic factors contributing to their sexual orientation” (3:416).

The use of criteria to create specialized subsets is often done in the construction of the research samples in these scientific articles, though it is not considered as such. Rather, in the selection of subjects, criteria related to “extremity” or “early onset” are often implemented in order to create mutually exclusive sample groups of heterosexuals and homosexuals. For example, one article notes that “[o]nly data from persons with either exclusive lifelong (since puberty) heterosexual or exclusive lifelong homosexual histories [fantasy and behavior] are reported here” (4:102). As mentioned previously, the effect of such criteria is to create a false dichotomy of sexual orientation and, as in the previous example, simplify the data in a way that might give more satisfactory results. In other words, the “extreme” subsets could be seen as an effort to “weed out” those who are most likely to have experienced consciously a degree of choice regarding their same-sex sexual orientation and who would be least likely to provide data that would support the hypotheses.

In one article, the failure to find differences in the results of lesbian and heterosexual women subjects similar to those found between gay and heterosexual men leads the researcher to speculate on the existence of just such a “biological subset,” one that is thought to represent a smaller proportion of lesbians than gay men:

Alternatively, the dissociation in patterns of sex atypicality in gay men and lesbians may be related to a similar dissociation seen in patterns of childhood sex atypicality. Gay men report (retrospectively) significantly higher rates of sex atypicality in childhood than do lesbians (Bailey and Zucker, 1995). Additionally in adulthood gay men show greater sex atypicality in gender role identity than do lesbians (Gladue *et al.*, 1990). Thus, it may be that the psychoendocrine theory of psychosexual differentiation presented here applies to a smaller subset of lesbians

than gay men and that alternative mechanisms are more important in the development of female as opposed to male sexual orientation. (5:105)

What is seen in this example is that the ideas of “early onset” and “extremity”—here posed in terms of “sex atypicality in childhood” and “sex atypicality in [adult] gender role identity,” respectively—are being posited as effects of the “psychoendocrine theory” of lesbian and gay orientations. Thus, the “strength” of the biological influence on a person’s homosexuality is correlated to the degree to which they manifest not only “exclusive” same-sex sexual orientation, but also childhood (and adult) gender nonconformity, just as in the genetic article quoted initially. Deviance from gender roles is tied to homosexuality, in this discourse, with a biological thread. Not only is the deviant status of homosexuality reinforced by the concepts of “early onset” and “extremity,” but so are “normal” gender roles for both children and adults.

### Theme 5: Intersections with Race

The discourse analysis including reading for ways in which beliefs and assumptions regarding essential racial differences were used to help construct the scientific discourse. This included analyzing not only for manifest content, but also for more latent imagery and metaphors. It is an assumption of this project that “race” is not a meaningful biological distinction but rather is a historically- and culturally-based means of social division on the basis of the belief in such essential differences. Also, the belief in meaningful biological differences has historically been a means of perpetuating power inequalities, and as such is ideological and pervades dominant social discourses in ways that are often implicit rather than overt (see for example van Dijk, 1993).



In addition, ideological beliefs about other differences, such as those of sex, gender, and sexuality, often intersect in discourses with notions of race to reinforce one another. Theories about this process have been developed by scholars such as sociologist Patricia Hill Collins (1990, 1999), and empirical research has previously demonstrated such intersections at work in scientific discourses (including Somerville; 2000; Gibson, 1997; Terry, 1995; Fausto-Sterling, 1995; and Stepan, 1993). Because this previous work has shown that scientific discourses have in the past used assertions of biological difference according to race and to sexual orientation in order to support the ideological belief in the superiority of white, heterosexual people, I argue for the necessity of analyzing the current scientific discourse for such issues.

While there are many issues of concern when analyzing the deployment of ideas about race in social discourses, for the purposes of this project the analysis is limited to looking for ways in which the discourse on biological origins of lesbian and bisexual orientations in women is supported, explicitly or implicitly, by associations with notions of biological racial differences. Specifically in terms of manifest content the texts are read for discussion of “race,” “racial categories,” “racial differences,” and references to skin color or other features thought to differentiate races. For more latent content, analogies and examples are closely read for any implicit associations with race, such as, for example, supporting an argument by referring to similarities with “other biological differences.”

The analysis of manifest reference to race reveals that in this scientific discourse, as represented by the articles included in this sample, race is only mentioned overtly in those few articles that describe the racial composition of their research samples (as

discussed in Chapter 4). These descriptions are done not to make intra-sample comparisons by race but rather to describe the degree to which the sample is representative of the population at large, and appears as an effort to acknowledge potential influences of the social context in which scientific research is done. As such, such descriptions of the sample composition might be interpreted as positive steps toward producing socially-situated science, although it cannot be assumed that such information will never be used to analyze for biologically-based racial differences.

Earlier sexological research on lesbians, such as that from the late 1800s described by Gibson (1997), and that from the 1930s described by Terry (1995), did just that, attributing greater “deviance” to some of the African-American subjects than to the white subjects. In addition, overt comparisons were made between the “abnormalities” of the white lesbian subjects and similar “abnormalities” attributed to women of color. Scientific discourses have a history of finding new ways to justify biologically the inferiority of oppressed groups. Thus it can be argued that discussion of racial categories in scientific discourses such as the one analyzed in the current project must be considered with some caution, even if it has positive aspects.

With regard to more latent imagery and metaphor, my analysis detects no use of examples or analogies that rely on implicit associations with race specifically. While certainly understandings of race as a biologically meaningful category still exist in social discourses, it is my interpretation from this analysis that in this particular scientific discourse, race as a concept unto itself is not used to help construct the discourse on biological origins of lesbian and bisexual orientations in women. Not using race in this

way could be considered a positive step toward reducing the perpetuation of racial ideologies in this discourse.

However, it would be overly simplistic, and in fact inaccurate, to say that the discourse is completely free of any ideologies regarding race. I make the assertion that ideologies regarding race are implicitly present in this discourse because of the fact that it is thoroughly infused with hegemonic ideologies concerning sex and gender, which are themselves embedded in a context of race. As discussed in the previous section, without the context of sex and gender ideology, much of the discourse on biological bases of lesbian and bisexual orientations in women would fail to make sense. Because ideologies regarding gender and race have been and continue to be deployed in ways that reinforce one another, the persistence of hegemonic gender ideals in this discourse argues against the irrelevance of race. As Collins states of intersections of gender and race: "Viewing gender within a logic of intersectionality redefines it as a constellation of ideas and social practices that are historically situated within and that mutually construct multiple systems of oppression" (1999:263).

Still, overall the analysis of the discourse for racial concepts reveals the most interesting finding to be the relative absence of such concepts. While meanings associated with race are certainly interwoven into the use of gender, the more obvious reinforcing of racial distinctions that occurred in earlier sexological work is not a notable aspect of the texts analyzed.

## Discussion

A feminist analysis of the discourse from 1990-2000 of the scientific study of biological origins of lesbian and bisexual orientations in women reveals the presence of several inter-related themes regarding gender, sexual orientation, and race. These themes are revealed by conducting close readings of the texts for the presence of words, phrases, and concepts related to gender, sexual orientation, and race, and interpreting the meanings associated with their use. Analyzing the textual construction of themes, in turn, points to the assumptions on which they depend. As a result, conducting an analysis of the scientific discourse creates opportunities to understand the ways in which researchers' assumptions may be informed by cultural ideologies of gender, sexual orientation, and race, and to understand how those ideologies might be reproduced in the texts of the scientific discourse.

Critical readings of these scientific texts suggest that gender, sexual orientation, and their inter-relations run throughout the discourse, but in specific and privileged ways. Assumptions and expectations of the "naturalness" of hegemonic forms of gender and sexual orientation are undercurrents to almost every theme uncovered. Because of their commonalities, the issues present in the themes reinforce each other and work together to reproduce dominant ideologies of inequalities of gender and sexual orientation.

For example, absent from the discourse are clear, explicit definitions and explanations of the key concepts such as sexual orientation, heterosexuality, and homosexuality. Obviously, this lack facilitates the mirage-like status of "sexual orientation" as a concept that might produce more than one category as an object of study. The discursive jumble of sex, gender, and sexual orientation is accomplished and

reflected in part by the textual absence of explicit meanings given to sexual orientation concepts. Likewise, the conflation of sex, gender, and sexual orientation benefits from the definitional absence and acts back upon it to provide implicit meaning for the sexual orientation concepts not clearly defined.

The themes uncovered suggest not only heteronormative assumptions but sexist ones as well. While heterosexuality's status as "normal" is upheld by the unproblematic association of sex, gender, and sexual orientation, so too is the belief in the masculinity of sexual agency. As seen in the implicit definition of sexual orientation as behavioral and correlated to animal reproductive behaviors, active sexual roles in this scientific discourse are defined as belonging to the male sex and masculine gender. In this way, the scientific study of biological orientations of lesbian and bisexual orientations in women has not appreciably evolved from the Sex Variant studies of the 1930s and 1940s, as described by Terry (1990). Terry explains that that research was so thoroughly gendered that the existence of feminine lesbians, particularly those who were sexual initiators with more masculine lesbians, was complete baffling to the researchers. Of course, the conflation of sex, gender, and sexual orientation also works in support of the view that "reproductive biology is (sexual) destiny," against which feminists have long argued.

The failure to be explicit about definitions of central concepts serves several discursive functions in these texts: first, it erases the agency of the scientists as the "namers" and "definers." As stated by philosopher of science Joseph Rouse, "[e]ven in the natural sciences, our practices are responsible for the *intelligibility* of the kinds of things there are, including what counts as identities or differences between them" (1987:223, emphasis in original). Yet the use of sexual orientation concepts and

categories without full disclosure of the meanings given them helps to create the appearance that they have unproblematically “arisen from nature.”

Second, failing to be clear in the use of terms allows the researchers to guide subtly the process of meaning-making and interpretation that happens in the minds of the readers of the texts. Cultural expectations, assumptions, and even stereotypes need not be overtly written into the science; rather, scientists can count on them being brought into the scientific discourse by readers filling in the gaps of vagueness and ambiguity in the texts. For example, Bleier (1988b) argues:

It is disingenuous for scientists to pretend ignorance of their readers' beliefs and expectations, and unethical to disclaim responsibility for the effects of their work and for presumed misinterpretations of their “pure” text. Scientists are responsible since they themselves build ambiguities and misinterpretations into the writing itself. (161)

The knowledge that silences in the discourse will likely be filled in with meanings derived from and benefiting dominant ideological expectations reflects the cultural privilege of those hegemonic forms.

Inter-related with both these functions is the issue of science's aura of authority. The epistemological privilege accorded to science is maintained in part by textual strategies such as those just discussed, yet also serves to help make those strategies work in the first place. The same sorts of ambiguities located in a text of a less-valued system of knowledge creation would not necessarily be given the same kind of leeway. As Haraway writes: “A scientist ‘names’ nature in written, public documents, which are endowed with the special, institutionally-enforced quality of being perceived as objective and applicable beyond the cultures of the people who wrote those documents” (1988:79). The perceptions of which Haraway speaks are both product and producer of the textual

practices of persuasion—for as Birke notes, “scientific articles are texts: they are rhetorical” (10).

Feminist science scholars suggest that scientific language be analyzed in order to discover what the discourse allows to be said and what understandings are marginalized or excluded (Bleier 1988b; Cohn 1996; Keller 1992). By framing the research on biological origins of lesbian and bisexual orientations in women in terms of sex and gender (as well as in terms that are gendered), sexuality cannot be discussed outside this context. It is not possible to question, for example, in research based on prenatal hormone theories, whether “masculinization” is an appropriate framework for understanding lesbian and bisexual orientations. The gendered nature of sexuality is not open for debate in this scientific discourse, as it is present at the level of assumption.

Emily Martin (1991) asserts we must “wake up sleeping metaphors” in science in order to “rob them of their power to naturalize our social conventions about gender” (499). The current analysis attempts to do so in part by uncovering the euphemistic use of “sexual orientation” to describe the subject matter in studies clearly intent on explaining homosexuality, and metaphors of “problems” and “deviance” in the discussion of lesbian and bisexual orientations. It is hoped that demonstrating the problematic nature of such metaphors and the evidence and assumptions that underlie their use will provoke additional critical examination and change.

Also, the texts are read critically for language that uses essentialist understandings of race to help construct the claims regarding gender and sexual orientation. Such language is not found to be present in this scientific discourse. As constructions of gender intersect with those of race, it cannot be said that race is completely absent from

these texts; however, the explicit uses noted in historical sexological work are not noted here. Since such past scientific uses of race in a biological context have frequently served to reinforce social inequalities of race, ethnicity, class, religion, and gender, the relative absence of race in the current scientific discourse may be seen as a positive change.

In conclusion, by analyzing the language constructions scientists use, it is possible to see how they conceptualize their objects of study. This in turn allows for recognition and examination of the limitations of these conceptualizations. This evidences the ways in which underlying assumptions are reproduced in scientific discourse, and invites challenges to ideological truth claims about the natural world. The power and privilege accorded to scientific discourses require that they be closely monitored to avoid the reproduction, via naturalization, of social inequalities.



## **CHAPTER 6**

### **IMPLICATIONS OF THE RESEARCH FINDINGS**

#### **AND RECOMMENDATIONS**

##### **Introduction**

**In this chapter I will explain the implications that my findings have for assessing the knowledge produced by the scientific research I analyzed. The ten articles analyzed in this project are representative of the past decade of research into biological bases of lesbian and bisexual orientations in women. The researchers who produced these articles presumably sought to make contributions to that body of knowledge, and of course did so. However, I argue that their contributions are limited in specific ways, primarily as a result of the types of background assumptions and beliefs with which the research is infused. The knowledge produced from this body of scientific work must be assessed in order to grasp what the science has truly contributed to understanding women's sexuality in general and lesbian and bisexual orientations in particular.**

**The current project consists of critiques of the methodologies and of the textual construction of the scientific research studies from the years 1990-2000 concerning biological origins of lesbian and bisexual orientations in women. I assert that critical readings of the scientific methodologies and of the language used to construct the research can provide insights into the assumptions and beliefs that underlie the researchers' approaches to their subject matter. By uncovering these assumptions and**

beliefs, it can be determined whether they reflect hegemonic ideologies concerning sexual orientation and thus whether the assumptions and beliefs underlying the research are more or less likely to perpetuate oppressive understandings and unequal social arrangements concerning sexual orientation.

Taken as a whole, the findings of this research suggest that the scientists conducting research into the biological bases of lesbian and bisexual orientations in women do transport some ideological assumptions and beliefs about those orientations into their research in several different ways. Especially notable is the underlying conflation of sex, gender, and sexuality noted in the research, as well as the assumption of sexual orientation categories as self-evident and natural. Revealing ideologies such as these in the scientific research has implications for evaluating the contributions of the results of such research to understanding women's sexuality.

The influence of cultural bias on scientific knowledge and practice limits in specific ways what can and cannot be inferred or interpreted from the research results, often in ways that are not made explicit. I have identified four areas of limitation on interpretation of scientific results that are made visible by my research findings. The first area concerns the naturalness of the categories of heterosexual, homosexual, and bisexual, or of "sexual orientation" as a concept; the second concerns the normality or abnormality of lesbian and bisexual orientations; third, the issue of embodiment of characteristics correlated to sexual orientation in women beyond those sampled; and fourth, the state of the scientific field of inquiry as a whole, in terms of the degree of consensus in findings.

The implications of the findings of this research will be addressed by integrating the results from the two different analyses undertaken—methodological and discursive. This integration is the logical outcome of the argument (described in Chapter 3) that both the way in which language is used and methodological flaws and limitations in science can be reflective of underlying ideologies. Thus when ideologies are revealed, the intersections and interworkings of the two different aspects of analysis become clearer. The link between epistemology, methodology, and method, or between scientific knowledge and practice, allows for the integration of analyses in evaluating how well the scientific research may describe “nature” (Bleier 1984; Harding 1986, 1989; Keller 1992; Longino 1989; Spanier 1995b).

It is important to reiterate at this point that I am not suggesting or recommending that all culturally-based assumption, beliefs, and values be removed from science, or that the science would be improved if values were removed. Previous work in feminist science studies makes clear that such a “value-free science” is simply not possible or desirable (Keller 1992; Longino 1989; Spanier 1995a). For example, Spanier argues that “politics informs *all* scientific work, just as it informs all other forms of work and knowledge production” (1995a:69, emphasis in original). Rather, assumptions, beliefs, and values should be made explicit, so that findings may be evaluated within their context.

The four implications to be discussed all reflect limitations on the usefulness or applicability of the knowledge produced by the scientific research due to the influence of unacknowledged assumptions and beliefs regarding sexual orientation. In the next sections of this chapter, informed by the work of feminist and other critical science

scholars, I will describe in greater detail how elements of my findings lead me to assert these limitations. To conclude the chapter, I will discuss some of the suggestions made by feminist science scholars regarding overcoming some of the limitations of traditional science.

**Implication 1: Results Cannot Provide Insight into  
the “Naturalness” of “Sexual Orientation”  
or Its Categories**

The scientific research analyzed in this project seeks to illuminate the potential biological origins of women’s sexual orientation. As stated in one article, the researchers hoped their work would contribute “an important step to unraveling the origins of female sexual orientation” (2:222). It is important to recognize in evaluating the results of these research studies, however, that their design does not permit them to be applicable to understanding whether human sexual orientation “naturally” falls into the categories of homosexual, heterosexual, and bisexual. Also, I argue that the limitations of design are not simply methodological errors, but rather that they follow from more fundamental limitations in the conceptualization of sexuality as a result of culturally-derived, unacknowledged assumptions and beliefs.

The explanation for the limitation on interpreting the results as providing evidence for the “naturalness” of the categories of homosexual, heterosexual, and bisexual can be found in the structure of the explanatory framework and in the research design. In addition, the textual construction of the research reveals limitations in the conceptualization of sexual orientation and its categories, as evidenced by the

impreciseness in defining sexual orientation concepts (theme 1 from the discourse analysis in Chapter 5). That these forms of evidence are interconnected should be expected, as they all appear to be informed by the same or similar sets of assumptions and beliefs on the part of the researchers. Their interconnectedness also reflects the inseparableness of scientific practice and the scientific knowledge that drives it.

My argument on this point is significantly informed by the work of Stein (1999). Stein argues that the existence of sexual orientation categories “in nature”—as an objective reality independent of social and historical context—cannot be proven by research that assumes that already to be the case. In his words, “[i]f the emerging research program assumes essentialism about sexual orientation, then it cannot possibly provide evidence to support essentialism” (1999:206). He argues of the work of LeVay (1991) and others, as do I of the research studies I have analyzed, that the conceptualization of the studies assumes essentialism, and thus cannot “prove” (or provide evidence in support of) that same essentialism.

First, the explanatory framework used in each study is conceptualized as exploring “women’s sexuality” or “women’s sexual orientation,” yet no possibilities for understanding or empirically testing sexuality are presented other than the categories of homosexual, heterosexual, and sometimes bisexual. This is evident in the very beginning of each article, when the framework for exploring possible biological or genetic differences is laid out. In addition, it is most apparent in the explanation of the research design and categorization of subjects into groupings that can be nothing but heterosexual, homosexual, and occasionally bisexual. The existence of these categories is assumed and

is not open for question or empirical testing in any of the research studies analyzed in this project.

Second, the discursive analysis revealed impreciseness in defining concepts relevant to sexual orientation, particularly in framing the research and discussing the explanatory framework. Terminology such as “sexuality” and “sexual orientation” went undefined, and definitions of sexual orientation categories were typically discussed only by implied meanings and in the context of operationalizing the variables. As Haumann (1995) states:

The biological discourse on homosexuality commonly relies on a set of terms whose use is so widespread that their meanings are no longer questioned. These concepts are reduced to key words (Williams, 1976) that presumably have a clear-cut meaning. A closer look, however, reveals that these words have a variety of different and often contradictory meanings. ... Their specific meanings have to be inferred from the context in which they occur. Nevertheless, they have a strong persuasive effect in the biological discourse because they seem to have exact and unequivocal meanings. (65)

Terminology central to the project of exploring the origins of women’s sexuality, then, presumably goes undefined because the words’ meanings are assumed to be known and accepted. This impreciseness is what allows the researchers to define implicitly sexual orientation categories as necessarily arising from “nature” without having to defend or even acknowledge this position. More importantly, failing to acknowledge explicitly that the categories have been defined using essentialist assumptions opens the door for the interpretation of the results as providing evidence for essentialism, which of course they cannot.

Thus the results of my analyses suggest that the terminology concerning sexual orientation categories is not well defined, yet the categories are discussed and utilized

methodologically in the research as if they arise naturally from the subjects' essential beings. It is my contention that the assumption of essentialism leads to both the discursive and methodological issues noted—that their origin is the same and that they in fact provide mutual support for one another. These issues in the research lead to the limitation on interpreting the results as providing evidence of essentialism, but their presence is not due to happenstance or error. It is the outcome of an unacknowledged assumption about the nature of sexual orientation.

The presence of the assumption of essentialism in the scientific research is the source of the limitation on the interpretation of the results as providing evidence for essentialism. This is not to say that no scientific research could provide evidence for the naturalness of the categories, but rather that the ones analyzed here cannot. Similarly, of LeVay's (1991) work, Stein writes: "I am not claiming that it is impossible to do a neuroanatomical study that would provide support to essentialism about sexual orientation. For this to happen, evidence for the existence of natural human kinds must emerge from the empirical results" (1999:206). Because my analyses demonstrate that the existence of sexual orientation categories does not emerge from the results of the scientific research, a significant implication is that the results cannot be interpreted as providing evidence for the categories' natural existence.

**Implication 2: Results Cannot Support Arguments  
for Either the “Normality” or “Abnormality”  
of Lesbian Orientation**

The results of my analyses lead to a second implication for evaluating the scientific research on biological origins of lesbian and bisexual orientations in women: that the scientific research cannot be interpreted as providing evidence for the status of homosexuality as either a “normal” or an “abnormal” condition. Several researchers have gone on record as stating their desire for their work to provide evidence for homosexuality’s biologically-based status, in order to make a case for ending its stigmatization (noted in, for example, De Cecco and Parker 1995; Spanier 1995a). Yet in the body of research analyzed, even a finding of a biological basis for homosexuality is far from equivalent to establishing a nonheterosexual orientation as a normal condition. The research also cannot provide evidence for the status of nonheterosexuality as an “abnormal” biological state, because in the majority of the research, such a deviation from “normal” is assumed.

As described in the section of Chapter 4 in which the explanatory framework was analyzed, the majority of the studies (seven of the ten) frame nonheterosexual orientations in women as being related to some form of biologically-based “overmasculinization.” Heterosexual women are taken to be the norm for all women in terms of the appropriate degree of bodily masculinization, and the expression of same-sex desire serves as a marker for an inappropriate degree of masculinization. Thus in terms of a study’s explanatory framework, every study that is based on the “masculinization



hypothesis” assumes homosexuality to be the sign of a biologically abnormal state, in which a woman has become overly “male-like” in specific ways.

Such studies cannot provide evidence in support of homosexuality’s status as a normal biological variation, because they are based on an understanding of same-sex desire that deems it inherently abnormal. They also cannot support an argument for “abnormality,” as a fundamental abnormality (“overmasculinization”) has already been assumed to be related to homosexuality. As in the previous discussion regarding the assumption of essentialism, research that assumes a particular characteristic to be inherent to the definition of homosexuality cannot then also be used to prove that characteristic’s inherent status.

The behavioral genetics studies that were analyzed (three of the ten) were not based in an explanatory structure that relied on “overmasculinization” as the causal factor in the origin of same-sex desire in women, although even these tended to incorporate some degree of this explanation into their work. Just as important, however, is the presence of other problematic issues that lead to the same implication. For these issues, we can look to the results from the discursive analysis.

Two main issues from the analysis of the scientific discourse contribute to my contention that the research analyzed cannot be interpreted as providing evidence for or against the biological “normality” of lesbian and bisexual orientations in women. The first issue concerns the equivalences and absences noted in the discussion of sexuality, sexual orientation, and the categories of homosexuality and heterosexuality (theme 2 in Chapter 5), and second is the discussion of lesbian and bisexual orientations in ways that revealed their conceptualization as problematic or deviant (theme 4 in Chapter 5). These

two issues intersect and interact, as they both (as I argued in Chapter 5) are textual manifestations of the underlying assumption of heterosexuality's default status.

The argument relating to textual equivalences and absences in discussing sexual orientation is elucidated by Haumann (1995):

The use of the term "sexuality" in biology is based on two ideological notions, both of which are important for the biological conceptualization of homosexuality. The first one, I will call the sexuality-as-heterosexuality ideology. It underlies most of the research on the neuroendocrinological basis of homosexuality. Inasmuch as heterosexual behavior is supposed to be the universal, normal form of sexual expression, heterosexuality is more or less equated with sexuality. Homosexuality is conceptualized as the aberration that calls for special attention. Heterosexuality is the "natural" category which needs no biological explanation. (65-66)

Interestingly on the surface Haumann's argument appears to be the reverse of my own: whereas I argued that when the researchers referred to explaining or finding origins of "women's sexuality" or "women's sexual orientation," they really meant they were explaining lesbian or bisexual orientations, Haumann states that it is heterosexuality that is implicitly equated with sexuality. These arguments, of course, represent two aspects of the same issue. Sexuality (and sexual orientation) is equated with heterosexuality at the level of assumption—the unstated—and thus none of these concepts is in need of investigation. Thus, when "explaining" or "uncovering the origins of" sexuality and sexual orientation are discussed, it is not heterosexuality but nonheterosexuality that is being referred to in the text.

The point of all this is to say that the equivalences and absences reflect the assumption that the origins of heterosexuality are not in need of investigation, but rather that homosexuality is the "biological aberration calling for explanation" (Haumann 1995:62). In addition the discourse analysis revealed lesbian and bisexual orientations to

be described in ways that made it even clearer that they were conceptualized as being problematic or deviant, based on an assumption of the default, normal status of heterosexuality. It is this assumption that leads to the implication that the research cannot provide evidence in support of the “normality” or “abnormality” of homosexuality, for the reasons described above: neither “normality” nor “abnormality” can be proven in a context in which abnormality is assumed at the most fundamental level.

### **Implication 3: Results Cannot Be Assumed To**

#### **Reflect Innate Differences or To Be**

#### **Applicable to All Women**

The third implication of the results of my analyses concerns in what way and to whom any findings of biological differences between heterosexual and lesbian research subjects can be generalized. I argue that differences found in research samples cannot be interpreted as being innate, essential characteristics, or as being generalizable to all women. While this may on the surface appear to be a self-evident conclusion, it is my contention that it is frequently unacknowledged or ignored either by researchers themselves, by consumers and publishers of such research, or by both (De Cecco and Parker, 1995; Spanier 1995a, Zicklin 1997).

There are really two parts to my claim: first, that results suggesting biologically-based differences between heterosexual and lesbian women cannot be interpreted as supporting the position that such differences are necessarily innate or wholly biologically driven; and second, that results obtained from the research samples cannot validly be

interpreted as being generalizable to larger populations of women. These issues are related but also to some degree distinct, and will be discussed separately.

The first issue concerns the origin attributed to findings of difference. I argue that even if differences are found that appear to be biological in basis, it cannot then be interpreted that such differences represent totally innate characteristics. Rather, such interpretations are to some extent speculative, based on what is currently known about development, largely gathered from laboratory examination of other species (Bleier 1988b; Fausto-Sterling 2000). The research findings of difference between heterosexual and lesbian women are subject to interpretation and are viewed through the lens of the explanatory framework.

My results showed that one type of explanatory framework—the masculinization hypothesis—dominates the research field. This framework postulates prenatal “masculinizing” hormone overexposure to be the origin of same-sex desire in women. In the case of the dominance of one explanatory framework (and its attendant background assumptions) in a research field, other possibilities tend to go unrecognized and unexplored (Haumann 1995; Longino 1990; Spanier 1995a). Longino (1990) states:

Background assumptions can also lead us to highlight certain aspects of a phenomenon over others, thus determining the way it is described and the kind of data it provides. Background assumptions are the means by which contextual values and ideology are incorporated into scientific inquiry. (215-216)

The discursive conflation of sex, gender, and sexuality also suggests that researchers might be overly likely to attribute findings of difference to innate biology. Because in these studies gender is viewed as indistinct from an assumed biologically-determined sex, and that sexuality follows directly and naturally from sex in a specific

way (males attracted to females, and vice versa), it is likely that researchers might similarly locate the processes leading to a homosexual orientation in the realm of the prenatally determined.

I argue this point because findings of difference between people with whole histories of life experiences cannot unproblematically be inferred to be solely biologically determined. Fausto-Sterling makes this point clearly in the following passage:

As we grow and develop, we literally, not just “discursively” (that is, through language and cultural practices), construct our bodies, incorporating experience into our very flesh. To understand this claim, we must erode the distinctions between the physical and the social body. (2000:20)

Fausto-Sterling argues that “sexuality is a somatic fact *created by* a cultural effect” (2000:21, emphasis in original). Thus findings of difference between heterosexual and lesbian women may in fact be biological differences, but not ones that were innately present at birth. Rather, it could be said culture writes itself on the body in ways that might account for findings of biological difference between groups treated very differently in a given culture.

The second issue concerns the interpretation of findings of difference as being generalizable to larger populations of women. This interpretation emerges from the logic of the belief in the biologically-driven nature of homosexuality (and heterosexuality)—the biological markers that signify the presence of a particular orientation are not expected to vary greatly among different people (De Cecco and Parker 1995; Stein 1999). I argue that one of the implications of my research is to suggest that scientific findings of apparent biological differences between lesbian and heterosexual women cannot be interpreted as necessarily generalizable to larger populations of women.

I make this argument based on three findings from my analyses. The first concerns the limitations imposed by the explanatory framework and is essentially the same argument made above (regarding interpreting bodily differences as necessarily innate). Because sexual orientation is assumed to be biologically driven, it is investigated—and the results understood—in ways that make sense for that assumption. Thus the research structure is not sufficiently open to other ways of interpreting the data, or even to obtaining other kinds of data, to be able to interpret findings as being necessarily generalizable (Longino 1990; Stein 1999).

The limitations imposed by the background assumptions are more specifically manifested in the sampling procedures used and the resulting samples gathered. It is the findings related to sampling that constitute the second piece of evidence for this argument. In the articles analyzed, the research samples were recruited using non-random methods. In almost every case, lesbian and bisexual subjects were recruited through means that were directed specifically at people who are to some extent open regarding their sexual orientation—for example, recruiting was directed at memberships of gay and lesbian organizations or readers of gay and lesbian publications. As discussed in the section of Chapter 4 in which the recruiting methods were analyzed, such a focus can lead to a sample of subjects with characteristics that differentiate them from others who may feel same-sex desires.

In addition, subjects were almost always recruited only in the locale in which the research was being conducted (rather than a cross-section of different areas), and tended to be disproportionately white, of the middle class, and well-educated (when such data were reported). The local nature of the recruiting and the sample compositions lead to

the conclusion that research samples probably did not consist of very many (if any) subjects from cultural backgrounds very different from the dominant culture of the United States.

The limited nature of the samples thus obtained suggests extreme caution in generalizing results to populations beyond those very similar to the subjects themselves. Yet in very few cases were the limitations of the samples used in the research studies acknowledged in the interpretations of results. Still, it is my contention that the weaknesses of the sampling procedures contribute to the implication that results cannot be presumed to be generalizable to larger populations.

The third relevant finding from my analyses comes from the textual analysis. I argue that two of the themes noted in that analysis—the conflation of sex, gender, and sexuality, and the discussion of lesbian and bisexual orientations as being problematic or deviant (themes 3 and 4 from Chapter 5)—represent culturally- and contextually-specific views. Both the themes are manifestations of underlying assumptions, which combined can be described as the assumption of binary sexes that lead to binary genders that are naturally sexually attracted to the opposite (Butler 1990; Jagose 1996).

These assumptions are culturally specific, because it is not universal that people are thought to be made up of two distinct genders that correspond to one's sex (Fausto-Sterling 1992b), nor that same-sex attraction or sexual relations are deviant (De Cecco and Parker 1995). If our culture is written into our flesh, as Fausto-Sterling (2000) argues, then it does not make sense to expect that the same biological markers will hold true across cultures. In addition the assumptions are contextually specific because even within the dominant culture of the United States, it is more likely that these assumptions

would be generated from positions of privilege relative to expectations for sex, gender, and sexuality. As a result, I argue that the presence of these underlying assumptions in the scientific discourse leads to the implication that the results obtained cannot necessarily be generalized, especially cross-culturally.

#### Implication 4: Consensus in Findings Across Studies Is Difficult To Determine

The final implication concerns what I am calling the “state of the field”—by which I mean the degree of consensus or disagreement in findings across the many different research studies being undertaken. Each scientific article locates its research questions, and later its research findings, within the body of similar research in terms of similarities and differences. Findings from other projects are often used as evidence to explain why a particular line of inquiry might be fruitful, or why a study’s results might have broader implications beyond the specific research itself. I argue that the findings from my research suggest that it can be difficult to make an accurate assessment of similarities in research findings, which impacts the ability to provide sufficient evidence to accept or reject the hypotheses.

Of course, the search for biological origins of lesbian and bisexual orientations in women is approached from several different scientific fields and sub-fields, so findings are not always of a comparable nature. Still, many of the projects are approached using a similar framework (i.e., the masculinization hypothesis), so some degree of comparison can be made even when the specific site being studied is quite different. In fact, as just explained, these comparisons are made all the time. Explaining how a research project



and its findings fit into the related, existing body of research is a part of almost every scientific article.

The state of the field, in this case, refers to the degree of consensus regarding hypotheses, theories, and evidence among different scientists doing research on biological origins of lesbian and bisexual orientations in women, based on similarities and differences in what the various researchers have found. Certain aspects of my research findings, I contend, carry with them the implication that making comparisons of results, even across studies framed using the same approach (such as the masculinization hypothesis), is problematic. The problematic nature is related to the high degree of ambiguity regarding issues such as populations studied and definitions of terms, as well as the frequently-used strategy of discussing and interpreting results in a way that lends itself to overstating their potential significance.

Thus I argue that the fourth implication of my findings is that because of poor standardization regarding essential elements across studies, as well as because of researchers' tendencies to interpret their findings in ways that overextend the boundaries of what the data do say and can say, accurate assessments of the state of the field cannot be made with confidence. There are several interrelated findings from my analyses that contribute to this conclusion. They can be divided into three areas: problems in sampling methods, in interpretation of results, and in defining terms.

The first area concerns the procedures used to gather and categorize the research samples. As shown in the analysis of how these procedures were followed in the ten articles I studied, most studies used different methods of recruiting subjects and setting criteria for their inclusion, with the effect of there being little standardization regarding

the groups actually being studied. Thus it may be inaccurate or misleading to compare the results obtained from different studies. For example, most studies recruited specifically from lesbian and bisexual populations more likely to be open about their sexuality (which has implications for extending the findings of such research to larger populations, as discussed above), but a few did not; several of the studies recruited specifically from university students, while others did not. These differences suggest the likelihood of obtaining quite different sets of subjects in terms of openness about sexual orientation (in the first case) and age, race, and social class (in the second case).

In addition, the criteria established for inclusion in the study were different across studies, relative to the most important element—subjects' sexual orientation. For example, some studies set specific criteria that excluded bisexual participants (in at least one case, even if the "bisexuals" self-identified as lesbian). Other studies did not have such inclusion criteria, suggesting that the subjects from whom results were obtained may have been quite different across studies. As stated by De Cecco and Parker (1995): "The belief that homosexuality inheres in the body led the biological researchers to be cavalier in the identification and selection of subjects since one 'specimen' was essentially equal to all others" (10). The complex nature of sexual orientation suggests that comparing results obtained from lesbian and bisexual subjects who may be very different across sexual orientation and other important variables is suspect (Allen 1997; De Cecco and Parker 1995; McGuire 1995; Spanier 1995a).

In terms of categorization of subjects, the different studies also had no standardization for distinguishing a heterosexual from a lesbian from a bisexual participant. Some studies relied on self-identification, while others had subjects complete

self-ratings using questions and scoring derived from the Kinsey research, while in other studies interviewers applied Kinsey ratings to subjects' responses to questions. When included, bisexual subjects were sometimes collapsed into the same category as the lesbian subjects and sometimes were maintained as a separate category. Thus the sexual-orientation categorization procedures used across different studies did not lend themselves to constructing groupings similar enough to evaluate consistencies in findings with any confidence.

The second issue relates to the researchers' interpretations of their data. As discussed in Chapter 4, researchers tended to overstate their findings in some ways. For example, correlations that did not achieve statistical significance were, in some cases, discussed in ways that appeared to give very little acknowledgment to that fact. In some cases it took careful examination of the actual data reported to recognize that interpretations and conclusions were being drawn that were not clearly supported by the data. Certainly it would be hoped that researchers would conduct such close examinations of others' data before citing findings in their reviews of the existing literature or before asserting the presence of consistencies with their own in their conclusions sections. However, such close examinations of data cannot be assumed, especially in the presence of interpretations and conclusions that subtly distort findings.

As Bleier (1988b) explains:

In this time of extreme specialization and technical sophistication, each of us who is a scientist must usually assume, on the basis of little more than faith, the carefulness and validity of the studies of other scientists, not only scientists in other fields but also those in other areas of our own field. Such validity rests not only on the design and execution of studies, but the completeness and candidness with which investigators discuss the uncertainties of their studies as well as the contradictory data that exist and the alternative interpretations that are possible. Few scientists

have the knowledge of the techniques or database in other fields that would permit them to supply what the author omits. ...the final responsibility rests with scientists (along with science writers) who, intentionally or not, endow reports of their work with more certainty and relevance than the evidence warrants. (160)

It cannot be assumed that researchers are necessarily likely to acknowledge or give credence to potential inconsistencies between data and interpretations in others' work when citing it in their own. In fact, in the case of work that fits with the dominant explanatory framework, the opposite may be true—that researchers (and even reviewers and journal editors) may be more likely to overlook flaws and inconsistencies when the explanatory framework of a particular project matches their own and the dominant mode of thinking at the time (Byne 1995; Spanier 1995a).

Relatedly, researchers are, in their articles, building a case for their work and the framework that informs it, and thus may be more likely to overlook flaws in their own work and in work that supports theirs. Not only may flaws, inconsistencies, and weaknesses go unacknowledged, but they may be disavowed outright in the effort to persuade; Birke (2000) explains that it is in part the “rhetoric of persuasion” employed in scientific writing that imparts its authoritative tone. According to Namenwirth (1988), this rhetoric includes projecting an aura of confidence in findings even when such confidence is not warranted:

In the patterns of words they choose for use in public lectures and research articles, scientists almost invariably project an image of impersonal authority and absolute confidence in the accuracy, objectivity, and importance of their observations. ... The weaknesses and inaccuracies, the holes in the data, are purposefully hidden as scientists interpose a shield of confident authority between themselves and the public. (23)

These issues point to the implication that determining the degree of actual consensus in findings may be complicated by researchers' tendencies to inflate subtly the

importance of their own findings and even those of others, when they fit with the dominant explanatory paradigm.

The last aspect of my findings that contributes to the difficulty in ascertaining the state of the field concerns the tendency noted in the scientific articles for researchers to be vague, ambiguous, and imprecise in defining concepts central to the project. This issue has already been discussed above, in regard to the first implication, yet is very relevant here as well. To the extent that important concepts (such as sexual orientation and homosexuality) are not explicitly defined, their meanings are established through implicit associations in the texts and through assumptions and inferences on the part of the reader. As Bleier (1988b) states:

The meaning of the words [in scientific articles] ... is not fixed; it does not reside alone in the words as they lie on the page or as they represent authorial intentions or thought (conscious or unconscious), but in the *reading* of it by other scientists, by science writers, and by the public who reads scientific reporting. ... It is disingenuous for scientists to pretend ignorance of their readers' beliefs and expectations, and unethical to disclaim responsibility for the effects of their work and for presumed misinterpretations of their "pure" text. Scientists are responsible since they themselves build ambiguities and misinterpretations into the writing itself. (161, emphasis in original)

The "multiplicity of meanings" (Bleier 1988b:160) in the scientific texts leads to different interpretations of what the research being reported in the articles has to say about lesbian "nature." For example, without specifying what is meant by "homosexuality," it can be meant or understood as referring to "behavior" or "orientation"—different concepts with different implications (Haumann 1995). Results obtained in a study in which concepts were understood and applied in one way (i.e., behavior) can, in the absence of clear definitions, be used as evidence to support an argument that employs concepts in a different way (i.e., orientation).

Certainly, as Bleier explains, such misapplications and misinterpretations of concepts and results can happen even when terms are specified more clearly, as the construction of meaning on the part of the reader is always a part of the process. Yet ambiguity and vagueness do not help, and are particularly ironic in a system of knowledge production that prides itself on objectivity and standardization. Such conceptual and definitional ambiguities contribute evidence for the implication that it may be difficult to determine the degree of actual consensus among the findings of various researchers studying biological origins of lesbian and bisexual orientations in women.

### **Recommendations: Doing Better Science,**

#### **Doing Feminist Science**

**Feminist have to insist on a better account of the world; it is not enough to show radical historical contingency and modes of construction for everything. (Haraway 1991:187)**

The implications discussed above reflect, in my view, limitations on what the scientific research analyzed in this project can tell us about human sexuality. These limitations derive from the specific culturally-based assumptions that underlie the research. One response to reading the ways in which the researchers' assumptions lead to limitations in the research might be to work even harder to eliminate all forms of assumptions, beliefs, and values in the scientific research, and thus remove the limitations. As should be clear at this point, this proposal is fundamentally at odds with the scholarship in feminist standpoint theories and in feminist science studies that informs this project. The feminist work on which this project is based argues that science not

only is not value-neutral, but that it cannot and should not be so (Keller 1992; Longino 1989, 1990).

Rather, approaches to scientific research that integrate feminist standpoint epistemologies would take seriously the idea that “traditional” science is likely to produce knowledge that justifies the social arrangements and power inequalities of its cultural and historical contexts. Scientific knowledge about the natural world cannot be produced from a neutral vantage point, and even if it could, would not necessarily be at all helpful to changing or ending oppressive power structures and relations. Thus feminist science scholars argue for scientific knowledge construction from a position of commitment to exposing and challenging social inequalities—from a feminist standpoint. As Longino explains, “[b]y focussing on science as practice rather than content, as process rather than product, we can reach the idea of feminist science through that of doing science as a feminist” (1990:188).

This of course does not mean that science done by researchers with feminist social and political commitments is without standards for validity and soundness. Rather, feminist approaches to science suggest redefining some traditional standards, like objectivity, and making sure that some others (like good methodological techniques) are actually upheld consistently by scientists and enforced by scientific communities.

Spanier writes:

Good politics, like good intentions, are not sufficient to produce valid science. The successor science envisioned by Sandra Harding, and increasingly by more scientists, must be sound in more than its politics, and this requires more collaboration and mutual education between feminists and scientists. I believe that the rules guiding Western science can be useful to feminist thinking, if applied with an understanding of their limitations. (1995a:67-68)

Feminist and other critical science scholars have made recommendations for how science might be done in ways that are less likely to reproduce social inequalities. I will discuss some of these suggestions as they relate to the current project. The recommendations I will discuss can be divided into three general areas: first, the need to place scientific research in its proper contexts; second, the need for scientific knowledge claims and their producers to be locatable and accountable; and third, the need for scientists and scientific communities to take more responsibility for producing quality science.<sup>1</sup> The three areas of recommendation are not completely separable, as they overlap and intersect—in fact it could be argued that the each of the second two is a logical outgrowth of the one that precedes it—but I do feel they are sufficiently distinct to deserve separate discussion.

### Recommendation 1: Acknowledging the

#### Inseparability of Science and Society

Might we, then, seek other ways of describing nature,  
which do not ignore context? (Birke 2000:19)

The first recommendation is the need for scientific research to be placed in its social, political, cultural, and historical contexts. Doing this means that scientists need to acknowledge that their research is a part of the society in which it is conducted. As Haumann (1995) states: “Science, as a system of knowledge production, is a social practice inseparable from its specific historical and cultural surroundings” (64). While science has elements that make it a particularly valuable form of knowledge production,

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<sup>1</sup> The structuring of these recommendations is based loosely on the work of Namenwirth (1988).



it is still a way of understanding the world that was created and continues to be conducted in social contexts.

For the current project, acknowledging context can have several implications. Scientists working on understanding sexual orientation in biological terms need to be aware of the cultural and historical foundations of “sexual orientation” as a concept, as well as the origins of its categories. The notion that sexuality and related concepts such as “sexual orientation” have a history and have been shown to have been created within cultures for specific purposes does not enter into the biological approaches to understanding lesbian and bisexual orientations in women. Spanier (1995a) writes:

Cultural influences, such as compulsory heterosexuality, on sexual behavior—or, more often, on acceptable sexual behavior—are generally ignored in biological studies of sexuality. Historical contexts too, such as changes in the meaning of homosexual and heterosexual activities and identities (cf. a “homosexual” to “a person engaging in homosexual activities”), are passed over in silence. (64)

De Cecco and Parker (1995) similarly note that

the biological theorists have little if any knowledge of the psychological, social, cultural, and historical studies of homosexuality. ... Such intellectual parochialism has led the biological theorists to adopt very simplistic concepts of homosexuality as dependent variables, more often expressed as a measurement technique, for example, a numerical rating on the Kinsey heterosexual-homosexual rating scale, than as a theory. The historical, cultural, and human corpus of knowledge and its evolving theory, what has come to be known as gay, lesbian, and bisexual studies, for most biologists, is *terra incognita*. (21)

From these quotes we can see the links between the failure to locate sexual orientation in its proper contexts and some of the implications discussed previously. Because only a very limited understanding of sexuality is used in the research, only a very limited knowledge can emerge from it. As expressed previously, the limited knowledge is not itself the problem, but rather the fact that the researchers do not

acknowledge such limitations, and believe their findings say much more than they are actually capable of saying about the biological origins of sexuality.

Thus what is implied by the general failure of researchers to recognize or acknowledge the limitations in the scientific work is their lack of familiarity with or serious consideration of the immense scholarship in gay and lesbian studies and feminist and queer theories that makes these limitations apparent. To place sexual orientation in its social, political, cultural, and historical contexts, the scientific researchers need to take seriously the work of feminist and queer theorists that challenges the facile associations of sex and gender and of the naturalness of our modern sexuality categories.

Related to understanding the issues involved in the construction of sexual orientation and its categories is the need to recognize some of the ways in which people's sexualities and their experiences of them are impacted by social contexts. In other words, even the current, culturally-specific categories such as "homosexual," "heterosexual," "lesbian," and "bisexual" are in people's actual lives mediated by other factors, such as experiences and membership in other social identity categories. It is particularly important for scientists to contextualize sexuality in this way because, first, it bears upon what interpretations about all members of a certain group (i.e., lesbian women) can be drawn from results obtained from a given sample of subjects from that group, and second, because it bears upon the ways in which understandings of one identity category (such as gay men) may or may not be useful to understanding another (such as lesbian women).

Contextual issues can impact whether someone identifies as heterosexual, lesbian, or bisexual, as well as what she or he means by that identification. Because of this it may be difficult to construct categories for research in which all members of a given category

(such as heterosexual women) have the “same” sexual orientation or are different in a specific and consistent way from all members of the “other” category (such as lesbian or bisexual women). As Spanier asks, “what of gender, race, class, ethnicity, age in influencing the construction and meaning of sexual experience?” (1995a: 64) Even if the construction of meaningfully similar (internally, and different from the “other”) groups can be accomplished, results obtained from those groups may not be generalized to all other people who share that identity category. Limitations on results must be considered.

The failure to acknowledge the complexity of sexual identification is a part of what De Cecco and Parker refer to as “the reification of the notion of gay and lesbian identity” (1995:21). They point out that it leads researchers to believe that one member of a given category is essentially (in a literal sense) the same as any other member of that category. Science that contextualizes sexual identity will need to be far more cautious both in constructing categories, by recognizing that social (as well as psychological) factors influence how one feels, experiences, and identifies in terms of sexual desire, and in generalizing results obtained from research samples. In critiquing the work of LeVay (1991), Spanier notes: “The more we try to take many real individuals ... into account in this scientific theory, the more oversimplification becomes a major conceptual error” (1995a:64).

Thus, for example, results obtained for white, middle-class lesbians should not be unproblematically generalized to lesbians of color and/or of the working class. Also, understandings of sexuality based on the experiences of gay, bisexual, or heterosexual men should not be uncritically assumed to be relevant for lesbian, bisexual, or

heterosexual women. Both Spanier (1995a) and Terry (1997) discuss that for social and political reasons, including “women’s complex relationship to questions of sexuality in general” (Terry 1997:288), men may be more likely to experience their sexuality as biologically pre-determined than women might.

Also, white gay men may be more likely to be welcoming of scientific efforts to locate a biological base to sexual orientation than might lesbians (of color or white) or gay men of color, “because biological explanations have been largely in the service of marginalizing certain groups defined as naturally inferior to white men (Hammonds 1993)” (Terry 1997:281). Given the scientific interest in “explaining” sexual orientation, experiences with the institution of science might impact the meanings one attaches to personal sexual feelings and experiences.

Science practiced in such a way as to challenge heterosexist and heteronormative understandings of sexual orientation, in particular lesbian and bisexual orientations, must resist universalizing or reifying sexual identity categories. Rather, knowledge produced should be specific to its social, historical, political, and cultural contexts. From this recommendation it is hoped that more accurate and useful information regarding sexuality will be produced from scientific research.

## **Recommendation 2: Constructing Locatable and**

### **Accountable Knowledge Claims**

**These are claims on people’s lives; the view from a body, always a complex, contradictory, structuring and structured body, versus the view from above, from nowhere, from simplicity. Only the god-trick is forbidden. (Haraway 1991:195)**

The second recommendation concerns the need for scientific knowledge claims to be locatable and accountable in terms of the contexts from which they arise. This suggests that scientists need first to make an effort to explore and uncover the culturally-based background assumptions and beliefs that inform their approach to their topic; and second, to acknowledge those assumptions and beliefs explicitly as part of the reporting of the research and the claims to knowledge.

Such recommendations have been made by many feminist science scholars, often as part of debates concerning objectivity and its relation to “truth” (Haraway 1991; Harding 1991, 1993; Longino 1990). I want to suggest thinking of the importance of locatability and accountability of scientific knowledge less in terms of how positions of power and privilege influence the “truth” of knowledge created, and more for how they influence the boundaries on knowledge claims. Also, following up on some ideas about feminist standpoint theory discussed in Chapter 2, I will discuss how locatability and accountability relate to the usefulness of the types of scientific knowledge produced in terms of feminist goals.

The implications discussed above, particularly the first three, relate to limitations placed on what the scientific research in the articles analyzed can say about the biological bases of women’s sexual orientation. In other words, they describe limitations or boundaries of the scientific knowledge claims, which derive from the influence of culturally-based assumptions and beliefs on the knowledge production process. It is necessary to uncover the presence of these assumptions and beliefs because the researchers do not acknowledge them explicitly themselves.

Every foray into the production of knowledge must begin somewhere. To have a starting point, some assumptions must be made, and sometimes, beliefs stated. Because knowledge production is a social process (Hubbard 1989; Longino 1990), the assumptions and beliefs that help establish a starting point will be at least partly social in nature. Because people (including researchers) are positioned differently in social structures and power arrangements on the basis of socially-created hierarchies, they have different experiences and understandings of the world from which to draw in constructing starting points for knowledge production.<sup>2</sup> Thus it is likely that at least some of the researchers' assumptions and beliefs will reflect some influence of those positionings.

Sometimes assumptions and beliefs may arise from aspects of the research topic considered to be already-established, collectively agreed-upon facts. To the extent that such "facts" truly are so elementary and accepted that they engender no dispute, they might be considered "safe" assumptions that do not place any kind of practical constraint on the knowledge production. Clearly, however, there are very few things that engender no dispute whatsoever, and this is particularly so when considering a topic as complex as human sexuality.

Thus most assumptions and beliefs that contribute to a researcher's approach to and understanding of her or his topic create some sort of boundaries on what the results of the research can ultimately explain about the research topic. This is because that which is assumed to be the case is not the subject of empirical validation in the knowledge production process. Assumptions are not questioned and thus are not verified.

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<sup>2</sup> It is argued that nature also is to some extent already socially constituted at the beginning of a scientific knowledge project (Harding 1991), but this issue is out of the scope of the immediate discussion.

The presence of socially-influenced assumptions and beliefs in scientific research, then, is not the problem here; rather, it is expected. In fact, the limitations on scientific knowledge claims, which are the logical outcome of the assumptions, are not inherently problematic either. Good cases have been made for creating knowledge that is partial and socially situated (Haraway 1991). Rather, what should be clear is that the problem lies in the researchers' failures to acknowledge the presence of socially-influenced assumptions and beliefs, as well as the limitations they create.

The reason such failures are problematic is not because they are limited, but because they lead to knowledge claims that tend to overlook those limitations. This is the point of the implications discussed above, and is, in my opinion, one of the main "distortions" to knowledge (Harding 1986, 1991) produced by scientific research in which background assumptions are not recognized. Perhaps the knowledge is also further from the way things "really are" (which is how I read some of Harding's argument), but my results do not speak to this claim.

Rather, I hope my findings help demonstrate how by making claims to knowledge about sexuality on the basis of unacknowledged, culturally-based assumptions about sexuality, the researchers' reach exceeds their grasp. Similar in some ways to the work of Haraway, I seek to construct "an argument for situated and embodied knowledges and against various forms of unlocatable, and so irresponsible, knowledge claims. Irresponsible means unable to be called into account" (1991:191). I suggest that locating one's approach to and understandings of the research topic by self-reflexively exploring one's positionality and attendant assumptions and beliefs, and discussing these explicitly in the research itself, would help overcome the scientific tendencies toward totalizing and

universalizing knowledge claims. Namenwirth (1988) offers specific recommendations on this issue:

**I would like to see scientists confront head-on the probability of cultural bias and distortion in choice of research problems, use of language for formulating and describing what ought to be studied, choice of experimental design, methods of data collection and analysis, and the evaluation and interpretation of the results. All these should become matters for introspection, for critique and discussion within research groups, and for open acknowledgment and analysis within the discussion sections of research papers. This process would be facilitated by involving culturally diverse people in the analysis and evaluation of research. Above all, these scientific quality control circles whether we are not being led astray by scientific paradigms and modes of analysis that fit poorly with the evidence at hand. (1988:35)**

What is made apparent in Namenwirth's recommendations is that by itself, making an effort to reveal the assumptions and beliefs that inform one's work is necessary but is not enough. For one thing, the nature of assumptions suggests that they may have to be pointed out before they can be seen. The key is to bring the scientists back in—to acknowledge that there are people behind the knowledge claims. This also suggests the need to transform the standards for scientific writing that tend to erase the researchers and their actions altogether. Finally, it will be necessary for scientific communities and others to take responsibility for evaluating the effects of a researcher's positionality, assumptions, and beliefs on the research results.

What the above discussion does not really get at are the differences between assumptions and beliefs based in elite and privileged positions versus those based in marginalized and oppressed positions. Certainly it is an integral part of feminist standpoint theories to assert that those positions produce knowledges that are not just different, but differently valuable for achieving feminist goals. It is argued that knowledge based in the experiences of the privileged is less likely to have a full



understanding of relations of domination along the particular axis of privilege, and thus us more likely to reproduce inequalities along that axis (Collins 1997; Harding 1997).

As discussed in Chapter 2, following my reading of Collins' (1997) work in particular, I contend that feminist standpoint theory is best applied to evaluating whether the claims made from a particular position are more or less useful to understanding and ending systems of oppression, rather than to evaluating their inherent truth or falsehood. I argue that because of the privileged positions of the majority of scientists and of science as a system of thought, scientific claims to knowledge about women's sexuality are likely to reproduce systems of inequality.

I contend that my findings largely bear out this assertion with respect to the axes of inequality analyzed for, which were sex, gender, sexual orientation, and race. Race, however, is the one exception to this general trend in my analysis. Analysis for culturally-based assumptions and beliefs related to race revealed only that research samples tend to be overwhelmingly white or not to report race information, suggesting the possibility that ways in which sexuality might be mediated by race in our culture are going unexamined. The mutual construction of deviant races, genders, and sexual orientations noted in historical analyses of medical and scientific descriptions (Fausto-Sterling 1995; Gibson 1997; Gilman 1985; Somerville 2000; Stepan 1996; Terry 1990) was not found in the current analysis.

Understandings of sex, gender, and sexual orientation, however, demonstrated underlying assumptions that, as I have argued, are in fact reproductive of systems of inequality. The recommendation of the need for locatability and accountability may lead, one hopes, to the recognition on the part of researchers of the ways in which science that

starts from privileged understandings and experiences may serve to reproduce ideological beliefs about sex, gender, and sexuality. In addition, the choice could be made to start scientific inquiry from positionalities other than privileged ones; in fact standpoint theorists and other feminist thinkers argue that doing this is absolutely necessary (Harding 1986, 1991). For example, Haraway (1991) writes:

We are also bound to seek perspective from those points of view, which can never be known in advance, which promise something quite extraordinary, that is, knowledge potent for constructing worlds less organized by axes of domination. In such a viewpoint, the unmarked category would *really* disappear – quite a difference from simply repeating a disappearing act. (192)

The necessity of starting scientific inquiry from positions other than those of the powerful is one of the reasons it is so important to increase the diversity of scientific practitioners. The perspectives from the standpoints of the oppressed may bring alternative kinds of research questions, answers, and goals for scientific research.

This leads me to my final point about accountability, which concerns a feminist transformation in the goals and ends toward which science works. Discussions of accountability by several feminist science scholars assert that feminist scientists should do science in ways consistent with feminist goals. Longino (1989) explains:

If we recognize, however, that knowledge is shaped by the assumptions, values and interests of a culture and that, within limits, one can choose one's culture, then it's clear that as scientists/theorists we have a choice. We can continue to do establishment science, comfortably wrapped in the myths of scientific rhetoric or we can alter our intellectual allegiances. While remaining committed to an abstract goal of understanding, we can choose to whom, socially and politically, we are accountable in our pursuit of that goal. In particular we can choose between being accountable to the traditional establishment or to our political comrades. (54)

This ideal for feminist science follows logically from the preceding discussion regarding the inability to construct scientific knowledge claims from a completely neutral, value-

free position. Assumptions underlie even the questions a scientist asks about the natural world, as well as the answers obtained, and to the extent that those assumptions are based in experiences of privilege, they help construct knowledge claims that serve in ideological fashion to justify and maintain relations of inequality.

Thus locating one's assumptions in certain ways, while necessary in order that they might be evaluated, also reveals political commitments to specific kinds of social relations. In other words, locatability and accountability must necessarily refer to goals and uses of scientific research as well as to positionalities and assumptions. For feminist science, the recommendation that emerges is an unabashed, explicit commitment to doing science as a feminist, for feminist goals and uses. The hope is that science and society will benefit. As Birke explains:

Biomedical discourse is ... a motley collection of narratives, building its tales on a motley collection of human and animal bodies; it is not a unitary story. Among those are tales that are less reductionist and which might serve feminist political ends rather better – and which can be more truthful stories of 'how bodies work'. (2000:176)

For the current project, this notion of accountability suggests that the scientists need to be fully aware of the implications of biological reductionist and determinist explanations of sexuality. It suggests paying attention to feminist concerns about such explanations, and seeking out other possible approaches, including integrative and interdisciplinary ones. Interdisciplinarity is necessary for feminist science to occur. As Fausto-Sterling (2000) writes:

The cell, the individual, groups of individuals organized in families, peer groups, cultures, and nations and their histories all provide sources of knowledge about human sexuality. We cannot understand it well, unless we consider all of these components. To accomplish such a task, scholars would do well to work in interdisciplinary groups. And while it

is not reasonable, for example, to ask all biologists to become proficient in feminist theory or all feminist theorists to be proficient in cell biology, it *is* reasonable to ask each group of scholars to understand the limitations of knowledge obtained from working within a single discipline. Only nonhierarchical, multidisciplinary teams can devise more complete (or what Sandra Harding calls “less false”) knowledge about human sexuality. (254-255, emphasis in original)

In addition, a science accountable to feminist goals would at the very least be far less likely to assume heterosexuality to be the biologically “normal” state of affairs (and anything else as deviant or abnormal), because it would recognize the historical and cultural constraints on women’s sexuality, as well as the conditions that gave rise to heterosexual and homosexual identities.

### Recommendation 3: Valuing

#### Quality Science

The final recommendation based on the implications discussed above is that scientists and the scientific communities that validate and help disseminate research results need to do more to ensure that poorly-done science is not rewarded, and that well-done science is rewarded. This recommendation relates to the fact that despite the flaws and unacknowledged limitations found in the articles I analyzed, they were all published and some received much popular attention. Also, based on others’ findings of good science being rejected apparently because it did not fit with the popular theoretical frameworks (Byrne 1995; Spanier 1995a), one must wonder about the effects of the predominance of one explanatory framework (the masculinization hypothesis) in the articles I analyzed.

In addition, one must question the poor level of standardization of concepts and the lack of forthrightness in writing, intentional or unintentional, that leads to what was described in the fourth implication discussed above—that the degree of actual consensus in evidence across studies is difficult to determine. Scientists are frequently rewarded for participating in the obfuscation of actual results of their own and other studies, because they then can use results from other studies to support their own conclusions (whether they actually do or not), and thus make their own work appear to have even greater significance. Changing this is partly about changing the attitudes and behaviors of individual scientists, but even more, it is about changing the scientific establishment as a whole. As Namenwirth (1988) writes:

We must redirect the science establishment to reward thorough, thoughtful, honest, and cooperative researchers while penalizing scientists who are dishonest, self-serving, and careless of what they do in the name of science. The structure of the research and publications system within which scientists work and advance must be modified to favor high-quality, thoroughly researched pieces of work published, if necessary, at longer intervals. ... Graduate programs must expect and reward honesty and openness about the limitations and uncertainties of one's experiments, while penalizing bluff and bluster. (36-37)

Researchers need to be rewarded rather than punished for acknowledging that their results, especially in an area as complex as human sexuality, are necessarily tentative, influenced by culture, and limited in scope. Scientists may be inclined to overstate either their own results or their concurrence with other findings in part because doing so has become so standard that it doesn't even appear problematic. Also, the risk involved is relatively low in areas where "cultural values and beliefs that shape the predominating explanatory frameworks in science hold sway over scientific evidence" (Spanier 1995a:56). For example, major publications may not publish critiques of poorly

done studies (Byne 1995) or studies contradicting a previously-published study when the new findings fail to reject the null hypothesis (Spanier 1995a).

Because the results produced within a dominating framework are more easily accepted, less likely to be refuted openly, and more likely to reach wide popular audiences (Fausto-Sterling 1991; Spanier 1995a), it is all the more important that they be examined carefully. Examples of the difficulty of discrediting such studies lead Byne (1995) to assert the following:

These examples, then, should serve as a warning against hasty interpretations of findings based on limited sample sizes, shaky methodologies, and extremely limited knowledge about the functions of particular brain structures and even less knowledge about the biological substrates of the mind. (336-337)

Allen (1997), discussing genetic research, also notes the importance of a dominating framework in shaping what kinds of research get funded and published. He too suggests that it is incumbent upon the scientific community to ensure that good science is done and that poorly-done science is critiqued as such:

The funds *are* being made available [for genetic research on homosexuality], and in a period of shrinking research grants, for some investigators “any port in a storm” will do. The individual scientists who pursue such work, gratified that their work is being funded and has some possible social relevance, are only partly responsible for the widespread promulgation of biological determinist theories. The scientific and academic community bears some responsibility to critique and evaluate these views openly, and to make it clear where the data is circumstantial or faulty. (266, emphasis in original)

Ironically, one of the characteristics of science of which many scientists seem most proud is its tentativeness and openness to challenge. Most of the necessary standards for ensuring that poorly-done science is not rewarded already exist and need only to be enforced in all areas of science, not just the ones that contradict popular ideas.

Regarding the science analyzed in the current project, greater attention needs to be paid, both by the researchers themselves and by those evaluating the findings, to sampling issues and their potential impact on results. Researchers need to be explicit about how they are defining important concepts and categorizing subjects' sexual orientations, so that comparisons are not made across studies with very different definitions, standards and criteria. Overstating the importance of findings (such as making interpretations based on statistically non-significant correlations) or their concurrence with others' findings should be strongly discouraged and are grounds for serious criticism. Conversely, well-done science that contradicts popular ideas should be given fair consideration.

Designing good-quality research in studies of sexual orientation is unlikely to be an easy task. Doing feminist science in this area will necessarily mean looking at how other influences intersect with biological ones. Issues of social, historical, political, and cultural context will need to be taken into account. It will mean being specific about terms and concepts, and acknowledging the limitations and specificity of the research topic itself. It will mean critically analyzing underlying assumptions and explanatory frameworks for heterosexist and other biases. Yet when it is accomplished, it needs to be rewarded with recognition and publication, rather than rejected as being, for example, too biased toward social and environmental factors in the development of sexuality or sexual orientation.

## Conclusions

**I want us never ... to lose sight of the fact that our debates about the body's biology are always simultaneously moral, ethical, and political debates about social and political equality and the possibilities for change. Nothing less is at stake. (Fausto-Sterling 2000:255)**

**It might seem logical to conclude, based on the historical and cultural specificity of our current manner of socially organizing human sexuality and the history of using science to justify social inequalities, that biological research into the origins of sexual orientation simply should not be done. Certainly I would argue that it should not be done with flawed methodologies and unacknowledged biases and limitations, and it is for this reason that I make recommendations for change.**

**However, it is not realistic to expect that all such projects will come to a screeching halt, at least not while the subject has so much popular interest. It also does not serve feminists and LGB persons and communities well to ignore such research and hope it will go away. Perhaps most importantly, though, calling for an end to scientific inquiry into origins of sexual orientation ignores the notion that feminist science is a worthy goal and can produce knowledge that may lead to transformation of oppressive social relations.**

**It is necessary to continue the task of evaluating scientific claims, as Spanier (1995a) explains:**

***All science, all endeavors, are shaped to varying degrees by the politics of the culture at large, the controlling interests, and the particular, sometimes counterculture interests of the people and institutions involved. Instead of rejecting all of science because of this reality, as a feminist scientist I urge that we do everything we can to hold science and scientists accountable to the standards of equity politics and the standards of valid science. (66, emphasis in original)***



Yet as Spanier and other feminist scientists have also argued, feminist science is more than a deconstructive process—it is a constructive one (Birke 2000; Fausto-Sterling 2000; Hubbard 1989; Spanier 1995a, 1995b). Hubbard (1989) notes that “[s]cience and technology always operate in somebody’s interest and serve someone or some group of people” (128). Feminists and LGB persons and communities cannot afford to have only the dominant groups be served in the scientific effort to define lesbian “nature.”

Recommendations for doing better science—feminist science—are steps toward ensuring that everyone has a say in determining who and what science will serve.

## **CHAPTER 7**

### **CONCLUSIONS**

**I do not need epistemology to justify my desire, my life, my love. I need politics; I need to build a world that does not require such justifications. (Phelan 1994:55)**

**In this final chapter, I will present a concluding discussion of the major findings of my research and their significance to feminist efforts to evaluate the claims of science regarding origins of sexual orientations in women. In addition, I will discuss some possible directions for future research toward which the current project and its findings might be applied.**

**With this research project, I sought to answer some questions about the current scientific research being done to locate biological origins of lesbian and bisexual orientations in women. Informed by feminist standpoint theories and feminist science studies, I wanted to evaluate the scientific claims within the context of their social positioning. To do this, I posed the following research questions: What assumptions and beliefs regarding sex, gender, sexual orientation, and race inform the scientific research? Whose interests are served by the way in which the research is conceptualized, conducted, and interpreted? Last, how is the scientific knowledge produced by these research projects impacted by the assumptions and beliefs that inform it?**

**The research methods used to answer these questions were those recommended by feminist science scholars—critique of aspects of the scientific methodologies and**

textual analysis of the language used in discussing the research constructing knowledge claims. The findings from these analyses were presented separately and were later integrated in the process of discussing the implications of the findings for evaluating the scientific knowledge claims made by the researchers.

My analysis of the scientific methodologies in the articles revealed several ways in which the findings from the scientific research are limited by the ways in which researchers' underlying assumptions and beliefs influenced the ways in which they approached, conducted, and interpreted their research. I will discuss the major findings from each of the three aspects of the methodological critique.

First, the body of research is dominated by one type of explanatory framework, what I have called the "masculinization hypothesis." This approach sees lesbian and bisexual orientations in women as the outcome of prenatal overexposure to masculinizing hormones. This assumption limits scientific research by viewing lesbian and bisexual orientations as necessarily determined by biological factors, rather than seeking to verify this conceptualization empirically, and by essentializing culturally- and historically-specific associations of sexual desire for women as being associated with maleness and masculinity. By transporting assumptions of sexual orientation as an essential characteristic and as following in a specific way from sex and gender, the knowledge claims of the research are limited to the context of those assumptions.

Second, the sampling procedures used in the majority of the articles analyzed create research samples that are not representative of larger populations of heterosexual, lesbian, or bisexual women. Subjects are predominantly white, middle class, well educated, and relatively young. Lesbian and bisexual subjects are frequently recruited

from sources that require them to be to some degree open regarding their sexual orientation. Sample sizes are often quite small.

Also, I contend that subjects are placed into sexual orientation categories in ways that call the reliability and validity of the sample groupings into question, especially for making comparisons across different studies. For example, the studies use different criteria for deciding how to place subjects into different sexual orientation categories. They also have no way of accounting for subjects' differing interpretations of their own feelings or experiences, or for the possibility of change in sexual orientation identification over the life course.

The use of sample construction procedures that are limited in these ways suggests the researchers assume the essential nature of sexual orientation. The problems with these sampling limitations are threefold—first, they place serious limits on the generalizability of findings to larger populations; second, they call the results themselves into question, on grounds of validity and reliability; and third, the apparent background assumption of essentialism makes it such that the claims must be evaluated within that context.

The final element of the methodological critique was the evaluation of the researchers' interpretations and conclusions drawn from their data. My findings from this analysis were that the researchers rarely include any consideration of the limitations of their samples when interpreting results and drawing conclusions and that they often interpret data and draw conclusions in ways that exaggerate findings of difference between sample groups. Interestingly, it appeared that researchers from the behavioral

genetics studies were both more likely to discuss sampling limitations and less likely to overstate findings than researchers from studies conducted in other fields.

The overall findings from my analysis of the researchers' interpretations and conclusions suggest that much caution must be exercised in accepting scientific knowledge claims and in attempting to determine consistency in findings across different studies. I argue that the assumption of essentialism is again present in the failure to consider sample limitations. Of the overstatement of significance of findings of difference, I suggest that it perhaps reflects the researchers' assumption that their explanatory framework, informed by the masculinization hypothesis, is correct and not in need of serious evaluation.

The second research method employed in this project was a textual analysis of the language used in discussing women's sexualities, especially as it intersected with sex, gender, sexual orientation, or race. This analysis revealed four major themes: first, the impreciseness of definitions given to key concepts related to sex, gender, and sexuality; second, the equivalence of "sexual orientation" and "homosexuality" in the framing of the central issue, combined with a lack of actual investigation of heterosexual identity; third, the conflation of the concepts of sex, gender, and sexuality; and fourth, language reflecting the understanding of lesbian and bisexual identities as either problematic or deviant. In addition, a fifth theme of language related to race was analyzed but did not reveal the presence of such language.

From these themes and their textual construction I concluded primarily that heterosexuality's privileged status in culture is carried into the scientific discourse. Heterosexuality is largely absent from these scientific texts on sexual orientation,

reinforcing its default status. Sexual orientation is posed as following naturally from sex in a way that makes heterosexuality the only “normal” sexual orientation. Lesbian and bisexual orientations are discussed in terms that reinforce their deviant status. Thus it appears the researchers assume the abnormality of lesbian and bisexual orientations even as they conduct and report on their “objective” scientific research.

The findings and conclusions from both analyses were applied to constructing a set of implications for assessing the scientific knowledge claims. I asserted that the researchers’ assumptions manifested themselves in their scientific research in ways that placed limitations on what the science can and cannot say about women’s sexualities. First, the scientific research cannot provide evidence in support of the “naturalness” of sexual orientation categories, as they are assumed; second, the findings cannot make claims as to the “normality” or “abnormality” of lesbian or bisexual orientations, as abnormality is assumed; third, the findings cannot speak to the innateness of differences found, or their applicability to all women; and finally, the ways in which the researchers construct their knowledge claims makes it difficult to ascertain the degree of consensus in terms of actual evidence produced by different studies.

My conclusions also led me to construct some recommendations for conducting science in ways more consistent with feminist goals, including the need to acknowledge the inseparability of science and society, to construct locatable and accountable knowledge claims, and for scientific communities to reward well-done science.

### Significance to the Field

In terms of findings, this project adds to the body of knowledge regarding understanding the current scientific conceptualizations of women's sexuality, and lesbian and bisexual orientations in particular. Compared to historical studies of medical and scientific knowledge claims regarding lesbian and bisexual women (in Chapter 2), my findings suggest that some aspects have demonstrated little change. Lesbian and bisexual women are still overwhelmingly viewed as deviant, and as manifesting a condition of sex and/or gender inversion, for example. The change in this view seems to be in the sites in which scientists expect to see evidence of this inversion. Whereas earlier studies examined the external body, and later, circulating hormone levels, today's science looks to subtler elements of sex differentiation and to inferred genetic correlations.

My research also contributes the finding that in the body of scientific research analyzed, past uses of tropes of race to understand sexual orientation and construct certain categories of both race and sexual orientation as deviant appear to be no longer in use. This is a positive change in terms of what can be inferred as a decrease in scientific conceptualizations of race in ways that maintain oppressive social relations, at least as represented in this body of research. However, concerning the analysis of race in this project, I am as guilty as anyone of doing precisely what is described by Mayberry, Subramaniam, and Weasel (2001), when they write that "[w]hile it is commonplace to speak of the importance of race, class, nationality, ethnicity, and sexuality, in practice these variables rarely shape the final analyses presented" (10). My interpretations of my findings would likely benefit from a deeper analysis of the role played by race in sustaining the ideologies that underlie the scientific research.

### **Directions for Future Research**

**There are several directions in which this project could be taken for future research. The findings of the research point to some possibly productive avenues of further inquiry, as do some aspects of the project that got less attention than they deserve. I will discuss three general areas in which I imagine there may be interesting and useful ways to build upon this project: further investigations into how heterosexuality's centrality is maintained through science; additional inquiry into the role bisexual orientations and identities play in constructing (and deconstructing) knowledge about sexual orientation; and for critical analyses of scientific sexuality research in particular and for feminist science studies in general, continued imagination and exploration of the ways natures and cultures overlap and intersect.**

**The first avenue for further study concerns the possibility of refocusing investigation in both science and science studies on the construction and maintenance of heterosexual orientations and identities. Some of my findings suggested that there is a great deal of relatively invisible labor occurring in scientific research that serves to keep heterosexuality's "normal" status unexamined and unquestioned. Such work ranges from scrutinizing only nonheterosexual orientations in a project ostensibly about the origins of sexual orientation to overstating findings of difference between heterosexual and lesbian subjects relative to the actual data gathered.**

**Future research in science might take seriously the notion of examining assumptions and practices in order to understand how they contribute to the maintenance of heterosexuality's position of dominance in culture, and develop means to conduct**



science in ways less likely to reproduce social inequalities. In feminist science studies and other critical examinations of these bodies of scientific research, a challenge might be to hold scientists accountable for studying all of sexual orientation and for designing research in a way that serves interests besides those of dominant groups.

I make the suggestion that future research focus on the scientific construction and maintenance of heterosexuality for two reasons: first, because I think my findings provide useful ways to enter into such analysis, and second, because I want to head off any temptation that might exist to see my findings as continuing the effort to “explain” lesbian “nature.” I argue that this project is concerned with the relations of power in the scientific construction of knowledge concerning lesbian and bisexual orientations, and as such, does not examine who or what lesbian and bisexual women “really are.”

Thus I envision this project and future ones that may build from it as shining a spotlight on how structures of power work to maintain the dominance of maleness, masculinity, and heterosexuality, so that they might be changed. My thoughts on this are informed by Phelan (1994), who writes:

Lesbianism provides a critical space against heteropatriarchy most keenly insofar as lesbians turn from self-explanation to analysis and demystification of the heterosexual order(s) that define “woman” and “man” and make lesbians so scandalous. Examining my own being as a lesbian, even in celebration, reinscribes that heterosexual space within which lesbians are an anomaly. This reinscription does not preclude any self-examination, but it mandates a measure of humility and critical distance on the constructions and narratives of identity that we produce and live within. (Phelan 1994:53-54)

The potential for disruption of structures of power that rely on the coherence of sex, gender, and sexual desire comes not from explaining lesbianism or lesbians, but explaining how and why they are considered anomalous and heterosexuals are not. Thus

I see this project as contributing to and useful for further feminist research in how the “heteropatriarchy” is maintained and ultimately can be changed.

The second area of further inquiry I see arising from this project relates to bisexual identification. While I set out to analyze the treatment of bisexual orientations in addition to lesbian ones in the scientific articles, I think I fell short of giving sufficient attention to bisexuality. As in the previous discussion, I am not proposing continuing the effort to “explain” bisexual orientations in women. Rather, I think what should be examined is bisexuality’s potential to be even more disruptive than lesbian orientation of the systems of presumed coherence of sex/gender/sexuality upon which heterosexism and heteronormativity rest (Phelan 2001).

It has been argued that the scientific research into biological origins of sexual orientation may have a difficult time dealing with bisexual identification (Spanier 1995a; Stein 1999). For example, the view of same-sex desire as representing a manifestation of a form of sex and/or gender inversion cannot easily account for sexual desire for persons of both sexes and/or genders. Bisexual orientations may, then, interfere with dominant understandings of sex, gender, and sexual orientation in ways that lesbian and gay orientations can, but often don’t. For this reason bisexuals are sometimes seen as problematic by both heterosexuals and by lesbians and gay men on two grounds, as Phelan (2001) writes:

First, the push to assimilate into existing cultural and legal categories is facilitated by notions of sexual orientation as fixed and binary. If homosexuals are “born that way,” their presence does not pose a challenge to the heterosexual identities and futures of others. ... The second element ... is the assertion that gays and lesbians do not challenge prevailing gender structures. If they are, as many insist, just like heterosexuals in their gender conformity, then they are not a threat to existing conceptions of masculinity, femininity, or sexual

difference. (118-119)

My findings suggested that bisexuality was handled in an ambiguous and inconsistent manner in the scientific research. For example, women self-identifying as bisexual were excluded entirely from some studies, while in others, the category was collapsed into the lesbian (or “nonheterosexual”) category for the convenience of constructing an opposition with the heterosexual category for purposes of analysis. Such results would preliminarily appear to uphold the assertion that the scientific research as currently conceptualized depends upon, or at least benefits from, understanding sexual orientation as dualistic.

The “threats” described by Phelan that bisexuality may pose to the understandings of sex, gender, and sexual orientation that help maintain relations of domination need to be explored further by feminists and others wishing to end such inequalities. I think additional examination into how bisexuality is treated in the scientific search for biological origins of sexual orientations might be useful for such explorations.

The final direction for additional research that I wish to discuss concerns the efforts of feminist science scholars to envision and enact different possibilities for understanding the world using science. Specifically, I would like to see future scientific research on sexual orientations—as well as social scientific research and critical analyses of both—consider seriously what feminist science scholars are increasingly proposing—that biology (or “nature”) and culture interact in complex ways not amenable to reductionistic causal models (Fausto-Sterling 2000).

For example, my findings suggest that ideological understandings of sex, gender, and sexuality are influencing the scientific research on origins of women’s sexual

orientation in many ways. One of these ways is a limited approach to obtaining subjects for research—an approach that does not appear to consider seriously how sexual orientation might be mediated by cultural differences, age differences, differences of class, race, or ethnicity, and others. Ignoring all these contextual influences in turn helps replicate and reinforce the notion that sexual orientation is purely essential, as the variations in results that might have been introduced by conducting research that could account for or consider different influences simply never have the opportunity to emerge.

The false dichotomization of nature and culture helps contribute to limited understandings of both (Mayberry, Subramaniam, and Weasel 2001:4). Feminist scientist Anne Fausto-Sterling suggests that we need to consider many different cultural components if we are to gain a better understanding of human sexuality (2000:255). Like others located in the natural sciences, Fausto-Sterling does not suggest we give up scientific efforts to understand our world. Rather, we need “new and better ways to conceptualize the problems at hand” (2000:255). I suggest that future research in this area continue to critique the false dichotomization of nature and culture and insist on the importance of their intersections.

### Conclusion

In the introduction to their edited volume on new contributions to the field of feminist science studies, Mayberry, Subramaniam, and Weasel (2001) write the following:

Despite our differences, what brings us together is a passion for a common set of questions: How do natures and cultures interact? How do we produce knowledge about the natural and cultural landscapes we inhabit? What consequences does this knowledge

have? The heterogeneous, multi- and interdisciplinary field devoted to exploring these questions has been increasingly called “feminist science studies.” (2)

The questions they mention get at the main issues being examined by feminist science scholars in many academic fields: How is our production of scientific knowledge impacted by the cultures in which it is produced? What aspects of natures and cultures are benefited and disadvantaged by the ways in which we understand and explain them? How can feminist science help us understand the world in ways that are less reductionistic and deterministic—in terms of complex interactions between “natures” and “cultures”?

These questions are critical, analytical, and deconstructive of oppressive power relations and the knowledge and materiality constructed by and for them. Ultimately, however, these questions get at the constructive goals of feminist science studies—as I see them, to produce the best understandings of the world we live in while working to create the least damaging or harmful conditions possible for all natures and cultures.

Similarly, with this project I posed critical and deconstructive questions and methods to the written descriptions of scientific research and knowledge claims, in the hope of going beyond deconstruction. As a feminist researcher, I am committed to feminist praxis, and have sought with this project not only to understand the world, but to change it (to paraphrase Marx). By uncovering some of the ways in which the assumptions and beliefs informing the current scientific search for biological origins of lesbian and bisexual orientations in women may help justify and perpetuate systems of sexism and heterosexism, my hope is to contribute to the development of better science and better relations among social and natural worlds. I am committed to creating a world

**in which, as suggested by the quotation from Shane Phelan that opened this chapter, we need no justifications, scientific or otherwise, for our desires, our lives, and our loves.**

## **APPENDIX**

### **LIST OF ARTICLES IN THE SAMPLE**

The following is a list that represents the sample, constructed for this project, of articles that report results of research related to biological origins of lesbian and bisexual orientations in women, published in English-language scholarly journals from 1990-2000 (sample collection procedures described in Chapter 3). The articles are listed in the order utilized in Table 1 of Chapter 4: first, the subsample of 10 articles that were analyzed in this project; second, the remaining 20 articles that were not selected for analysis; and third, the five articles that were excluded from consideration for the sample that was analyzed. They are divided into the groupings described in Chapter 3: genetic, brain/cognition, and neuroendocrine approaches. The numbering of the articles corresponds to the numbering in Table 1 of Chapter 4 and to the numbers by which the articles were referred to in the data analysis chapters (Chapters 4 and 5). The citations are in CBE format to correspond to the preferred style for scientific articles.

#### **Subsample of Ten Articles Used in Analysis**

##### **Genetic studies:**

1. King M, McDonald E. Homosexuals who are twins: a study of 46 probands. *Brit J Psychiat* 1992; 160: 407-409.
2. Bailey JM, Pillard RC, Neale MC, Agyei Y. Heritable factors influence sexual orientation in women. *Arch Gen Psychiat* 1993; 50: 217-233.

3. Pattatucci AML, Hamer DH. Development and familiarity of sexual orientation in females. *Behav Genet* 1995; 25: (5) 407-420.

**Brain-function and cognitive studies:**

4. Gladue BA, Beatty WW, Larson J, Staton RD. Sexual orientation and spatial ability in men and women. *Psychobiol* 1990; 18: (1) 101-108.
5. Wegesin DJ. A neuropsychologic profile of homosexual and heterosexual men and women *Arch Sex Behav* 1998; 27: (1) 91-108.

**Other neuroendocrine studies:**

6. McCormick CM, Witelson SF, Kingstone E. Left-handedness in homosexual men and women: neuroendocrine implications. *Psychoneuroendocrino* 1990; 15: 69-76.
7. Holtzen DW. Handedness and sexual orientation. *J Clin Exp Neuropsychol* 1994; 16 (5): 702-712.
8. Hall JA, Kimura D. Sexual orientation and performance on sexually dimorphic motor tasks. *Arch Sex Behav* 1995; 24 (4): 395-407.
9. Bogaert AF. Physical development and sexual orientation in women: height, weight, and age of puberty comparisons *Pers Indiv Differ* 1998; 24 (1): 115-121.
10. McFadden D, Pasanen EG. Spontaneous otoacoustic emissions in heterosexuals, homosexuals, and bisexuals. *J Acoust Soc Am* 1999; 105 (4): 2403-2413.

**Remaining 20 Articles Not Selected for Analysis**

**Genetic studies:**

11. Bailey JM, Bell AP. Familiarity of female and male homosexuality. *Behav Genet* 1993; 23 (4): 313-322.
12. Bailey JM, Benishay DS. Familial aggregation of female sexual orientation. *Am J Psychiat* 1993; 150: 272-277.
13. Whitam FL, Diamond M, Martin J. Homosexual orientation in twins: a report on 61 pairs and three triplet sets. *Arch Sex Behav* 1993; 22 (3): 187-206.
14. Hu S, Pattatucci AML, Patterson C, Li L, Fulker DW, Cherny SS, Kruglyak L, Hamer DH. Linkage between sexual orientation and chromosome XQ28 in males but not in females. *Nat Genet* 1995; 11 (3): 248-256.



15. Hershberger SL. A twin registry study of male and female sexual orientation. *J Sex Res* 1997; 34 (2): 212-222.
16. Bailey JM, Dunne MP, Martin NG. Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample. *J Pers Soc Psychol* 2000; 78 (3): 524.

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