

**COMPETING PARADIGMS FOR EXPLAINING THE ETIOLOGY OF HUMAN  
MALE HOMOSEXUAL ORIENTATION: A CASE STUDY IN THE  
APPLICATION OF THE METHODOLOGY OF SCIENTIFIC RESEARCH  
PROGRAMS**

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**Thesis Presented for the Degree of  
DOCTOR OF PHILOSOPHY in the DEPARTMENT OF PHILOSOPHY,  
UNIVERSITY OF CAPE TOWN**

**JUNE 2003**

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**Competing Paradigms for Explaining the Etiology of Human Male Homosexual  
Orientation: A Case Study in the Application of the Methodology of Scientific  
Research Programs.**

**Abstract**

This thesis is a case study in the application of the principles of the methodology of scientific research programs to a contemporary scientific debate: the debate concerning the causes and origins of human male homosexual orientation. It begins by identifying two major research programs that seek to explain homosexual phenomenon, namely, the biological and experiential research programs. Using the methodology of research programs as a framework for analysis, the study shows that the two programs have stagnated. Neither of them meets the Lakatosian criterion of 'progressivity'. The study argues that lack of progress in this area may be a consequence of the two groups of researchers, the biologists and the experientialists, rigidly clinging to the hard cores of their respective programs. The study calls for an interactionist approach to the study of homosexual etiology and suggests that such an approach could benefit from recent trends in developmental systems theory and evolutionary psychology. It is also argued that this episode in the history of science undermines the normative generalizability of Lakatos' account of science.

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Cape Town  
June 2003

### **Acknowledgements**

I should like to begin by recording my gratitude to my principal supervisor, Professor Don Ross of the University of Cape Town, for guiding me through this study. His careful and penetrative criticisms saved me from many an error. I would also like to thank my second supervisor, Dr Jack Odhiambo of the University of Nairobi, for guiding me especially during the early stages of this project.

This work was supported by a grant from the Andrew W. Mellon Foundation through the University, Science, Humanities and Engineering Partnership in Africa (USHEPiA). I am most grateful to the University of Cape Town for awarding me this fellowship. I would also like to thank the coordinators of USHEPiA, especially Nan Warner, Carol Ojwang' and Zubeida Hattas, for their many kindnesses.

A great part of this study was carried out when I was a visiting associate at the Center for African Studies, University of Cape Town. I am deeply indebted to the center's staff for their warm hospitality.

Lastly, I would like to thank my former teachers at the London School of Economics (1994-1995), especially Professors John Worrall and Elie Zahar, for introducing me to the thought of Imre Lakatos whose methodology of scientific research programs was the crucial philosophical influence on this thesis.

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## **Introduction**

Sexual relations between members of the same sex have existed throughout recorded human history in almost all societies both primitive and civilized. Homosexuality, as this behavior is called, has given rise to considerable interest and controversy among scientists and the public at large. The debate revolves around the question of whether homosexuals are born or made, that is, whether homosexual orientation is primarily determined by biology or it is the result of experiential factors. A survey of the literature on human sexual orientation research reveals that there are two major research programs seeking to explain the genesis of human male homosexuality, namely the biological and experiential research programs. It is the aim of this study to reconstruct and comparatively evaluate the history of these two programs using the methodology of scientific research programs, which was first formulated by the philosopher Imre Lakatos.

One of the main reasons why scientists are interested in the etiology of homosexuality is because it seems to flout what is generally regarded as the most important function of sexuality, which is to produce offspring. Homosexuality is also a paradox for those who believe in the truth of the Darwinian theory of evolution by natural selection. If we assume that sexual orientation has some genetic basis, how are we to explain the persistence of the gay gene over time? Why has it not been eliminated from the gene pool? What selective advantages, if any, might those who carry the gene enjoy?

The question of what causes homosexuality is itself controversial because it implicitly assumes that homosexuality is a pathological condition and that heterosexuality does not

need an explanation. Some people fear that those researching into the causes of homosexuality may be unknowingly laying the foundation for a genocidal campaign against gays and lesbians (Murphy 1997). It is feared that the results of etiological research into homosexuality may lead some people to attempt to 'cure' or eliminate homosexuals. In fact, one of the leading researchers in this area, Simon LeVay, has been accused of secretly trying to eliminate gay people (LeVay 1996). Others, especially supporters of homosexual rights, are interested in scientific research into the causes of homosexuality because they think that such research has social, legal and ethical relevance. For example, they believe that a biological explanation would show that homosexuality is natural in a morally significant sense and that it would improve their standing in the eyes of the public and the law. In fact, early sexologists such as Richard v. Kraft-Ebing, Havelock Ellis and Magnus Hirschfeld based their argument for legal equality for homosexuals on the claim that homosexuality had a biological basis (Haumann 1995: 81). However, other scholars such as Schüklenk (1996) have questioned the appropriateness of allocation of scarce healthcare and health research funds to the study of the etiology of homosexuality. She urges that such funds should be used for ethical research, which would be of benefit to homosexual people.

There are good reasons to be worried about the possible misuse of the results of sexual orientation research. Research into the causes of homosexuality has in the past been driven by the desire to eradicate the trait rather than understanding it. Many homosexual people have been forced to undergo treatments to change their sexual orientation, while others have undertaken to undergo them in order to avoid being stigmatized. In Nazi Germany, for example, homosexuals were considered biologically defective and were

therefore castrated, imprisoned and even killed. And as recently as 1991, a German endocrinologist by the name of Gunter Dörner suggested that hormone injections could be used as a vaccine against homosexuality (Dörner 1991).

In view of the ethical, legal and political controversy that research into the causes of homosexuality generates, and considering that people's attitudes towards homosexuals are to a large extent influenced by beliefs about the causation of homosexuality, an objective evaluation of the methods, assumptions and the evidence adduced by researchers on the two sides of the debate seems called for. Whereas the few philosophical studies on homosexuality have tended to focus on the ethical aspects of this debate, this study will depart from that tradition by examining the competing paradigms for explaining the causes of human male homosexuality from an epistemological and methodological point of view.

As already indicated, the relative merits of two research traditions will be appraised in the terms provided by Imre Lakatos' methodology of scientific research programs or MSRP in short. MSRP is a set of rules for interpreting the history of science and its developments. It has proved to be an effective tool for epistemological analysis and evaluation of historical episodes especially in the physical sciences (see Howson 1976). MSRP is also becoming increasingly popular among philosophers of science interested in other branches of human knowledge including mathematics, geology, economics, ethics, and evolutionary psychology to mention but a few.

This study will proceed from the assumption that there are two rival research programs for explaining the origins of human male homosexual orientation, namely the biological and experiential programs. Moreover, different hard cores and problem solving techniques characterize the two programs. According to the biologically oriented view, genetic, neuroanatomic as well as hormonal factors play a primary role in the causation of homosexuality. This line of research can be traced back to the 1860s when the German sexologist, Karl Ulrichs, hypothesized that homosexual men were biological males with female psyches (Herrn 1995: 35). Since then, researchers have been trying to find a biological explanation of homosexuality. The experiential research program, on the other hand, holds that homosexuality is socially and psychologically created by experience and opportunity. This line of thinking can be traced back to Sigmund Freud (1905), who ascribed male homosexuality to unconscious conflicts and fixations that have their origins in childhood.

In summary, the aim of the present study is to appraise and reconstruct the history of the experiential and biological explanations of human male homosexuality. More specifically, this study will be concerned with the question of whether the two rival research programs meet the Lakatosian criterion of 'progressivity', which postulates that a progressive program must be able to successfully account for apparent anomalies and generate novel predictions and explanations. The normative value of Lakatos' methodology will also be assessed. It is important to reiterate that this study will be principally concerned with epistemological and methodological questions and not with the moral and political issues that sexual orientation research generates.

# Chapter 1

## The Methodology of Scientific Research Programs

History of science without philosophy of science is blind; philosophy of science without history of science is empty.  
Lakatos (1970: 91)

### *1.1 Introduction*

It is not the objective of this dissertation to defend any particular account of the origins and development of erotic desire. The primary purpose of this study is to identify and appraise two main rival research programs for explaining the etiology of human male homosexuality. The methodology to be used to accomplish this task is that of scientific research programs (hereafter abbreviated as MSRP), which was developed by the philosopher Imre Lakatos. In this chapter, I will explore the basic tenets of this methodology and then show how it will be used to reconstruct the history of sexual orientation research in subsequent chapters.

As the first part of the dictum quoted above suggests, one of Lakatos' prime motives for developing his research programs methodology was to set standards for the evaluation of episodes in the history of science. These standards, as we shall later see, apply to research programs, not to individual theories and they judge the evolution of a program in comparison with the evolution of rivals, not by itself. Indeed, Lakatos treats the history of science as a history of competition between rival research programs with the world acting as the referee. He believes that this kind of competition produces rational and objective advances in scientific knowledge and a better approximation to the truth.

What makes Lakatos model appealing is that it appears to avoid the conceptual difficulties that characterized older historiographic models of science such as inductivism, conventionalism and Popperian methodological falsificationism. It is also able to rationally reconstruct many episodes in the history of science, which these other models of science would consider irrational. These methodologies, Lakatos argues, are at odds with the 'basic appraisals of the scientific elite' as revealed in history and are therefore inadequate (Lakatos 1971: 111). He also notes that, unlike MSRP, these older historiographies of science are more dependent on external facts in the historical reconstructions they generate.

### ***1.2 MSRP, Popper's Falsificationism and Kuhn's Paradigms***

In formulating the MSRP, Lakatos saw himself as improving Popper's falsificationism while at the same time not succumbing to what he considered to be Kuhn's irrationalism. His aim was to save the most important feature of Popper's methodology while taking account of the various criticisms to which it had been subjected by some eminent philosophers of science, notably Agassi, Feyerabend and Kuhn. Lakatos maintained that theories could not be empirically tested without accepting a chain of related theories, assumptions and agreed upon facts. And while he agreed with Popper that a rational reconstruction could be given for the growth of scientific knowledge, Lakatos realized that Popper's model could not fully account for the considerable stability and continuity of science. He objected to Popper's claim that development in science is to be achieved solely by conjecture and refutation. Against Popper, Lakatos argued that scientists do not

reject their theories when they encounter falsifying empirical data. On the contrary, scientists tend to take such data as anomalies, which the program will be able to explain in the course of time. In fact, Lakatos proposes a shift in focus from empirical refutations to empirical confirmations and explicitly rejects the idea that a research program can be decisively eliminated by a single experiment. He points out that the clash between a given theory and observation could be due to some auxiliary assumptions that have been made in deriving the theory. Lakatos goes on to suggest that a program should be given time to develop sufficiently to show its potential and to outgrow 'infantile diseases' such as anomalies, inconsistencies and *ad hoc* moves (Lakatos 1974: 249).

Lakatos was also influenced by Thomas Kuhn's account of scientific growth especially as presented in his influential book *The Structure of Scientific Revolutions* (1962). Using examples from the history of science, Kuhn had shown that science is sometimes conducted even when confronted with anomalies or phenomena that do not fit the accepted paradigm. And although the notion of paradigm has been shown to be ambiguous (see Masterman 1994), it does have certain identifiable characteristics. A paradigm, according to Kuhn, is a constellation of beliefs, values, procedures, and past scientific achievements that is shared within a community of scientists. It directs their research activity, and is learned during their training or in their common research experiences. Furthermore, a paradigm provides a way of seeing problems and suggests what kinds of techniques are appropriate and what kinds of solutions are acceptable. Lakatos shares with Kuhn the conviction that for productive research to be undertaken, it is necessary to have a basic set of shared and agreed facts to serve as the starting point for

scientific inquiry. However, although he acknowledges that Kuhn was right to emphasize continuity in science, he criticizes him for treating revolutionary episodes in science as instances of mystical conversion.

According to Kuhn, the decision to switch from one paradigm to another is not steered by arguments based on logic and experience alone, nor does he think it should necessarily be. The rejection of one conceptual framework and its replacement by another involves a non-rational process akin to a religious conversion. This means that for Kuhn scientific revolutions, which are central episodes in the advance of knowledge, ultimately lie beyond the bounds of rational intelligibility. Consequently, Lakatos sought to develop a model devoid of the irrationalist and subjectivist overtones present in Kuhn's conception of science.

As already pointed out, Lakatos intended the MSRP to be a standard for appraising the scientific and rational status of contemporary conceptual systems as well as a conceptual tool for the historian of science for constructing explanatory accounts of scientific change. He accepted the fact that there are discontinuous transitions in science, but unlike Kuhn he argued that such transitions are rationally intelligible. And although his model was originally intended for the physical sciences (see Howson 1976), it has been applied to other fields of study including mathematics, biology, evolutionary psychology and economics to mention but a few. Lakatos himself argued that the 'methodology of scientific research programs may be applied not only to norm-impregnated historical knowledge but also to any normative knowledge, including even ethics and aesthetics

(Lakatos 1971: 132). Two of his former students, namely, John Worrall and Eli Zahar have used the MSRP to appraise two different episodes in the history of physics while Peter Urbach has used it to appraise the environmentalist and hereditarian debate on IQ (Zahar 1973, Worrall 1974, Urbach 1974).

From the foregoing, the MSRP should be viewed as an outcome of the attempt to reconcile the main principles of Popper's methodology and the historical criticism presented by Kuhn. It is, in fact, a synthesis of what Lakatos regarded as the positive aspects of Kuhn and Popper's accounts of scientific change.

### ***1.3 Hard Cores and Protective Belts***

The starting point of MSRP is the claim that the appropriate unit of appraisal in science is not an individual theory, as Popper thought, but a sequence of related theories, which Lakatos calls a scientific research program. Indeed, he considers the use of word 'theory' for the unit of appraisal a 'category mistake' since appraisal can only be applied to a succession of theories (McMullin 1976). Theories for Lakatos do not have a history, as they do not evolve. Research programs, on the other hand, have a history during which the theories within them are replaced by different theories. Thus the unit of appraisal for Lakatos is an organic unit and not a fixed set of sentences or a theory. In some respects, the concept of a research program is similar to Kuhn's notion of normal science. As Lakatos himself explains: "the concept of a 'research program' may be construed as an objective, 'third world' reconstruction of Kuhn's social-psychological concept of paradigm" (Lakatos 1970: 179).

Like Kuhn, Lakatos is aware of the fact that theories cannot be evaluated in isolation from the auxiliary concepts, which specify initial conditions, and relevant evidence. (Pierre Duhem was the first to formulate this thesis when he pointed out that an experiment in physics could never condemn an isolated hypothesis but only a whole group of ideas and assumptions (Duhem 1954)). It is this larger theoretical scheme (i.e. research program) that Lakatos takes as the entity to be judged as progressing or degenerating and as the basis for estimating the rationality of a particular scientific enterprise. A program is said to be rational if it is progressing, irrational if it is degenerating.

A Lakatosian research program consists of a hard core, a protective belt and methodological rules, which fall into two categories: a negative heuristic and a positive heuristic. Different scientists may be working on different problems within the same program. What is common to all scientists working in the same program is that it is the program that generates the problems and the approach utilized to solve the problem is guided by positive heuristic of the program.

The hard core is non-negotiable and takes the form of general theoretical hypotheses that form the basis from which the program is to develop. And although it may never be explicitly stated, the hard core may be identified from the principles that guide the scientist in his or her practical research. It is comparable to Kuhn's paradigm in that scientists pursuing a particular research program do not question its fundamental tenets.

The only major difference is that while Kuhn speaks of the scientific community being committed to its paradigm, Lakatos speaks of scientists making a methodological decision not to tamper with the hard core of their research program. This distinction is important because it means that a scientist could decide not to modify some part of a theoretical system without committing him or herself to its truth (Musgrave 1976). As an example, Lakatos cites the hard core of the Newtonian research program, which consisted of the three laws of dynamics and the universal law of gravitation. In addition, this program had a protective belt composed of the assumptions about the gravitational center of large bodies, the number and paths of planets in the solar system, the distance of the fixed stars, Newton's theory of atmospheric refractions and many other auxiliary hypotheses.

The decision to accept the hard-core is not necessarily a conscious decision on the part of the individual scientist. Rather, the hard-core exists implicitly in all she or he does. In fact, acceptance arises more from a process of indoctrination into a field than from any rational decision. However, it is important to note that Lakatos tells us little about how these hypotheses are to be selected. His critics regard this as one of the main weakness of MSRP.

Heuristics, on the other hand, are organizing principles that determine the form that inquiry will take. The negative heuristic stipulates that the basic assumption underlying a program, its hard core, is not abandoned in the face of experimental difficulties. In the words of Lakatos: 'Instead, we must use our ingenuity to articulate or even invent

‘auxiliary hypotheses’, which form a protective belt around this core, and we must redirect *modus tollens* to these’ (Lakatos 1994: 48). The rationale for this proposal is that if the hard core of a program were not protected from disconfirming evidence, no research programs could evolve, since there always will be anomalous data to be found. Thus the rules of negative heuristic forbid the scientist from regarding the hard core as being falsifiable. A most instructive example of this is the famous story of the discovery of the planet Neptune. When the planet Uranus was found not to be fulfilling its Newtonian predictions, this did not lead to the conclusion that Newtonian gravitational theory was false. Instead, two astronomers John Adams and Urban Leverrier, introduced the new auxiliary hypothesis of an undiscovered planet beyond Uranus, perturbing its motion through conventional gravitational effects. This proposal, according to MSRP, was scientific because it was independently testable. In fact, it led to the discovery of the planet Neptune in 1848. The discovery was a novel and dramatic success, which justified the program being evaluated as progressive. In order to save a research program from refutation, the protective belt can be modified but such modification must be able to extend the empirical content of the theory beyond the refuting cases. They must imply ‘novel facts’ that can be empirically supported. In fact, the protective belt of a research program is constantly changing in response to the empirical developments and under the program’s positive heuristic.

A scientist who modifies the hard core of his research program automatically opts out of that particular research program. Astronomer Tycho Brahe, for example, abandoned the Copernican research program and started a new one when he hypothesized that all the

planets other than the earth revolve around a stationary earth (Chalmers 1994, Kuhn 1985). Copernicus himself had earlier on rejected the hard core of the Ptolemaic astronomy, which, among other things, postulated that the earth was the center of the universe and that all the planets and the sun revolved around it.

The other important component of the MSRP is the positive heuristic. This is a research policy or a set of guidelines for ordering research priorities. It anticipates empirical refutations and gives directions in advance about how they are to be dealt with. It also concentrates on generating novel facts and expanding the explanatory power of the program. The positive heuristic tells the scientist how to supplement the hard core in order for the program to be capable of providing explanations and predictions of the phenomena under consideration. It also protects the scientist from the confusing influence of counter observations. Consequently, a scientist may ignore the anomalies as long as his research program continues to predict novel facts. Like the hard core, the positive heuristic cannot be abandoned without giving up the program altogether.

#### ***1.4 Progress and Degeneration***

According to the MSRP, scientific knowledge grows by progressive programs overtaking degenerating ones. A program's success largely depends on the strength of its positive heuristic, which should be able to foresee anomalies and turn them into successful applications of the program. Consequently, Lakatos distinguishes two types of progressiveness: theoretical and empirical. A program is theoretically progressive if each change in its protective belt leads to novel predictions and it is empirically progressive if

these novel predictions are corroborated by data. On the other hand, a program degenerates if it accounts for new facts with what Lakatos calls *ad hoc* hypotheses unanticipated in its positive heuristic and fails to make and confirm novel predictions.

Initially, Lakatos classified a prediction as novel if and only if the phenomenon being predicted had never been observed prior to prediction. But his pupil Elie Zahar modified this definition to include phenomena that may have been observed before the time of prediction but which did not belong to the problem situation that led to the formulation of the hypothesis in question (Zahar 1973). In other words, according to Zahar, a program will still be considered progressive so long as it predicts some known fact for which it was never intended to provide an explanation.

For scientific progress to be made, the adjustment of the protective belt of a research program must not only protect the hard core, it must also increase its domain of explained facts beyond the addition of the explained anomaly. Consequently, Lakatos distinguishes three different ways in which theories within a given research program can be *ad hoc*:

*Adhoc 1*: the theory has no excess empirical content over its predecessor

*Adhoc 2*: the theory predicts novel facts but it is not corroborated

*Adhoc 3*: the theory is arbitrary in relation to the protective belt, that is, it does not form an integral part of the positive heuristic

Lakatos allows a progressive research program to be *ad hoc* 1 and *ad hoc* 2 but not *ad hoc* 3. A research program whose series of theories persistently makes *ad hoc* 3 moves and does not lead to the discovery of novel facts is said to be degenerating. A research program is progressive in respect to other programs if it provides an excess of corroborated information in comparison to what they prohibit. Lakatos regards a theory in a series falsified when it is superseded by a theory with higher corroborated content. MSRP teaches that 'one must treat budding programs leniently, programs may take decades before they get off the ground and become empirically progressive' (Lakatos 1978: 6). However, Lakatos admits that it is difficult to decide when a program has irrevocably degenerated, or when one of two rival programs has achieved a decisive advantage over the other. He notes that a creative shift in the positive heuristic may push a degenerating program forward again.

### ***1.5 Commensurability of Research Programs***

Unlike Kuhn and Feyerabend, who assume that two theories involved in a revolutionary development are mutually incommensurable and that there is no algorithm for theory choice, Lakatos maintains that we can rationally compare and appraise competing research programs in terms of their theoretical and empirical progressiveness. In fact, as a rationalist, Lakatos is committed to articulating a set of principles which provide for the assessment of the relative merits of rival theories against any given background knowledge. For Kuhn and Feyerabend there are no objective theory-neutral principles relative to which the theories embedded in rival paradigms can be compared. Lakatos cites Newtonian and Einsteinian mechanics as specific examples of two incommensurable

paradigms. In fact, he explicitly rejects the standard view that Newtonian mechanics can be derived as a limiting case from relativistic mechanics. Competing programs differ so radically from each other that they are incommensurable. Consequently, each research program contains its own standards of appraisal. For Kuhn, then, 'scientific change is a mystical conversion which is not and cannot be governed by rules of reason and which falls totally within the (social) psychology of discovery' (Lakatos 1970: 93). Lakatos objects to this socio-psychological explanation of paradigm shifts and argues that the empirical contents of competing paradigms can be objectively compared and assessed. He even suggests that a single scientist can simultaneously work on two rival programs (Lakatos 1976: 11). Indeed, Lakatos sees himself as defending science against Kuhn's irrationalism. He writes:

*Can there be any objective (as opposed to socio-psychological) reason to reject a program, that is, to eliminate its hard core and its program for constructing protective belts? Our answer, in outline, is that such an objective reason is provided by a rival research program, which explains the previous success of its rival and supersedes it by a further display of its heuristic power. (Lakatos: 1994: 155)*

According to MSRP, significant progress in science is attained when a program makes novel predictions, which agree with facts. When successive modifications of the protective belt fail to produce any new independent tests, which are passed, the research program is degenerating. But a research program can never be justified once and for all. It can however overtake another if it successfully predicts all that its rival predicts and more besides. Einstein's theory of relativity, for example, superseded Lorentz's ether

program, when it explained the anomalous precession of the perihelion of the planet Mercury in 1915 (Zahar 1973).

Lakatos maintains that it would be rational to give up or 'shelve' the overtaken research program. He even goes so far as saying that researchers in a degenerating program should be denied research funds and that editors of scientific journals should not publish any work submitted by researchers in a degenerating program. However, he also says that a degenerating program can recover and attain unforeseen splendor and that it is equally rational to stick to it. What Lakatos is suggesting here is that it is always rational to continue to work on a degenerating research program provided only that one remains aware that the program is degenerating. In his own words: 'it is perfectly rational to play a risky game: what is irrational is to deceive oneself about the risk' (Lakatos 1971: 104-5).

### ***1.6 Reconstruction of Episodes in the History of Science***

According to MSRP, the history of science shows that competition between scientific research programs produces rational and objective advances in scientific knowledge and a closer approximation to reality. Consequently, the historian of science should provide a rational reconstruction of episodes in science. But in reconstructing such episodes, Lakatos finds it useful to demarcate between internal and external history. This distinction is intended to keep the logic of discovery separated from the psychology of research. It is important to Lakatos because it is what differentiates his philosophy of science from the Kuhnian socio-psychological approach.

External history is concerned with the social forces which affect the development of science but which do not have anything to do with the content of science. It is the history of what *actually* happened which takes note of economic, social and technological conditions. External history will also include 'any failure of scientists to act according to MSRP, as, for example, preferring a degenerating SRP to a progressive SRP, on the ground that the former is more 'elegant' than the latter possibly accompanied by the denial that it is in fact degenerating' (Blaug 1976: 158).

Internal history, on the other hand, has to do with how theories are proposed, rejected and accepted within the scientific community and how this contributes to the advancement of knowledge; it is history reconstructed as if the scientist had always proceeded in a rational manner. In the words of Ian Hacking, internal history 'is to be a history of Hegelian alienated knowledge, the history of anonymous and autonomous research programs (Hacking 1992). It is the history of what Popper (1978) would call world three or the world of objective contents of thought. Lakatos contends that only when the actual history of an episode fails to match the rational reconstruction may the historian of science resort to social or psychological factors to explain the deviation. He even goes so far as suggesting that the philosopher of science should put the rationally reconstructed version of events in the main body of the text, while relegating the history of what actually happened (external history) in the footnotes (Lakatos 1971: 107). Lakatos maintains that MSRP is superior because it turns many problems that were considered external by other historiographies into internal ones.

The Lakatosian historian searches for the competing programs of the period he is investigating and attempts to identify their respective elements (hard cores, negative heuristics, developing sets of theories, etc). He also notes the appraisals made by scientists of the research programs; he then describes and documents the ways in which the programs progressed or degenerated. This study will attempt to reconstruct the etiology of homosexuality debate from a Lakatosian perspective. Of particular interest will be to see how workers in the two rival research programs have been handling counter-examples. I will also be interested to find out why, in the last decade, the pendulum of popular and scientific opinion has swung back to favoring the biological hypotheses.

In evaluating the sexual orientation research using MSRP, two issues need to be distinguished: *normative* recommendation and historical *description*. MSRP was meant to serve both as (i) a normative recommendation on how science ought to be appraised and (ii) a historical description claiming to reflect scientific practice in so far as science is done well. This is true of all the methodologies of science including conventionalism, falsificationism and inductivism. In this regard, the present study will not only attempt to find out whether the story of homosexual etiology research fits the Lakatosian model, it will also be concerned with the question of whether MSRP is a rational method that practicing scientists *ought* to follow. Of course Lakatos has been at pains to say that his model was not meant to provide heuristic advice to *practicing* scientists. However, as a number of writers have conclusively shown, no clear distinction between methodological

appraisal and heuristic advice can be logically defended (Quinn 1972, Feyerabend 1976, Amsterdamski 1992). Indeed, to say that a particular program is progressing or degenerating is to suggest that it deserves more support, or less, from scientists. Similarly, to say that degenerating programs are risky, as Lakatos himself says, is to make a heuristic proposal.

It is important to note that one of the central theses of MSRP is the claim that scientists rigidly hold on to the hard cores of their research programs even in the face of empirical difficulties. This stress on the fixity of the hard core has however been disputed by a number of philosophers of science. Newton-Smith, for example, has noted ‘that even when a program is having great success, the scientist’s faith in its basic postulates is not such as to preclude the exploration of the possibility that they may be mistaken as they stand’ (Newton-Smith 1994: 85-86). A similar point has been made by Allan Chalmers who notes that when faced with empirical difficulties, Copernicus adjusted the hard core of his research program by moving the sun a little to the side of the centers of planetary orbits and had the moon orbit the earth instead of the sun (Chalmers 1999: 145). Allan Musgrave makes the same point when he argues that throughout the history of Newtonian research program, there were suggestions that the law of gravity (part of the hard core of this program) was in need of revision (Musgrave 1976).

It would be interesting to find out whether by polarizing the sexual orientation research into nature versus nurture and by failing to adopt an interactionist approach, the two groups of workers in the homosexual orientation research have impeded or promoted the

growth of scientific knowledge in this area. Recall that according to Lakatos, competition between research programs produces rational and objective advances in scientific knowledge and a closer approximation to reality.

### ***1.7 Research into Homosexuality: The Biological and Experiential Research Programs***

The first step in the application of MSRP is of course to identify the research programs that are to be compared. An examination of the literature dealing with homosexuality reveals that there are basically two competing research programs for explaining the etiology of human male homosexuality: biological and experiential. These programs not only have a long history but also have distinctive hard cores and positive heuristics. In addition, there are two distinct research communities pursuing these research programs: those who proceed from the assumption that homosexuality has a biological bases and who therefore seek to prove that this is indeed the case; and those who proceed from the assumption that it is caused by experiential and social environmental factors and who therefore seek social-cultural evidence to support their theory. It is important to note that while the majority of the proponents of the biological research program have some training in biology, many of the proponents of the experientialist program are social scientists.

Thus, in line with the Lakatosian philosophy of science, the two research programs are characterized by distinct hard cores and employ quite different heuristic techniques for resolving empirical difficulties. Furthermore, researchers favoring either of these programs have been able to find at least some empirical support for their own theories

and some empirical disconfirmation for competing views. In the following four sections I shall identify the hard cores of the two programs as well as their positive and negative heuristics.

### ***1.8 The Hard core of the Biological Program***

The biological research program takes as its hard core the proposition that an individual's sexual orientation is primarily determined by innate biological factors. Within this program, a number of hypotheses or sub-programs can be identified: genetic, hormonal, neurobiological, and sociobiological explanations. All these hypotheses form part of the same dominant research program with one identifiable hard-core and one negative heuristic. Philosopher Edward Stein describes the hard core of the experientialist research program as follows:

A person's biological make up at birth or at an early age determines or strongly constrains his or her sexual orientation, in particular, it determines (or strongly constrains) whether a person is attracted to men or women. This is an interesting and non-trivial claim. It is important to keep in mind that this is the claim at the heart of the emerging research program concerned with sexual orientation (Stein 1999: 124).

By 'the emerging research program' Stein is of course referring to the biological research program although it is not clear why he refers to it as 'emerging' considering that it has been in existence for more than a century (Bullough 1994). The first person to have formulated a biological theory of homosexuality appears to have been the German lawyer, Carl Heinrich Ulrichs in the eighteenth century. Drawing from recent advances in the study of the human embryo, he hypothesized that homosexuals were 'biological males with female psyches'-in Latin: '*anima muliebris in corpore virili inclusa*' (Ellis 1897/1975: 69). This was a radical departure from previous and subsequent theories that

regarded homosexuality as an acquired 'vice'. Although Ulrich's theory was rejected by the medical establishment of his day, his legacy lives on as exemplified by the continued quest for biological causes of homosexuality today. Another serious attempt to explain sexual orientation in biological terms was made by Von Kraft-Ebbing (1886/1965) and later elaborated by Havelock Ellis (1915). The two explicitly rejected social learning as a major cause of homosexuality and argued that homosexuality was 'in born'.

Genetic factors of homosexuality have been primarily investigated through twin studies. Kallman (1952a,b) provided a case for a hereditary basis of homosexuality in his famous twin study with exclusive homosexuals. The dramatic results of this study indicated that of a total of 37 pairs of monozygotic twins, all were concordant in exclusive homosexuality, whereas no homosexual trend was found among 26 pairs of dizygotic twins. Kallman concluded that genetic factors did serve a critical function in the onset of homosexuality. However, a number of cases of divergent sexual orientation in monozygotic twins have been reported (Rainer et al. 1961; Klintworth 1962; Parker 1964; Zuger 1976; McConagy and Blaszyński 1980; Farber 1981).

Evidence for a genetic basis for homosexuality was also reported by Hamer et al. (1993), who claimed to have found a locus on the X chromosome, which is associated with homosexuality in men. Another recent addition to research on biological correlates of homosexuality postulates the existence of anatomical differences in the size and cell number of various nuclei in the brains of homosexuals as compared to heterosexuals (Swaab and Hofman 1990, LeVay 1991, Allen and Gorski 1991). These differences are

thought to play a crucial causal role in determining whether one becomes heterosexual or homosexual.

Research on the biological causes of homosexuality has also focused upon the hypothesis that homosexuality has an endocrine basis. During the 1940s, shortly after sex steroids had first been synthesized, many attempts were made to investigate their possible relationship to homosexuality. Glass, Devel and Wright (1940), for example, reported reduced androgens and elevated estrogens in their male homosexual subjects as compared to controls. A similar conclusion was reached by Myersson, Neustadt and Kolodny (1971) who found that homosexual men had depressed plasma testosterone levels in comparison to those of heterosexual men. A study by Evans (1972) involving both heterosexuals and homosexuals found that the homosexual group had significantly lower levels of nonadrogenic urinary metabolites and lower levels of blood serum lipids. Although Evans did not make any specific conclusions, his findings supported the hypothesis that an unidentified common biological factor underlies the etiology of homosexuality.

Most psychoendocrine research on homosexuality is currently focused on prenatal hormones. Dörner (1975, 1976 and 1980) theorized that androgen deficit during a critical prenatal phase led to homosexuality in men but that androgen excess at such a phase produced homosexuality in women. Despite the suggestive findings outlined above, considerable disagreement exists with respect to their interpretation.

Also included in the biological research program are sociobiological explanations of homosexuality. Edward Wilson advanced one such explanation in 1975. He suggested that homosexuality might involve a form of genetic altruism, through which homosexuals benefit those closely related to them and in this way offset their own lowered reproductivity (Wilson 1975: 229-231, 343-344). This model predicts that homosexuals would be more altruistic than heterosexuals. Since sociobiological hypotheses presuppose the existence of a gene for homosexuality, I shall include them in the biological research program.

### ***1.9 The Positive Heuristic of the Biological Research Program***

The positive heuristic of the biological research program directs the researcher to look for biological differences (e.g. genetic, hormonal, and anatomic) between homosexuals and heterosexuals (see Haumann 1995: 60). If no such differences are detected, advocates of this research program will blame the method used in deciding who is a homosexual and who is not. Workers in this research program may also argue that familial factors commonly thought to account for homosexuality may be the result of the pre-homosexual child being 'different' to begin with. Even if the mother was overprotective and the father aloof or hostile, this behavior can be explained by saying that it was provoked by the homosexual child's *innate* peculiarities. In other words, the homosexual child's behavior and characteristics may themselves have an impact on the parental behaviors. Researcher bias as well as other methodological inadequacies may also be invoked to explain away anomalies.

### ***1.10 The Hard Core of the Experiential Research Program***

The hard core of the experientialist research program, on the other hand, consists of the proposition that experiential factors determine an individual's sexual orientation. Stein describes this hard core as follows:

Although today the most widely believed theories of the development of sexual orientations see biological factors playing the primary role, experiential theories once held the greatest sway. For much of the twentieth century, most people believed that the effects of a person's experience on his or her psychological make up would explain how he or she develops sexual orientation (Stein 1999: 229).

Within this program, two major hypotheses can be identified: psychoanalytic and social learning hypotheses. The psychoanalytic hypothesis can be traced back to Sigmund Freud. Although he did not reject the biological explanations entirely, Freud (1905) thought that male homosexuality was caused by the presence of an intensely affectionate, possessive and domineering mother or the absence of a dominant father. In fact, Freud's theory predicts that male homosexuals would tend to be emotionally dependent on their mothers and emotionally distant from their fathers.

Most experiential and social environmental explanations continue to emphasize the theme of a romantic triad including a dominant mother, a weak or absent father and the mother's favorite son. Fenichel (1945), for example, has argued that male homosexuals tend to be mother-fixated and to have identified with their mothers because these mothers were domineering in contrast to weak fathers. The now famous study by Beiber et al (1962) claimed to support some of the psychoanalytic predictions about the parental causes of homosexuality. In this study, Beiber and his associates investigated the early family

patterns of 106 mainly homosexual patients and a group of non-homosexual patients. Beiber *et al.* found that in a majority of cases, the behavior of the mothers was seductive and over-indulgent, domineering and inhibiting, while the behavior of their fathers were hostile or indifferent. Similar findings have been reported by O'Connor (1964) and Bene (1965).

Social learning theorists e.g. Feldman (1966), Churchill (1967) and Bandura (1969) maintain that homosexuals have failed to learn appropriate sexual behaviors and preferences. These authors maintain that children learn through social reinforcements and conditioning patterns to express themselves sexually more toward one sex than the other. Bandura (1969) and Mischel (1969) also contend that parents are actively indoctrinating the child to his appropriate sex role by such actions as selective reinforcement of sex appropriate behaviors, differential dressing, selection of sex-appropriate toys and activities, and promotion of association with same-sex playmates. Empirical support for this position has been provided by several studies (e.g. Moss 1967, Goldberg and Lewis 1969). Kardiner (1963) attributed homosexuality to excessive societal demands on boys to be 'masculine'. Boys who felt inadequate in complying with those demands were believed to seek refuge in female sex roles.

Some social learning models have also attributed homosexuality to seduction in early childhood by an older same-sex sibling, suggesting that this too could prematurely arrest psychosexual development. Other writers have ascribed male homosexuality to the absence of eligible women, either because there are too few women or because of their excessive training in chastity (Westermack 1922). It is important to note that most of the earlier studies in this area examined emotionally disturbed subjects or criminals, and to

generalize to all homosexuals from this clinical and prison samples would be unreasonable. Recent studies cast serious doubt on the prevalent assumption that negative parental behavior, especially mother's, play a critical role in differentiating the backgrounds of homosexuals and heterosexuals (Bell, Weinberg and Hammersmith 1981, Seigelman 1981).

### ***1.11 The Positive Heuristic of the Experiential Research Program***

The positive heuristic of the experiential research program directs the experientialists to look for the experiential and social-environmental factors, which bring about differences in sexual orientation.

When monozygotic (MZ) twins are found to be concordant for sexual orientation, workers in this program may argue that the two individuals must have shared a common environment. On the other hand, if the twins have been brought up together but are found to be discordant for sexual orientation, proponents of this program may blame the techniques used to determine the sexual orientation or the zygosity of the individuals concerned. They will also argue that the environments under which the twins were brought up were in fact different despite their superficial similarity. And where there is a high concordance rate for homosexuality in dizygotic (DZ) twins compared to non-twin biologic brothers, the experientialists will attribute this to the increased similarity of the trait-relevant environment in the former. This is because DZ twins and full biological siblings share the same genetic material and any difference in true concordance rates would be attributable to environmental rather than genetic factors. The environmentalists may also argue that 'biological factors exert at most a predisposing rather than a determining influence on sexual orientation (Byne et al 1993: 228).

### ***1.12 Research into Homosexuality: Two Programs or One?***

It may be argued that research into the causes of homosexuality (and sexual orientation in general) is best understood not in terms of two parallel programs, but in the context of one interactionist model. According to this view, homosexuality (and most aspects of human behavior) is a joint product of biological (genes) and environmental factors. John Money, for example, asserts that people become homosexual, bisexual or heterosexual because of what happens to them partly in their prenatal history and partly in their postnatal history (Money 1988: 4-5). Byne et al (1993) have suggested a similar interactionist model. According to this model, genes or hormones bias particular personality traits and thereby influence the manner in which an individual and his or her environment interact as sexual orientation unfolds developmentally. Haynes reaches a similar conclusion when he says that sexual orientation is a result of 'the interaction between the genotype and the environment' (Haynes 1995: 93).

It is of course true that some researchers *believe* that both nature and nurture have a role to play in molding an individual's sexual orientation. However, as Peter Urbach has pointed out, and as Lakatos would agree, 'the private, psychological beliefs of scientists have no place in the appraisal of their work. What must be taken into account are the heuristic principles they follow *in practice*' (Urbach 1974: 109). Peter Clark made a similar point when he wrote:

What the identification of hard core and heuristic presupposes is that the working scientists *utilized a common approach to, and set of techniques*

*for, solving their problems.* In general, in locating the hard core and heuristic of a program what is important is not what working scientists say about what they are doing, nor their beliefs about the truth or falsity of the specific theories they espoused, but what principles they *adopted and followed in practice* in developing their theories (Clark 1976: 46).

The fact of the matter is that while one group of researchers is guided by the assumption that biological factors determine homosexuality, the other group is guided by the assumption that homosexuality is determined by experiential factors. In other words, the two groups of researchers continue to approach the etiology of homosexuality debate as if it was an either/or issue. Indeed, although some of these researchers claim allegiance to an interactionist banner, they still use the same nature-nurture framework they claim to deride. Dean Hamer, for example, explicitly states that his study ‘favors an explanation based on genes rather than on the rearing environment’ (Hamer and Copeland 1993: 104). Simon LeVay betrays his biological-determinist inclinations when he concludes his book on the neurobiology of sexuality, *The Sexual Brain*, by saying that ‘our range of individual development is defined and limited by what we are born with (LeVay 1993: 138). He says this despite having said three sentences earlier that neither nature nor nurture can provide an adequate account of sexual orientation. In the media LeVay has on several occasions said that his ‘brain study will be foundational for determining whether nature or nurture causes sexual orientation’ (Halley 1994: 534).

### ***1.13 Conclusion***

In this chapter I have identified an episode in the history of science, which requires a rational reconstruction, namely: research into the genesis of human male homosexuality. I have also identified two competing research programs as well as their respective

elements (hard cores, positive heuristics, developing set of theories, etc.). In the chapters that follow I shall examine a number of hypotheses that have been advanced in the two rival programs to explain the etiology of human male homosexuality.

## **Chapter 2**

### **Homosexual Orientation**

#### ***2.1 Introduction***

As already indicated, the aim of the present study is to appraise the competing paradigms for explaining the etiology of human male homosexuality. It is only fitting that such a study should begin with an attempt to tease out the meaning of the term 'homosexuality'. A clear and widely accepted definition of homosexuality has been very difficult to attain. In fact, although some people are classified as homosexual, there is no standard of agreement about what it is to be homosexual. In their search for causal explanations, different investigators have adopted different assumptions about the nature of homosexuality. As a result, controversy, ambiguity and confusion have characterized research into the etiology of homosexuality. In this chapter I will highlight and discuss some of the problems that arise from the lack of a clear definition of the term 'homosexuality'. Other issues that will be discussed along the way will include the prevalence and distribution of homosexuals in the population as well as homosexuality in different cultures. The debate between essentialists and social constructionists about sexual the categories of orientation will also be briefly discussed.

#### ***2.2 Definition***

As I have just pointed out, one of the main problems underlying any discussion of the causes of homosexuality is that of definition. Yet, in spite of more than a hundred years of study and debate, there is still no unanimously accepted definition of the term 'homosexuality' among both clinicians and behavioral scientists (Panel 1986). In fact, a

close examination of the literature on homosexuality reveals a definitional crisis. This state of affairs has partly been occasioned by the confusion between description (homosexuality as behavior) and explanation (homosexuality as an explanation abstracted from observed or self-reported overt behavior). The term 'homosexuality' is ambiguous for it may refer to sexual behavior or to sexual orientation. John Money puts it well when he says that 'all discussions of homosexuality become wasteful word games unless, at the outset, a differentiation is established between homosexuality defined as a behavioral act, versus homosexuality defined, by inference, as a permanent state of erotic disposition and preference' (Money et al 1972: 228). Apart from hampering research into the causes of homosexuality, lack of a satisfactory definition has also contributed to the current disagreement between the social constructionists and essentialists over the nature of the categories of sexual orientation. Whereas the former hold that homosexuality is an artifact of culture, the latter believe that it is a real category that transcends culture and historical epoch. The scientific study of homosexuality requires reliable assessment of heterosexual and homosexual behavior.

The first person to have used the term homosexuality to denote sexual attraction between members of the same sex appears to have been the German scholar, Karl Maria Kertbeny (born Karl Maria Benkert) in 1869 (Bollough 1976). Magnus Hirschfeld popularized the term in Germany, while Havelock Ellis, who used it in his *Psychology of Sex* (1936), popularized it in the English-speaking world. However, Ellis made a distinction between homosexuality and sexual inversion, with homosexuality including all sexual attractions between people of the same gender, even when seemingly due to situational

unavailability of members of the opposite sex. He reserved the term sexual inversion to congenital or fixed forms of homosexuality (Ellis 1936: 1).

The concept of homosexuality has received several different definitions. Some authors consider individuals to be homosexual if they so identify themselves and if their sexual desires and overt sexual behavior are both predominantly directed towards members of the same sex. But others consider a dominant fantasy for members of the same sex as evidence of homosexuality without the requirement of overt homosexual affairs. According to this view, then, overt homosexual behavior is neither a sufficient nor a necessary condition for an individual to be considered homosexual. In fact, it is not unusual for heterosexuals to have sexual experiences with people of their own gender while they maintain their heterosexual identity. For this reason, individuals who are driven into transitory homosexual patterns of behavior as a consequence of intense heterosexual frustration and who return to exclusive heterosexuality as soon as the opportunity arises cannot be regarded as genuine homosexuals. Sex between individuals of the same gender may also be an expression of power relation rather than sexual gratification or love. This is particularly true of same-sex relations between men in prisons.

In defining the term homosexuality, therefore, it is fundamentally important that a conceptual distinction must be made between homosexuality as behavior and homosexuality as a form of sexual orientation (disposition). Some writers have tended to conflate the two. Homosexuality defined as the sustained erotic attraction to one's own

gender must not be confused with occasional homosexual experiences because behavior alone does not determine sexual orientation. Homosexual experiences are fairly common, especially early in adolescence (Ellis 1987: 233) or in the absence of alternative sexual outlets and are no more indicative of homosexuality than occasional heterosexual experiences are indicative of heterosexuality. Furthermore, studies have shown that sexual orientation is not necessarily expressed in sexual behavior. Homosexual behavior refers to same-sex physical relationships but it does not imply sexual orientation. This may occur among predominantly heterosexual individuals, who are unable to engage in heterosexual relationship due to the situational unavailability of members of the opposite sex. Homosexuality of this kind is to be found in monasteries, convents and boarding schools. It is also to be found among sailors and prisoners. This is not the kind of homosexuality that most of those researching into the etiology of homosexuality have in mind. The ritualized homosexuality as practiced by the Sambia of Papua New Guinea in which older men anally or orally inseminate young men must also be excluded from the definition of homosexuality as a sexual orientation. In fact, despite universal homosexual experience during early adult life, only a small minority of Sambian men become homosexuals in adulthood (Mondimore 1996).

Definitions of homosexuality that focus solely on manifest homosexual behavior are bound to be deficient and misleading. Such definitions assume that all homosexuals act out their same-sex erotic fantasy whereas research findings of Kinsey et al (1948) revealed that this is not always the case. Consider a man who is erotically attracted to other men but who has never had sexual relations with anybody. Or consider a catholic

nun who is sexually attracted to members of the opposite sex but who takes her vow of celibacy very seriously. Are these individuals to be classified as asexual, heterosexual or homosexual? What of the person who dies without ever having engaged in sex with any male or female? Proponents of the behavioral view would not assign any sexual orientation to such individuals. The truth of the matter however is that one does not have to act on his or her sexual desires in order to be described as having a particular sexual orientation. Definitions of homosexuality in terms of overt homosexual behavior will exclude those individuals who suppress their same-sex erotic desires due to fear of disapproval or punishment. In fact, an enormous number of homosexuals in highly repressive societies never act out their sexual feelings at all. Another group of individuals that will be misclassified are those married men who fantasize about males when having sex with their wives and must do so in order to attain orgasm (Harry 1984: 113). Besides, by ignoring motivational factors, behavioral definitions of homosexuality will fail to distinguish between true homosexuality, situational homosexuality, and transitory adolescent homosexual behavior viewed as a normal developmental phase, not necessarily indicative of future adult homosexuality.

As I have already pointed out, a person may have sexual relations with people of the same gender and still maintain a heterosexual identity. Heterosexual males who engage in homosexual prostitution, for example, cannot be categorized as true homosexuals although they engage in homosexual behavior. The same is true of heterosexual females who engage in lesbian acts for monetary gain. Kurt Freund puts it well when he says that 'homosexual interaction, even if occurring regularly, is not by itself a very reliable

indicator of homosexuality and this applies conversely to heterosexual interaction as well' (Freund 1974: 29). The main problem with the behavioral view of sexual orientation is that it fails to recognize that people have a privileged access to their feelings including their sexual desires.

A better and more inclusive definition of homosexuality takes both motivational and behavior characteristics into account, as a result of which it appears to be more adequate and acceptable. I find the following definition by Reiter quite useful:

A homosexual is an adult whose fantasies, attachments and longings are predominantly for persons of the same gender, who may or may not express those longings in overt behavior, and whose orientation may or may not be accompanied by homosexual identity (Reiter 1989: 140).

The advantage of this definition is that it does not dichotomize homosexuality into overt and covert types, but treats them as variants of one condition. It allows that a person can be said to be homosexual even before he or she has sex. It also rules out the heterosexual male prisoner or male prostitute who have sex with other men from being counted as homosexual. Despite these advantages, however, the application of this definition could erroneously imply that homosexuality and heterosexuality are a rigid dichotomy. Sexologists have attempted to overcome this problem by proposing various scales for rating sexual orientation. I will discuss these scales in the next section.

### ***2.3 Sexual Orientation Rating Scales***

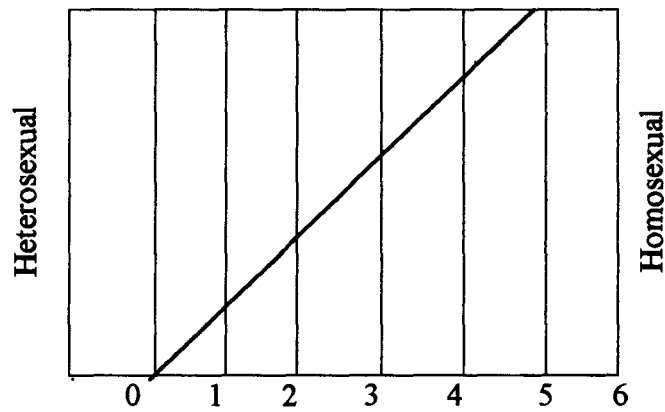
As already indicated, lack of a satisfactory method for determining an individual's sexual orientation has partly contributed to the ongoing controversy concerning the cause(s) of

human homosexuality. Because of their tremendous plasticity, human erotic lives have proved very difficult to categorize. Prior to the publication of the pioneering work of Alfred Kinsey and his colleagues in 1948, a person was considered to be either a heterosexual or a homosexual. And although some people allowed a third category of bisexual, others believed that a bisexual was a homosexual in disguise. Kinsey is credited with challenging this dichotomous categorization of sexual orientation. He realized that a bipolar categorization does not adequately reflect the complex realities of human sexuality.

Kinsey discovered that homosexuality was much more prevalent than previously thought. He also claimed that engaging in homosexual acts did not automatically make a person homosexual. For Kinsey, the best way to view sexual orientation is in terms of a unidimensional continuum in which an individual is rated in terms of heterosexual and homosexual behavior. And as Kinsey himself wrote:

Males do not represent two discrete populations, heterosexual and homosexual. The world is not divided into sheep and goats. Not all things are black nor all things white. It is a fundamental of taxonomy that nature rarely deals with discrete categories. Only the human mind invents categories and tries to force facts into separated pigeon-holes. The living world is a continuum in each and every one of its aspects. The sooner we learn this concerning human sexual behavior the sooner we shall reach a sound understanding of the realities of sex (Kinsey 1948: 639).

According to Kinsey, an individual's sexual orientation is to be defined primarily in terms of the type, extent, and frequency of his or her erotic fantasies. To determine the balance of heterosexual and homosexual, Kinsey and his colleagues developed the following seven point rating scale.



### Key

- (0) Exclusively heterosexual with no homosexual
- (1) Predominantly heterosexual, only incidentally homosexual
- (2) Predominantly heterosexual, but more than incidentally homosexual
- (3) Equally heterosexual and homosexual
- (4) Predominantly homosexual, but more than incidentally heterosexual
- (5) Predominantly homosexual, but incidentally heterosexual
- (6) Exclusively homosexual

(Source: Kinsey et al. 1948)

Kinsey's sexual orientation scale is an equal interval scale with continuous gradations between heterosexuality and homosexuality. According to this scale, 0 represents exclusive heterosexuality and 6 represents exclusive homosexuality. People who fall between scale point 2 and 4 show equal erotic response to both homosexual and heterosexual stimuli and are referred to as bisexual or *ambisexual*. Kinsey's ratings are allocated on the basis of overt sexual activity and psychological responses to members of

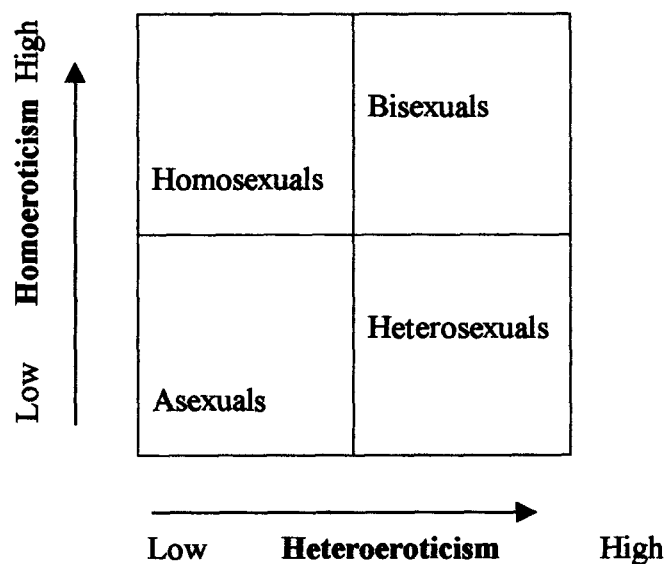
both sexes. These categories were defined in terms of sexual arousal leading to orgasm and ejaculation in the case of males. It is noteworthy that Kinsey thought of his scale as a way of classifying behaviors and not persons.

Despite its attractiveness, Kinsey's scale has many limitations for describing an individual's sexual orientation. In the first place, the scale does not take into account the dimensions of time or the multivariable aspects of sexual orientation such as attraction, behavior, fantasy, lifestyle and emotional preference. It is therefore very difficult to label a person using the scale (Klein et al 1985). Besides, the scale erroneously assumes that the more heterosexual an individual is, the less homosexual she or he is and vice versa. In other words, the scale assumes that an individual loses degrees of one orientation as he or she moves towards the opposite end of the scale. In addition, the scale assumes that sexual behavior and erotic responsiveness are the same within individuals.

The universality of Kinsey's scale has also been questioned. Some commentators have argued that the scale is only applicable to middle class white American males and that it cannot be used to assess the sexual orientation of people from other cultures (McWhirter 1990: xviii). This is because it was based on the interpretation of answers supplied by a group of white American males and was therefore not representative enough. The Kinsey scale has also been criticized for its orgasmocentric bias and for its reductionistic assumption that an individual's sexual orientation is determined by his or her own gender and the genitalia of the individual to whom one is attracted or has sexual relations with (Coleman 1990: 269). In fact, his emphasis on orgasm as a necessary criterion would

This grid is considered a reliable and suitable instrument that can differentiate sexual orientation by taking into account the meaningful dimension of time as well as other varied dimensions. However, because of its potential number of variables, some people have found this scale too complicated to administer. It is therefore not very useful for research purposes (McWhitrter 1990: xviii).

Psychologist Michael Storms (1980) has proposed a modification of Kinsey's unidimensional model of sexual orientation. According to Storm's model, heterosexuality and homosexuality are independent, orthogonal erotic dimensions rather than opposite extremes of a single bipolar dimension. This model postulates that bisexuals are high in both heteroeroticism and homoeroticism while asexuals are low in both. Heterosexuals, on the other hand, are high in heteroeroticism and low in homoeroticism while homosexuals are high in homoeroticism and low in heteroeroticism. This is what might be called a two dimensional view of sexual orientation (see figure below):



(Source: Storms 1980)

The advantage that Storm's model has over Kinsey's model is that whereas the former distinguishes between asexual and bisexual individuals, the latter combines these two categories. Failure to distinguish these two categories can obscure research on sexual orientation. However, as with the other sexual orientation scales, this particular scale has not been universally accepted and some writers have questioned its usefulness as a research tool.

#### ***2.4 Prevalence of Male Homosexuality***

Homosexuality, broadly defined as sexual relations between members of the same gender is stigmatized and socially rejected in most cultures. For this reason, it has been extremely difficult to secure factual data concerning its frequency and nature, and the reports of different researchers show significant discrepancies. The matter is compounded by the lack of a universally accepted definition of the term 'homosexuality'. The most frequently cited but dated estimates for the incidence of homosexual behavior are those published in the pioneering studies of Kinsey and his associates in 1948 and 1953 respectively. These studies consisted of interviews involving more than 2000 subjects, covering a wide range of human sexual activities.

Kinsey et al found that 4 percent of adult white males in the United States were exclusive homosexuals for a period of at least three years during adulthood while 37 percent had some overt homosexual experience between adolescence and old age. They also found that among males who had remained single until age 35, this incidence rose to 50 percent. In the case of females, 13 percent of those who were interviewed had some overt

homosexual experience to the point of orgasm and between 1 and 3 percent of unmarried women were exclusively homosexual.

The accuracy of Kinsey's figures on the prevalence of homosexuality has been questioned. Critics have complained that Kinsey's research lacked probability samples. Indeed, his sampling strategies were haphazard by modern standards. The figures were based on a sample that included a high proportion of prisoners as well as ex-convicts. Many of these men may have been heterosexuals who due to the unavailability of the opposite sex availed themselves of opportunities for homosexual intercourse. Moreover, what Kinsey's study focused on was homosexual behavior rather than inner orientation or fantasy (Gonsiorek 1991: 3).

More recent attempts determine to the base rate of homosexuality in modern western societies include McConaghy et al.'s 1979 study of medical students at the University of New South Wales in Australia. The study showed that 60 percent of the subjects reported that they were aware of homosexual feelings during adolescence, and more than forty per cent were still aware of homosexual feelings. However, it should be noted that most of the subjects were in their late teens or early twenties, so many may not have reached their final adult sexual preference. Moreover, a sample of medical students can hardly be generalized onto the Australian population as a whole. Another study carried out in the 1980s by Fay, Turner, Klassen and Gagnon (1989) reported that between 3 and 6 percent of the male population in the United States is exclusively homosexual. The study also found that homosexual contact increased with educational level and was highest among

single, male college graduates. Finally, Fay and his associates found that 8 percent of married men reported having homosexual experiences fairly often. The consensus today is that the incidence of homosexuality is between 4 and 10 percent of the general population (Bower 1993: 37)

Outside the Western world, there is no authoritative data on the prevalence of both male and female homosexuality. And where the figures are available they must be regarded as underestimates because in most non-Western societies, people are unwilling to report sexual desires and behaviors that are still considered by some to be unnatural and pathological.

### ***2.5 Homosexuality Across Time and Culture***

Homosexual activity has existed throughout human history. Although different societies and cultures have looked upon homosexual activities with a wide range of attitudes, there are very few cultures, and certainly no historical epochs, in which there is no record of some homosexual activity (if by homosexuality we mean sexual relations between persons of the same phenotypic sex).

In different cultures and at different historical epochs, homosexual behavior has variously been socially rejected, tolerated, treated with reverence or regarded as a normal variation of human sexual behavior. In most societies, however, homosexuality is regarded as an aberration. The Judaeo-Christian tradition has generally perceived it as sinful, and thus homosexuality is viewed as socially unacceptable throughout most of

Western culture. Homosexuality is condemned in the Old Testament and the practice seems to have been widespread among the ancient tribes of Israel. The destruction of Sodom and Gomorrah in Genesis is said to have been an expression of God's abhorrence of homosexuality. Homosexuality is also condemned in the New Testament especially in the epistles of Saint Paul, which suggests that it was common during the time of Christ. With the exception of Buddhism, which takes a neutral doctrinal position towards homosexuality, all the other major religions of the world condemn homosexual behavior.

Sexual relationships between members of the same sex was both tolerated and condoned in ancient Egypt, Greece and Rome. Although the ancient Greeks did not have a single word for what we now call 'homosexuality', same-sex love was considered a higher form of love than ordinary heterosexual love. It was considered an honor for a youth to become the homosexual partner of a nobleman. Early Greek writings as well as vase paintings depict same-sex erotic behavior and Greek legends describe sexual relationships between members of the same sex. The Greek philosopher, Aristotle, considered homosexual disposition perfectly natural and dismissed Plato's suggestion about prohibiting homosexual behavior as 'ridiculous'. Plato himself was a bachelor and is thought to have exclusively homosexual (Boswell 1980: 49). However, it is important to note that in Ancient Greece, the vast majority of men who engaged in sexual relationships with other men were in most cases married (or later became married), had sexual relationships with their wives, and they sired children. They should therefore be regarded as having been bisexual rather than exclusively homosexual. Furthermore, the relationship was in most cases trans-generational, that is, between a young boy (the beloved) and an older man

(the lover). Also, a person's status in the society was important to how culture viewed his or her sexual interests (Halperin 1990). For instance, a citizen was allowed to penetrate but could not be penetrated by non-citizen who included slaves, children and foreigners. This is what has led some social constructivists to the conclusion that contemporary categories of sexual orientation in the west cannot be applied to the inhabitants of ancient Greece. Homosexual marriages were also common in both Greece and Rome throughout the middle ages.

Among the Sambia people of Papua New Guinea, homosexuality was institutionalized and compulsory for pre-pubertal males. A man who did not engage in this practice would be stigmatized and considered a deviant (Money 1990: 43). The Sambia believed that homosexual behavior among adolescent boys was essential to the attainment of strength and virility. According to the Sambia, a boy could not mature physically unless an older male implanted semen in his body. Male qualities such as courage and proficiency in hunting as well as ability to dominate women were thought to be transmitted this way (Greenberg 1990: 29). However, it is important to note that virtually all Sambian men turned out to be predominantly heterosexual in adulthood and even took brides despite having spent their entire adolescence engaging in male-male sexual relationship (Herdt 1981). Only a few continued with same-sex sexual relations and these are the ones who would perhaps fall on point 6 on the Kinsey scale. It is important to distinguish this type of institutionalized homosexuality from obligatory or compulsive homosexuality, which occurs even when members of the opposite sex are available.

There is no term for homosexuality among the Gikûyû people of Kenya. In fact, they do not seem to have an awareness or even a concept of someone whose erotic and sexual fantasies are directed *primarily* at the members of his or her own sex. As Kenyatta (1953) explains in his *Facing Mount Kenya*, the Gikûyû were free from homosexuality. This would seem to support the social constructionist's claim that homosexuality is not a universal category. Yet, homosexuality was quite common among the Nyakyusa boys of Tanzania and was viewed as a substitute for heterosexual intercourse (Broude 1996). Holmberg (1950) observed no homosexuality among the Dogon of Mali and the Siriono Indians of Bolivia.

In a cross-cultural survey of sexual patterns in preliterate societies (they called them primitive), Ford and Beach (1951) reported that in 49 out of 76 of these societies, homosexual activities were considered acceptable under certain circumstances. Among the Siwans of North Africa, for example, all men were expected to engage in homosexual sodomy and a man who did not have both female and male affairs was considered peculiar. The Aranda youths of Australia went through a stage of homosexual marriage in which they lived as husband and 'wife' with an older bachelor for several years until they were ready for heterosexual marriage. Ford and Beach also report that although the Cubeo Indians of North West Amazon were very strict in preventing premarital heterosexuality, they permitted and even encouraged adolescent homosexuality.

The forgoing review is not exhaustive. It only serves to show that homosexual behavior is a common occurrence in many cultures and that it has existed throughout recorded

human history. However, it is important to emphasize that what has been reported in this survey is the existence of homosexual behavior and not necessarily the existence of homosexual orientation. In the following section, I will focus on the essentialism-constructionism debate, which addresses this very important distinction.

### ***2.6 Essentialism- Constructionism Controversy***

One other issue that needs to be addressed at this stage is the debate between the social constructionists and essentialists concerning sexual orientation and homosexuality in particular. James Weinrich has described this debate as ‘the hottest philosophical controversy to hit psychology in recent years’ (Weinrich 1992: 175). Essentialism-constructionism debate revolves around the question of whether homosexuality is a natural kind or a social kind. The debate has deep ramifications for scientific research into the causes of homosexuality because most biologically inclined investigators assume that homosexuality is a real category existing discretely in nature, uninfluenced by social mores.

The central claim of constructionism is that homosexuality as an identity or membership in a community is a comparatively new phenomenon and cannot be properly or completely understood apart from the social milieu in which it is embedded. On this view, homosexuality does not reflect an entity, which exists irrespective of the social circumstance. It is not, as Hacking (2002) would say, a natural human kind. In other words, there is no underlying quality that characterizes homosexuality in all places and at all times. Categories of sexual orientation, according to this view, refer to empty natural

kinds and can be compared to witches and warlocks who were once thought to possess supernatural powers (see Stein 1998:439). Some proponents of this view trace the emergence of homosexual identity in the west to the late nineteenth century. They claim that homosexuality did not exist until Karoly Kertbeny coined the term in 1869. Before this time, they contend, individuals were not socially defined in terms of their sexual behaviors (either homosexual or heterosexual). Thus, before the nineteenth century, there was no such a thing as homosexual. The sex of the person that one wanted to have sex with was not taken to provide a definition of the type of person one was. As the French theorist Michael Foucault (a self-confessed pedophile who died of AIDS in 1984) explains in his famous statement: 'Homosexuality appeared as one of the forms of sexuality when it was transposed from the practice of sodomy into a kind of interior androgyny, a hermaphrodism of the soul. The sodomites had been a temporary aberration; the homosexual was now a species' (Foucault 1980: 43). David Halperin echoes the same point when he says that 'Before 1869 there was no homosexuality, only sexual inversion' (Halperin 1990: 29). Indeed, for these two theorists, the term 'homosexual' is nothing but a label inscribed into individuals as a means of controlling them. If it is true that sexual orientation is a social construct as the constructionists allege, then it should come as no surprise that the quest to discover its cause(s) has not been successful.

While the social constructionists admit that same-sex activity may exist in all cultures, they think that only in some cultures are people categorized according to their sexual orientation. According to this school of thought, sexual orientations, and homosexuality

in particular, is culture dependent, relational and subjective. In other words, those engaging in same-sex acts are defined, and in part, created by the societies and families in which they grow and live (Dickerman 1995: 177). There is an element of truth in this. History shows that although same-sex relations was regarded as a sin in the middle ages, those who committed that 'sin' were not regarded as constituting a type of people different from others. Indeed, the focus was on the homosexual acts themselves (i.e. sodomy) and not the homosexual condition of the individual. But some social constructivists make a much stronger claim than this. They deny that homosexuality is a natural kind or that it plays a role in scientific explanation.

Social constructionists appeal to bisexuality, historical variation as well as cross-cultural differences to support the view that homosexuality is a socially constructed phenomenon and not an objectively detectable, erotic orientation. For example, they point out that the early Greeks did not have single word for what we now call homosexuality and they take this to mean that homosexuality did not exist in classical Greece.

Social constructionists contend that since homosexuality is a socially malleable trait, it is best studied using the methods of hermeneutics or critical political analysis. However, it should be noted right at the outset that some social constructionists do not just question the findings of scientific research into homosexuality- they question the very enterprise itself. Mary McIntosh, a social constructionist, puts it well when she says that failure to find the causes of homosexuality results from asking the wrong question rather than the lack of scientific rigor or inadequacy of the available evidence. She adds, "one might as

well try to trace the etiology of 'committee chairmanship' or 'Seventh Day Adventism' as of homosexuality' (McIntosh 1992: 21). Dupre makes the same point when he says that the search for biological differences between homosexuals and heterosexuals 'may be no more firmly grounded than the search for the typical characteristics and genetic peculiarities of stamp collectors or aficionados of crossword puzzles' (Dupre 1993: 253). For the social constructivists, the choice of one's preferred sexual partners does not have any kind of categorical primacy over other aspects of the choice of sexual partners such as their age, physical appearance or even race. Instead of trying to trace the etiology of homosexuality, social constructivists insist that researchers should investigate why and how the 'erroneous' idea of homosexuality as a real category came into being in the first place.

Although the social constructionists are right in asserting that the term 'homosexual' was coined in the nineteenth century, it would be wrong to conclude from this fact that homosexuals did not exist before then. The truth of the matter is that it is possible for a homosexual person to exist in a society that has no name for the trait. And as Boswell aptly puts it 'the absence of a concept can hardly be taken to demonstrate the absence of what it applies to' (Boswell 1992: 142). As an example, he notes that although the Romans did not have an abstract word for 'religion' they did have religions, including Christianity. The same is true of blood types. Even though the ancient Greeks did not categorize people according to their blood types, this does not mean that there were no blood types in ancient Greece (Stein 1999: 98). One could therefore argue that the coining of the term 'homosexual' only helped to classify the world differently. People

had been performing homosexual acts long before the word homosexual came into existence and this suggests that homosexuality might in fact be a real category that transcends both culture and history. Moreover, many writers in the past were able to characterize homosexuality as a distinct mode of erotic expression without finding the need to invent a name for it (Boswell 1996: 194).

Essentialists, on the other hand, are of the view that sexual orientation is a fixed objective aspect of human nature. On this view, our contemporary categories of sexual orientation can be applied to people of any culture and at any point in history. Thus sexual orientation is an innate quality in individuals, stable and unchanging. Essentialists look at homosexuality as a mode of being and not simply as the performance of sexual acts. They are realists for they believe that sexual categories reflect an underlying reality (Epstein 1992: 244). And as Boswell has noted, 'the heterosexual/homosexual dichotomy exists in speech and thought because it exists in reality: it was not invented by sexual taxonomists, but observed by them' (Boswell 1996: 185). According to this view, being homosexual, bisexual or heterosexual is as innate a characteristic as skin complexion. It is not, as some constructivists have claimed, a superficial matter of taste like the preference for blondes, fat women or white wine. This means that an essentialist would have no problem saying that there were homosexuals in traditional African societies or in ancient Greece. And as Edward Stein puts it 'it is just a matter of whether or not a person has the relevant properties such as certain genes, hormones or psychological condition' (Stein 1992: 326).

Essentialists are also committed to the view that law-like generalizations can be made about the nature and causes of homosexuality. And even though essentialists acknowledge that different societies have different ways of expressing sexual desire, they argue that this does not in any way contradict the view that homosexual desire is innate. They maintain that there is an underlying reality in the categorization of homosexuality that has outlasted the cultural changes that have taken place in the past two thousand years and as such it is a legitimate candidate for biological and/or psychodynamic explanations. Supporting the same view, philosopher Michael Ruse draws an analogy between homosexuality and the physicist's notion of mass. He writes:

The physicist's notion of mass has changed drastically from the nineteenth-century Newtonian concept to the twentieth century Einsteinian concept; yet there is continuity, and we can now see that both the nineteenth- and twentieth century scientists were talking about the same thing. The same, I suggest, is true of homosexuality, or more particularly the homosexual (Ruse 1988: 17).

The point that Ruse is making here, and I think he is right, is that the homosexual is a real category and not a mere artifact of culture.

The essentialist-constructionist debate should not be conflated with the nature/nurture debate concerning the etiology of homosexuality. Some people wrongly think that all essentialists believe in the innateness of sexual orientation and that all social constructionists hold that sexual orientation is learned. It must be emphasized that essentialism does not require a biological explanation for the universal qualities assumed to constitute the 'essence' of homosexuality. Indeed, although most essentialists believe that sexual orientation has a biological basis, others believe that it is the result of the

social environment. But it is not even necessary that an essentialist specify any particular cause of sexual orientation, be it biological or experiential. Indeed, some essentialists are agnostic about the origins and etiology of human sexuality.

However, it is important note that radical social constructionism is not compatible with the view that sexual orientation is innate or that it is the function of biological factors. This is important because if sexual orientation were socially constructed, as the social constructionists suggest, then biological research into its causes would not make sense. Conversely, if investigators were to prove beyond any shadow of doubt that sexual orientation had a biological basis or that it was innate, it would not make sense to argue that homosexuality is nothing more than a social construct (Stein 1998: 436). At least such a finding would give us a definition of homosexuality that is not socially or culturally dependent.

It must be emphasized that historical and anthropological evidence that has so far been adduced is fully compatible with essentialism. Prior to the eighteenth century, as a reading of Plato's *Symposium* (1935) indicates, people were aware of homosexuality although they did not have a term for it. Aristophanes speech, as a number of commentators have pointed out, suggests that there was a class of males in attic Greece who had a lifelong sexual preference for males. This, as Greenberg tells us, included the founder of stoicism philosopher Zeno of Citium and Alexander the Great (Greenberg 1988). Indeed, far from being a superficial point of taste, Aristophanes regarded homosexual desire as an expression of something, which lies deeper in the soul and not

merely a cultural artifact. This piece of evidence is suggestive of essentialism although it does not completely discredit constructionism (see Halwani 1998). Moreover, even among the Sambia people of Papua New Guinea where homosexuality is ritualized, studies have shown there is a small minority of men who, despite social ostracism and disapproval, continue to have same-sex relations even after completing their rites of passage into manhood (Stoller et al 1985). This seems to be consistent with essentialism.

Rictor Norton, a cultural historian, has exposed what he considers to be the fallacies of social constructionism by providing strong anthropological and historical evidence, which suggests that homosexual identity (third sex) was a commonly accepted category in many societies well before the term homosexual was coined in the nineteenth century (Norton 1997). The berdache role in Native American cultures and India's hijra are two good examples. These roles stress sexual attraction to members of the same gender and thus undermine the notion that homosexuality did not exist prior to 1869. Norton also notes that literary works by Italian writers in the fifteenth century, for example, portray homosexual characters rather than homosexual incidents. In addition, he observes that the looks gestures, and vocal intonations that are shared by homosexuals transcend language and culture and cannot possibly be an imposed social construct.

Although the social constructionists are right in maintaining that different societies have different ways of expressing sexual desires, I think it would be wrong to use this fact as a premise to conclude that sexual orientations are produced and sustained by social practices alone. While the ways in which sexual orientation is expressed are dependent on

history and social context, it does not mean that various sexual orientations share no common aspects that can be traced to biology or psychology. Furthermore, the social constructionists have not been able to demonstrate how cultural notions of homosexuality cause people in the culture at large to have homosexual interests (Murphy 1997). In fact, they have been unable to explain why one individual rather than another comes to have the sexual orientation that he or she has.

## ***2.7 Conclusion***

In this chapter I have attempted to highlight some of the difficulties involved in defining the term 'homosexuality'. We have seen that assessing an individual's sexual orientation is a complicated affair. Failure to make a correct identification of the trait being studied could lead to spurious results. In the chapters that follow, I will appraise a number of hypotheses that have been advanced to explain the genesis of human male homosexuality. In evaluating these hypotheses, it is important that we remember the definitional problems and metaphysical worries raised in this chapter because they have a direct bearing on how etiological research into homosexuality is carried out. In fact, as we shall see later, most biologically inclined investigators assume that homosexuality is a real category that transcends both history and culture.

## **Chapter 3**

### **Experiential Research Program: Family and Social Learning**

#### **Hypotheses**

##### ***3.1 Introduction***

In chapter 1, we saw that there are two rival research programs that seek to explain the genesis of homosexual orientation, that is, the experiential and biological research programs. I also argued that two different types of positive heuristics guide the workers in the two research programs. The aim of the present chapter is to use the methodology of scientific research programs to appraise the series of hypotheses that have been advanced by workers in the experiential research tradition to explain the genesis of human male homosexuality. A huge body of literature exists purporting to show that human homosexual orientation is an acquired behavior and attempts to explain its genesis by discovering correlations between childhood experiences or parental situations. Indeed, in spite of the recent rise in the popularity of the biological explanations, some people today still believe that early childhood experiences play a greater role than biology in accounting for differences in people's sexual orientations.

I will begin by examining Freud's psychoanalytic theory of homosexuality. Freud's theory emphasizes the importance of early family relationships in the establishing of male sexual adaptation. I will then consider a number of social learning hypotheses, which have also been advanced by the experientialists to explain why people have different

‘a theory may well be invalidated by known evidence, even as its proponents refuse to accept the refutation’ (Grünbaum 1993: 51). In other words, whether a theory has potential falsifiers or not can be determined independently of the behavior of its advocates. Furthermore, the fact that some Freudians refuse to let their theory be falsified does not mean that the theory itself is essentially any less falsifiable than any other.

The following propositions contained in Freud’s theory of male homosexuality are testable:

1. The male homosexual, unlike his heterosexual counterpart, has had an unusually close and intense involvement with his mother. In the Oedipal phase, attachment to her was strongly erotic. The erotic attachment is subsequently replaced by defensive identification with her.
2. The homosexual male’s relationship with his father is characterized by distance, coldness and antagonism. He perceives his father as a hostile rival.

These hypotheses have been tested in a number of studies (for example Westwood 1960, Beiber et al 1962; Bene 1965; Snortum et al 1969; Thompson et al 1973 and Bell et al 1981). All these studies have been concerned with the question of whether Freud’s concepts of the family patterns that foster homosexuality do actually appear in the backgrounds of homosexual persons. However, as we shall later see, most of these studies are riddled with methodological difficulties and considerable disagreement exists with respect to the interpretation of the research findings.

### ***3.4 The Nature of the Evidence***

In this section, I will describe a number of studies that have been carried out to test Freud's psychoanalytic theory of homosexuality. I will then evaluate them to see whether the experiential research program has been progressive.

One of the earliest attempts to test the psychoanalytic theory was carried out by Westwood in 1960. This study, which involved a sample of 127 male homosexuals, revealed that half of these men had come from reasonably happy homes, in which neither parent was dead or absent. Thirty eight percent reported unsatisfactory relations with their father and 44 percent were of the opinion that their mother was possessive or over-protective in some way. When asked which was the more dominant parent, 29 percent of the homosexuals named their father whereas 57 percent named their mother. Although these findings do seem to support the psychoanalytic theory to some extent, it is important to note that this particular study included no control group of heterosexuals with which to compare these incidence figures, consequently the findings remain suggestive rather than conclusive. The fact that some of the homosexuals reported happy relationship with their parents must however be regarded as an anomaly for the psychoanalytic theory. Proponents of the experiential research program have not been able to account for this anomaly.

In another study, Chang and Block (1960) tried to test Freud's idea that homosexuality in males is a manifestation of the identification with the mother figure rather than the usual identification with the father figure. The subjects were made to describe themselves and

also their parents by means of a series of adjectives. As compared to a control group of heterosexual men, homosexual men tended to identify more with mother and less with father. This was consistent with the Freudian predictions. However, it is important to note that this particular study was retrospective in nature and retrospective accounts of childhood relationships with parents are subject to gaps in memory and distortions. In addition, the answers given by adult homosexuals regarding their childhood may be influenced by their own acceptance of a particular theory of homosexual etiology.

The first major attempt to test the psychoanalytic theory was carried out by Beiber and his associates in 1962 (Beiber et al 1962). This study involved 106 male homosexual patients and a control group of 100 heterosexuals in psychiatric treatment. The subject's psychotherapists filled out long questionnaires about their patient's childhood years, relationship with parents and so on. The patients themselves were not aware of the study. A majority of homosexual's mothers were reported to have formed a close-binding-intimate association with their homosexual sons, favoring them over their other children and even over their husbands, spending a lot of time with them, over protecting them, discouraging masculine attitudes and interfering with their heterosexual interests. On the other hand, the study found significant trends for the father to be removed, hostile, minimizing and openly rejecting. In addition, the study found that the attitude of homosexuals towards their fathers was characterized by hatred and fear. Beiber and his colleagues emphasized that that it would be simplistic to incriminate one particular type of parent interaction in the etiology of homosexuality. Instead, they argued that a particular mother-father-son interaction appeared to be influential and any son exposed to

this parental combination had a higher chance of becoming homosexual. They summed up their findings as follows:

Our findings are replete with evidence of a close mother-son relationship and confirm the observations of Freud and other investigators that "mother-fixation" is related to homosexuality. The data also provide convincing evidence of the importance of the Oedipus complex in the etiology of homosexuality. Our material highlights the parental distortions of this phase of child development, as noted in the over-closeness and seductiveness of the H-mother and the hostility of the H-father (Beiber et al., 1962: 308).

Thus Beiber and his co-workers concluded that the home environment during development was the most important causal factor in determining whether one became homosexual or not. However, Beiber et al did address the question whether paternal rejection and hostility were stimulated out of feelings of disappointment and failure because of the son's homosexuality. They maintained that this was not likely since only 17 percent of the fathers were reported to have been aware of their sons' homosexuality. The Beiber group also argued that the fathers' attitudes could not be attributed to the fact that the sons were inadequate and unattractive children, since the mothers did not find them so. This argument has been challenged by Evans who says that the fact that the mothers did not find their sons unattractive does not imply that the fathers did not (Evans 1969).

Beiber's study is subject to criticism on several counts. The most commonly expressed criticism is that it was concerned with patients who were severely disturbed, which leaves open the question whether similar disturbances would have been found in the life histories of the broader gay population. Critics of this study have also pointed out that it is possible that it is those homosexuals who had unsatisfactory relationships with both

their fathers and mothers who most often came to the attention of psychiatrists. It has also been noted that the sample was not representative enough in that most of the subjects were university graduates holding high income, professional and managerial positions in the New York City area. Another point of contention is that Beiber et al employed the services of psychoanalysts to fill the subject's questionnaires. While this method may be useful in elucidating deep underlying dynamics, there is a very real possibility that the subjects will be inadvertently influenced by the theoretical commitments of the interviewer. The psychoanalysts themselves may also read into the data the precise things they intended to find.

Later studies tried to avoid the methodological weaknesses that characterized Beiber's study. Evans (1969) compared homosexual and heterosexual men in their response to a questionnaire dealing with multiple aspects of parent-child relationship. Unlike the Beiber study, which was based on the psychoanalyst's reconstruction of the subject's early life, Evans' study was based on retrospective self-reports of how the subjects viewed their childhood. In order to expand the database beyond patients in psychotherapy, Evans questioned 43 homosexual and 142 heterosexual males who had not sought therapy. The subjects filled a 27-item questionnaire which was similar to the one used by Beiber and his colleagues. The results were very similar to those of Beiber. The study at face value confirmed Freud's view that the male homosexual is raised in an environment in which the mother is close, binding and seductive, and the father distant and unfriendly.

Although he was able to replicate Beiber's findings, Evans was cautious about the interpretation of his own findings. Without rejecting the influence of parents on a child's personality, he argued that some consideration must be given to the notion that the child's inner characteristics partially determine parental reaction and attitudes towards him. He thus seemed to be suggesting that biological factors might in fact play a role in the causation of homosexuality. It is also important to note that some diseases such as autism, and manic-depression were once blamed on poor parenting, but now they are regarded as due to biological causes that parents cannot be blamed for.

Another study by Bene (1965) involved a sample of 83 self-reported homosexual men and the same number of married men (supposedly heterosexual) of roughly equivalent age and class. Bene used a semi-projective technique (Bene-Anthony Family Relations Test) and questionnaires to gather information on the subject's early life. The subjects were asked to think back to their early years and to say which member of their childhood family most closely fit each description. Bene's findings confirmed Freud's claim that homosexual men recall bad relations with their fathers. However, she did not find the expected evidence of strong attachment to mother predicted by the psychoanalysts. On the contrary, mothers of homosexual men were reported to have been more nagging and hostile than those of heterosexual men. Bene's study corroborated the earlier findings of Westwood (1960), who reported that his male homosexual group showed more evidence of inadequate fathers than of over-possessive or domineering mothers.

From this study one cannot say with confidence that defective parental upbringing causes homosexuality, since the memory of adult homosexuals may be subject to bias, and even if the parental behavior described took place, it might have been provoked by the homosexual child's inborn peculiarities. Indeed, the fact that two variables correlate with one another does not tell us which is the cause and which is the effect. Freud might as well have confused cause with effect. Thus a son who displays feminine characteristics or homosexual tendencies might well arouse a mother's sympathy while at the same time arousing the father's hatred. In other words, the homosexual child's effeminate behavior may itself influence the way his parents behave towards him (Evans 1969). Michael Ruse expressed the same point when he wrote:

Perhaps it is the delicate 'mother's boy' who alienates the potentially friendly father. The coldness and distance does then exist, and later the adult homosexual is reporting truly. Yet what he is reporting is effect, not cause. How could he (the homosexual) know that it was his own childhood nature that made his father what that father ultimately became? (Ruse 1988: 39).

The fact that most boys raised by single mothers do not become homosexual must also be an embarrassment to the advocates of psychoanalytic theory. And as Simon LeVay, one of the chief proponents of the biological research program, has pointed out, in spite of the fact that over the last three decades a whole generation of African-American youth has been raised by single parents, there has been no explosion of homosexuality among black male teenagers (LeVay 1996: 279). If lack of a relationship with one's father causes male homosexuality, one would also expect that the generation of European boys born in early 1940s during the second world war or Kenyan boys born in early 1950s during the Mau Mau rebellion would have a much higher incidence of homosexuality than other

generations, because so many fathers were away. No such evidence exists. A study carried out by Schmidt et al (1995) found no evidence of increased numbers of homosexuals in German cities most affected by the Second World War (this study was designed to test Günter Dörner's hormonal hypothesis, which among other things, postulates that more homosexual men are born in wartime than in peacetime due to maternal stress caused by war).

Investigators have also found no significant differences between children raised by lesbian parents and those raised by heterosexual parents (Flaks et al 1995, Golombok and Tasker 1996). In fact, children who grow up with a homosexual parent are not themselves likely to become gay. Bailey et al (1995) found that sexual orientation was unrelated to the amount of time that the sons spent living with their gay fathers, a result that is at odds with many versions of experientialist theories about the transmission of sexual orientation (Freud attributed the prevalence of male homosexuality in ancient Greece to the fact that young boys were tended by male slaves (Freud 1953: 230)). It is also important to note that there are very many men whose parents were well adjusted and who displayed no preadolescent cross-gender behavior and yet became homosexual. The findings of Fredrick Whitam also refute Freud's theory of homosexuality. In a cross-cultural study of male homosexuality, he found that gay men brought up in societies where homosexuality is tolerated report less hostile relationships with their fathers than those brought up in homophobic societies (Whitam 1983).

The most recent and thorough attempt to test the psychoanalytic theory of sexual orientation was carried out by Bell et al (1981). This study, which involved 979

homosexual men and women and 477 heterosexual men and women living in the San Francisco Bay area in the United states, found no empirical support for psychoanalytic theories of homosexuality. This study was done more carefully and according to better scientific standards than many previous surveys. And although the sampling had an obvious geographical limitation, it enabled the researchers to obtain a large number of gay men who could be open enough to cooperate and participate in the research. Bell et al followed a path analysis model which enabled them to trace the flow of possible causal influence in parental and familial associations through childhood and peer relationships and sexual experiences, to the final outcome of heterosexuality and homosexuality. This model enabled the researchers to determine which variables are causally connected to the development of homosexuality, and which are associated with it only spuriously (Bell et al 1981).

The results of this study indicated that experiential explanations of homosexuality are inadequate and are not supported by the data. Differences in family background did not seem to make any difference in whether one becomes heterosexual or homosexual. The tendency for homosexual males to perceive their fathers in a relatively negative fashion was found to have very little influence on their psychosexual development. The study provided no support for the notion that homosexuality is associated with a seductive mother-son relationship as described by Freud. Indeed, only a minority of the subjects said that their mothers acted like girlfriends and lovers, and there was no difference between homosexuals and heterosexuals in this regard.

Additionally, the study found that dominating and seductive mothers as well as weak, hostile, or detached fathers (factors believed to cause homosexuality) characterized the

biological basis for sexual preference' (Bell et al 1981: 216). However, they were reluctant to say that a biological basis for sexual preference had been established since they had actually collected no biological data.

In this section I have surveyed attempts to explain sexual orientation differences in terms of family dynamics. The failure of these attempts to achieve any progress in the experientialist program has caused most experientialists to stop using psychoanalysis as a theory for explaining the etiology of homosexuality. Freud's ideas appear to have been based on an outdated theory of libido development to which very few people today subscribe. Indeed, in the past thirty years or so, serious students of sexuality have abandoned the ideas of Freud although they have not abandoned the idea that the mind is an empty slate on which experience is inscribed. It is also important to note that much of the early psychodynamic research into the causes of homosexuality was done by psychiatrists and physicians and as Michael Ruse 'many of these researchers were obsessed with questionnaires and surveys and did not show even the experimental ingenuity of a first year physics student' (Ruse 1988: 43). Indeed, Freudian explanations have fallen out of favor and a number of psychologists have concluded that a new theory of sexual orientation is needed (Steen 1996). In the next section I will examine the social learning theory of homosexuality.

### ***3.5 Social Learning Explanation***

In an attempt to save the experiential research program from refutation, some investigators have advanced the social learning theory to explain the genesis of

homosexuality. Social learning theorists such as Churchill (1967), Bandura (1969) and MaCulloch and Feldman (1967) have postulated that sexual orientations are learned behaviors. Proponents of this model focus on the social context within which learning of sexual orientation and gender role attitudes and behaviors occurs. Like the Freudians, these theorists hold that early experiences play an important role in the development of sexual orientation. According to this view, humans have relatively amorphous, undifferentiated pool of sex drive which, depending on circumstances (rewards and punishments), may be channeled in any of several directions. Consequently, homosexuality simply reflects sexual relationships between two people of the same-sex, which have been particularly rewarding so that the preference for sex partners of the same sex becomes a conditioned behavior.

Kinsey and his co-workers (1948) stressed the role of social learning and conditioning, as well as social-cultural pressures, in the development of sexual orientation and sexual attitudes. He argued that although people are born with the capacity to respond sexually, the direction in which this capacity comes to be expressed is learned. He thus rejected the notion that people are innately heterosexual, homosexual or even bisexual. For Kinsey the development of sexual response, and therefore of sexual preference, is the result of both childhood and adulthood experiences, not just of childhood experiences as some researchers had stated. On Kinsey's view, the first sexual encounter as well as the most intense experience with the same-sex exerts a significant conditioning effect on the individual's sexual orientation. The opinions of others and social codes can also influence the decision to reject or accept sexual contact.

Similarly, Masters and Johnson (1979) attributed homosexuality to social learning. They maintained that a person's sexual orientation at birth is neither homosexual nor heterosexual. More specifically, Masters and Johnson hypothesized that homosexuality arose as a result of failed or ridiculed attempts at heterosexuality. They categorically rejected the view that homosexuality has a physiological basis.

There are many problems with the social learning theory of sexual orientation. First, it predicts that in societies in which homosexuality is tolerated or encouraged, the number of homosexuals would increase or even predominate. This prediction is refuted by the observation that even in societies where adolescent homosexuality is institutionalized, adult homosexuality is the exception rather than the rule. Social norms do not seem to facilitate or impede the emergence of homosexual orientation. For example, among the Sambia people of Eastern Highlands of New Guinea, boys are expected to engage in ritualized homosexual contact for several years during adolescence but they turn out to be predominantly heterosexual in adulthood and even marry (Herdt and Stoller 1984). Indeed, as Mondimore explains, only a small minority of Sambian men 'seemed to become adult "homosexuals" despite universal homosexual experience during adolescence and early adult life' (Mondimore 1996: 18). Similarly, same-sex behavior is known to occur among boys and girls in traditional British Boarding schools but again, as Le Vay (1996: 90) observes, attendance at such schools does not increase the likelihood of homosexual orientation during adulthood. More puzzling still is why there are any

homosexuals at all in most societies given that the practice is almost universally discouraged. All these cases constitute anomalies for the experientialist research program.

Social learning theorists have also postulated that the first sexual encounter leading to orgasm plays a crucial role in shaping an individual's sexual orientation. McGuire et al (1965) has cited several cases in support of this hypothesis. Babuscio (1977), himself a homosexual, appears to support the same view when he says that the conditioning of the first sexual experience with persons of the same sex *is* important to the later development of homosexuality.

There are a number of problems with this theory. In the first place, studies have shown that sexual encounters between people of the same gender during adolescence, even if pleasurable, do not always lead to an adult homosexual orientation. Indeed, if sexual orientation developed as a conditional response to contexts of teenage orgasm, as some experientialists allege, Sambian men should be mostly gay. However, as I noted above, this is in fact not the case. Many heterosexuals have had adolescent homosexual encounters without being swayed in their adult sexual orientations. Hertoft (1976) supports this view and maintains that young people frequently encounter homosexual advances and learn how to deal with them. What is more, as Bell et al (1981) have reported, the overwhelming majority of gay people are aware of sexual interest in people of their own gender long before they had any sexual encounters with them, pleasurable or otherwise. Bell's study also showed that sexual orientation is established early in life and that childhood and adolescent sexual expressions by and large reflect rather than

determine a person's underlying sexual orientation. In other words, early childhood and adolescent involvement in homosexual activity may be an indicator of an underlying homosexual disposition rather than cause of it. Learning theorists have also been criticized for their exclusive focus on objective aspects of behavior, to the exclusion of subjective aspects (Scholeid 1965). The complexity of human behavior demands that both objective and subjective aspects of behavior be considered. The truth of the matter is that at the moment we do not know which environmental factors, if any, influence sexual orientation even after more than a century's theory and research.

### ***3.6 Conclusion***

From the forgoing it should be clear that the evidence for the experientialist research program is fragmentary and weak and many of its theoretical assumptions are unsupported. The program is also riddled with numerous methodological difficulties. We have seen that most of the studies that have so far been carried to test experientialist hypotheses have been retrospective in nature and in such studies it is difficult to determine the direction of causal relationship. The fact that homosexual males report that their fathers were either absent, aloof or hostile and that their mothers were domineering and possessive does not conclusively demonstrate that defective parenting is the cause of human male homosexuality. Correlation between homosexuality and 'faulty' parenting does not equal causation. As already pointed out, it is logically possible that the homosexual son's behavior is the cause of parental attitude towards him.

A scrutiny of current literature on the etiology of homosexuality reveals that most investigators have abandoned the experientialist research program. (Since the publication of Bell et al's *Sexual Preference: Its Development in Men and Women* (1981), no serious work has been carried out in this area). The program's inability to make both theoretical and empirical progress has contributed to this state of affairs. Indeed, many researchers today appear to subscribe to a biological or nature explanation of sexual orientation although they are careful to hedge this conclusion in their written work. Nevertheless, this in itself should not be construed to mean that experiential factors do not have a role to play in the etiology of homosexuality. As we shall see in the next chapter, workers in the rival biological research program have reported experimental results, which seem to suggest that experiential factors may after all have a role to play in the causation of homosexuality. For instance, in some studies, monozygotic twins have been found to be discordant for sexual orientation (Reiner 1960, Parker 1964, Bailey and Pillard 1991). This observation alone would seem to require the inclusion of non-genetic variables as part of a causal scheme some of which could be experiential. The high correlation of homosexuality among fraternal twins also makes a powerful case for environmental causes. Indeed, in the absence of biological markers and given the uniqueness of each individual's upbringing and the impossibility of replicating it, we can only suppose that certain psychological factors might have contributed to a person's thoughts, feelings or behavior.

From a Lakatosian perspective, it is clear that the positive heuristic of the experiential research program for explaining the genesis of human male homosexuality has

completely run out of steam. Since its inception, this program has not been able to digest anomalies nor has it been able to generate any novel predictions and explanations. In fact, this program does not seem to have had a progressive stage during its lifetime. It seems to have reached a dead end. But this is hardly surprising. For progress to be made, experientialists would have to radically modify the hardcore of their research program by incorporating biological factors into their explanatory scheme. However, from the point of view of the methodology of scientific research programs, this would mean abandoning the program altogether. As we saw in chapter 2, any scientist who modifies the basic assumptions of his research program automatically opts out of that particular program. Perhaps what is needed is an interactionist research program – a program that takes seriously the role of both biology and experience in the development of homosexual orientation.

## **Chapter 4**

### **Biological Research Program: Genetic Hypotheses**

#### ***4.1 Introduction***

As we saw in chapter 2, the hardcore of the biological research program is the proposition that biological factors play a primary role in the causation of human male homosexual orientation. Two models of the role that biological factors might play in sexual orientation can be distinguished: direct model and indirect model (Byne 1994: 27). Most workers in the biological research program subscribe to the former model. According to the direct model, biological factors (e.g. genes and hormones) act directly on the developing brain to wire it for sexual orientation probably before birth. The indirect model, on the other hand, holds that biological factors predispose individuals to certain personality traits that influence the relationship and experiences that ultimately shape sexual experience.

Those who advocate biological causes have argued that homosexuals possess different hormonal mechanisms, genotypes or brain structures. But how are these factors related to one another? Simon LeVay and Dean Hamer have suggested that there may be individual differences in how brains respond to sex hormones (estrogens and androgens) and that this may be determined by genes(s) (LeVay and Hamer1994). A 'gay gene', for example, may make a brain that fails to take advantage of androgens circulating in the blood stream so that the individual (male) becomes homosexual.

In this chapter, I will focus on the biological approach that emphasises the role of genes in the causation of homosexual orientation. The genetic approach promises the most direct support for the 'born that way' argument for homosexuality. In evaluating this research program, it is

important to remember that according to the methodology of scientific research programs, scientific theories are not evaluated in a vacuum. On the contrary, their evidential basis and plausibility are compared to those of the competition. In this particular case, biological theories of homosexuality will be compared to experiential theories already discussed in the last chapter.

#### ***4.2 Genetic Explanations***

The idea that homosexuality is genetic, or at least biologically predetermined and unchangeable, is not new. As far back as 1899 the German scholar, Magnus Hirschfeld (1986), argued that homosexuality was hereditary and called for legal equality based on this thinking. He used August Weibmann's theory of the inheritance of latent characteristics to explain the inheritance of homosexuality (Hirschfeld 1914). Havelock Ellis and Kraft-Ebing also regarded homosexuality as having a constitutional or hereditary origin (Bell et al 1988).

However, the first serious study of the involvement of genetic factors in the causation of homosexuality can be traced back to 1940. Thomas Lang postulated that homosexual males were chromosomal females with male bodies (Lang 1940). On the basis of this theory he predicted that there should be a higher proportion of brothers in families with gay males than those that do not (the normal sex ratio of males to females at the time was taken to be 106:100). Lang went on to corroborate his theory in a study based on German police records and involving 1015 male homosexuals. He reported a sibling sex ratio of 100 females to 121 males. This theory was later shown to be false and abandoned. Two studies involving a detailed examination of actual chromosomes taken from exclusively homosexual men showed that they had normal male chromosomal pattern just like their heterosexual male counterparts (Pare 1956, Pritchard 1962).

Scientists have designed a number of methods for studying human behaviour genetics. The first approach is based on the assumption that traits that are genetically influenced aggregate in families. If this can be shown the case, the genetic hypothesis is corroborated. The problem with this method, however, is that members of the same family often share environment as well as genes and it is difficult to separate the two. Moreover, not all traits that run in families have a genetic basis. Poverty, wealth, habits, values and religious affiliation, for example, may aggregate in families but this does not mean that they are genetically influenced. These traits are familial more for cultural and social factors than for genetic reasons.

Another method that is often used by scientists to test whether a particular trait has a genetic basis involves the study of monozygotic (MZ) and dizygotic (DZ) twins. The underlying rationale of the twin method is very simple. MZ twins are genetic clones i.e. they share 100 percent of their gene, but DZ twins share only 50 percent of their genes. Therefore, if a particular trait is genetically influenced the degree of concordance should be greater for MZ twins than for DZ twins, who in turn should show greater similarity than biologically unrelated people. Conversely, if a trait is not genetically influenced, MZ twins should be no more concordant for a given trait than DZ twins. However, it is important to note that concordance for a given trait even in the case of MZ twins could be due to a shared environment rather than to shared heredity. Indeed, because they are identical appearance, MZ twins are likely to be treated more similarly by friends and family than DZ twins and this may contribute to concordance for a particular trait. Another technique involving twins is the study of twins raised in different environments. If the twins are concordant for a particular trait, this can be attributed to heredity.

### ***4.3 Kallman and the Twin Method***

The first large study aimed at testing the genetic theory homosexuality using twin studies was carried out by Frantz Kallman (1952), an American authority in heredity who claimed a genetic predisposition for many behavioural traits. Kallman's study involved 85 twin pairs: 40 of these were MZ while 45 were DZ. The control group included 112 non-twin homosexual siblings and 116 employees drawn from his Psychiatric Institute. All the homosexual subjects were recruited from prisons and psychiatric institutions in New York.

The concordance for homosexuality among the MZ twins was found to be 100 percent while that of DZ twins was found to be 60 percent. For non-twin siblings the concordance rate was 11.5 percent. From this data, Kallman concluded that his study "plainly diminishes the plausibility of studies which overstress the importance such precipitating or perpetuating factors as social ostracism, incompetence of a particular parent, or other potentially traumatizing experiences arising from the effect of uncontrolled imperfections in the structure of modern societies" (Kallman 1952a: 295). Kallman's findings were consistent with two earlier but smaller studies, which had reported a high concordance rate for homosexuality in MZ twins (Sanders 1934, Habel 1950).

However, it is essential to note that some studies immediately following Kallman's failed to find any concordance for sexual orientation while others found concordance rates between 10 percent and 50 percent thus refuting Kallman's findings (Rainer et al. 1960, Klintworth 1962, Parker 1964, Heston and Shields 1968). Unfortunately, most of these studies either involved very small samples or studied twins who were raised together at birth thus making it difficult to compare the relative contributions of genetics and environment. Kallman himself later claimed that his MZ concordance rate was a statistical artefact (Kallman 1960).

Kallman's study is subject to criticism on both methodological and theoretical grounds. In the first place, his sample was not representative enough. As already said, all the subjects were recruited from psychiatric institutions and prisons. Such a sample can hardly be said to be representative of the gay population as a whole (Rosenthal 1970). In fact the behaviour displayed by these subjects may actually have been an expression of psychopathology rather than homosexual orientation.

A related point is that Kallman did not indicate how he determined whether the twins in the study sample were either MZ or DZ. The way that this is done is critical as some DZ twins may wrongly be classified as MZ simply because they physically resemble each other or because they share the very trait that is being examined. Similarly, MZ twins discordant for sexual orientation or who do not share physical characteristics may be classified as DZ (McGuire 1995: 115). It is noteworthy that when this study was carried out, reliable methods for determining zygosity such as finger printing and blood sampling were not in use. Kallman may have relied on what the subjects told him about their zygosity but since the majority of the twins were maladjusted, their testimony cannot be trusted.

Furthermore, Kallman never bothered to carry out his analysis blind, that is, without knowing whether his twin pairs were either MZ or DZ. In this regard, some critics have speculated that the greater similarity that he observed between MZ twins compared to DZ twins may actually have been due to his prior knowledge of his subjects' degree of relatedness (Allen 1997).

It is also important to note that although Kallman claims that the twins became homosexual independently of one another, there is no indication in the study that they were reared apart.

Consequently, some critics have argued that there is no way in which the similarities can be claimed to be more the result of genetics than environment. In fact, environmental factors might well explain the high concordance rate that Kallman reported. Proponents of the experientialist research program have argued that monozygotic (MZ) twins are likely to react more similarly than dizygotic (DZ) twins are to the same environmental influences (Rose et al 1984). MZ twins are also more likely to be treated and dressed alike than DZ twins, making genetic influence seem more important in shaping their behaviours.

As already indicated, several case studies involving both identical and monozygotic twins suggest that the true monozygotic rate is less than 100 percent and probably near 50 percent. A study by Michael Bailey (discussed in greater detail below) confirmed the view that Kallman's findings of perfect concordance for homosexuality for MZ pairs was too high. The 52 percent concordance rate was similar to both the 50 percent rate estimated by Pillard et al and the 40 percent found in Heston and Shields who reported the only systematically ascertained sample of homosexual twins to date.

Kallman has also been severely criticised for lack of objectivity in his research (Marmor 1965). His study, it has been argued, was motivated by strong eugenic concerns and this may have biased his findings. Earlier on he had claimed a genetic basis for tuberculosis and schizophrenia but his findings were based upon a highly selected population. He has also been accused of carelessness, including diagnosis of schizophrenia from very old hospital records (West 1967).

#### ***4.4 Michael Bailey and Richard Pillard: Twins and Other Siblings***

Since MZ twins unlike DZ twins and adoptive brothers share identical sets of genes, the biological research program predicts that the former will have a higher concordance rate for homosexuality than the latter. An attempt to test this hypothesis was carried out by Michael Bailey and Richard Pillard (1991).

Using a combination of twin and adoption methods, Bailey and Pillard conducted a two-year study involving a sample of 56 homosexual MZ twins and 54 DZ twin brothers, as well as 57 adoptive brothers. All the subjects were obtained through homophile publications. The researchers assessed the zygosity of the twins by self-reports while the subject's sexual orientation was assessed by personal phone interviews, ratings by relatives and co-twins and questionnaire responses. The study found a 52 percent concordance for homosexuality in MZ twins, 22 percent for DZ twins, 11 percent for adoptive brothers of homosexual men and 9 percent for non-twin biological brothers.

This study suffers from a number of methodological flaws. In the first place Bailey and Pillard did not use a random sample of homosexuals. The men in the study were recruited through advertisements in gay magazines and newspapers as well as through homosexual organisations, thus effectively excluding those men who may engage in homosexuality from time to time but do not read gay publications. And as one critic has put it, 'instead of finding a correlation to sexual orientation per se, Bailey and Pillard's study could just as well indicate that there is a genetic underpinning to coming out of the closet', that is, their research may indicate only a gene for self assertiveness and bravery (Terry 1995: 282). MZ twins who were concordant for homosexuality are likely to have been more willing to participate in the study

than discordant pairs if they believed that the study would bring benefits to the gay community. This possibility may have skewed the findings and cannot be ignored.

As already pointed out, this study reported that adoptive brothers were more likely to be both gay than non-twin biological brothers who share half of their genes. This unexpected result is at odds with a simple genetic hypothesis, which would predict a higher concordance for biologically related siblings. In fact, this particular finding is consistent with the experiential research program.

Bailey and Pillard have attributed this anomaly to the different ways the twins and adoptive brothers were recruited for the study. They believe that the true rate is closer to that shown in an earlier study (Weinrich and Pillard 1986) in which the concordance rate for non-twin brothers of gay men was found to be 22 percent, the same rate found in DZ twins. Bailey maintains that their work still leaves room for environmental influences but he thinks that they are likely to be predominantly *biological* ones, in the form of hormonal variations, rather than psychosocial ones. In fact, he explicitly rejects all experiential accounts of homosexual orientation (see Holden 1992).

One other weakness of this study is that the subjects were reared together in the same environment. For this kind of study to be truly meaningful, one would at least have to look at twin brothers raised apart. A final point that is worth mentioning is that neither of the two researchers in this study is a geneticist or molecular biologist and no attempt was made to analyse the subjects' DNA for genetic markers.

#### ***4.5 Hamer's Pedigree and Gene Linkage Analysis***

Consistent with the teachings of Lakatos, advocates of the biological research program have continued to work on the genetic theory of homosexuality in spite of a growing list of anomalies. Guided by the heuristic of the biological research program, Dean Hamer and his co-workers have attempted to isolate what they consider to be markers of a gay gene on the X chromosome of selected homosexual subjects. Hamer explicitly states that scientific study of human sexuality, and sexual orientation in particular, 'must produce specific and testable predictions, not just vague generalities that defy empirical examination' (Hamer et al 1993: 14).

Hamer and his group were motivated by Bailey and Pillard's study, which had suggested that homosexuality runs in families. However, unlike Bailey and Pillard who merely sought to demonstrate that homosexuality is inherited, the Hamer group was interested in identifying a direct genetic marker that could be linked to homosexuality in males. The study was in two parts. The first part involved reconstructing pedigrees of 117 families that had at least one male homosexual. The researchers found that 13.5 percent of the gay men recruited for the study also had a gay brother compared to 2 percent of men without gay brothers. Besides the high incidence of gay brothers, Hamer et al noticed a pattern of homosexuality in male relatives of mothers of gay men. They found that 7.5 percent of gay men in the study also had a gay maternal uncle or cousin on the mother's side. This led the researchers to the conclusion that for some male homosexuals, the trait is passed through the X chromosome, the only chromosome inherited exclusively through the mother.

The second phase of the study involved analysing the DNA of homosexual brothers with a view to identifying the genetic markers. Hamer's reasoning was that if homosexuality is really

same DNA sequence close to the gene. On the other hand, if no such gene exists, then there is unlikely to be a shared piece of DNA. DNA samples were prepared from a pair of 40 brothers who were concordant for homosexuality. The samples were scanned for 22 markers that are scattered throughout the X chromosome from the tip of the short arm to the end of the long arm. If the brothers inherited the same markers from their mothers, they were marked as concordant, and if they inherited different markers they were marked as discordant. The study found that over most of the X chromosome the markers were randomly distributed between the gay brothers. However, in region 28 of the long or q arm of the X chromosome 37 of the 40 pairs of brothers (82 percent) shared the same markers. Seven pairs of brothers did not share the same markers. The findings led the researchers to conclude that genes influencing sexual orientation may reside in region Xq28 of the X chromosome.

It is important to emphasise at the outset that Hamer et al did not find a particular gene linked to sexual orientation. What they found was a general area in the X chromosome within which the gene is presumed to be located. As Hamer himself puts it: 'the most important limitation of our research was that we didn't isolate a 'gay gene'; we only detected its presence through linkage. We narrowed the search to the neighbourhood, the X chromosome-and even the block, Xq28-but we didn't find the house' (1993: 147).

In an attempt to corroborate their earlier findings, Hamer and his colleagues carried out a second study involving both males and females (Hu, Hamer et al 1995). In this study 23 out of 32 gay brothers (66 percent) were found to share the Xq28 markers. In 9 out of 11 families with two homosexual brothers and one heterosexual brother, the heterosexual brother did not have the Xq28 markers that his gay brothers shared. No correlation between female homosexuality and lesbianism was found.

Hamer has gone on to explain how a gene favouring homosexual orientation but not reproduction could continue to exist without being eliminated from the gene pool by natural selection. He suggests that men who receive a copy of this gene from their mothers are disabled from reproducing because the gene causes them to adopt their mother's sexual orientation (which is the desire to have sex with men). In addition, Hamer argues that those women who carry two copies of this gene will produce more offspring than their heterozygous sisters. And since some of their offspring will be female, the 'gay gene' will be passed on to the next generation. Thus Hamer sees homosexuality as a by-product of heightened heterosexual desire. This is a plausible hypothesis but it will remain a mere hypothesis until the gene for homosexuality is isolated. However, it is important to point out that, at the moment, no evidence exists to suggest that the mothers of gay men have more children than the mothers of straight men. The same applies to their maternal aunts, female cousins and nieces. I will say more about this kind of sociobiological explanation in the last section of this chapter.

The design and conclusions of Hamer's first study are open to challenge on a variety of levels. In the first place, an attempt by Rice and his co-workers (1999) to replicate Hamer's study found no evidence of the so-called gay gene. Rice et al studied the sharing of alleles at position Xq28 in 52 pairs of homosexual male siblings from Canadian families. Four markers at region Xq28, namely, DXS1113, BGN, Factor 8, and DXS1108, were examined. The study found that gay brothers were no more likely to share the Xq28 markers than would be expected by chance. A statistical analysis ruled out the possibility of any gay gene in Xq28 region having a major genetic influence on male's chances of being gay. However, Rice has pointed out that in spite of his group's failure to corroborate Hamer's findings, genetics may still

contribute to homosexuality but he thinks that researchers should be looking for the gene at another place in the genome (Rice et al 1999: 66).

Robert Pool has cautioned against uncritical acceptance of Hamer's study. He reminds us that the 'field of behavioural genetics is littered with apparent discoveries that were later called into question or retracted' (Pool 1993: 291). Initial reports of genetic linkages for complex traits such as manic depression and alcoholism have fallen apart under further scrutiny. Other commentators have found the family history data given by Hamer rather shaky. King (1993), for example, has suggested that maternal male relatives may have been more willing to reveal their family history than were paternal male relatives. Indeed, women are more likely to know details of family history than men.

The statistical significance of Hamer's study is also open question. His findings were based on the assumption that the base rate of homosexuality in the general population is two percent, which is an extremely conservative estimate. His definition of homosexuality was also rather stringent as it included only those people who were exclusively or predominantly gay and who disclosed their sexual orientation to family members and outside investigators. Most investigators today believe that the base rate of male homosexuality is between 4 and 10 percent. Hamer's findings lose their statistical significance when the data are reanalysed using the four percent figure (Risch 1993).

Other critics have pointed out that male homosexuality is likely be polygenic and not a simple Mendelian trait. In fact, there would be strong selective pressure against homosexuality if it was such a trait (Wickelgren 1999: 571). Hamer's group can also be faulted for failing to conduct DNA linkage with the non-gay siblings of the homosexual subjects. In fact, the study

did not have a control group, which is a serious flaw in scientific method. Concordance of the Xq28 region in those straight brothers would have strongly suggested that the DNA sequences in question were not responsible for homosexual orientation (Sober 2000: 355).

Another factor that weakens Hamer's study is that the xq28 marker was not found in seven of the forty pairs of homosexual twins. This is not a small number. It is hard to establish that factor A causes behaviour B if in a significant number of cases we have behaviour B and we don't have factor A. Furthermore even if we were concede that there is a correlation between a particular gene and homosexuality, that would not mean that the two are causally connected. An additional possibility worth noting is that the correlation identified in this study may be relevant not to homosexuality per se but to another trait that gay men have in common (Murphy 1996: 35). A gene that increases the tendency of brothers to psychologically identify with one another, as Fausto-Sterling notes in her critique of Hamer's study, 'might influence their similarity in such matters and sexual orientation would be picked in the present study (Sterling 1993: 261). And as Pool speculates, a gene might give mothers a tendency to smother their sons, a phenomenon traditionally associated with nurture rather than nature (Pool 1993: 291).

A similar kind of interpretation of Hamer et al's findings has been suggested by John Maddox. Writing in the prestigious journal *Nature* he asks:

What if it is accepted, for example, that it is true what the psychoanalysts say that male homosexuality is in part determined by the influence of an over-loving mother? And what if the gene located at the end of the long arm of the X chromosome does not determine homosexuality, but instead plays a part in telling whether a mother is 'over-loving' in the appropriate sense? Then the gene concerned would be strictly irrelevant to the causation of male homosexuality, whose determinants would remain those of nurture rather than of nature' (Maddox 1993: 364).

The kind of explanation that Maddox has in mind is called parental manipulation hypothesis and is discussed at greater length in section 5.9 below.

Unfortunately, Hamer has resorted to *ad hoc* arguments to explain away those facts that did not fit his theory. For example, he explains the absence of Xq28 markers in the seven of the twin pairs in the first study by saying that perhaps these men inherited different genes from those associated with Xq28, or that different genes in different families predispose an individual to homosexual behaviour. This is what Allen (1997) has described as the 'moving target approach'. The problem with this kind of theorising is that it reduces the scientific status of Hamer's theory by making it unfalsifiable. It is also important to note that one of Hamer's collaborators in this research has accused him of manipulating the scientific data and biasing the results. Hamer is said to have excluded pairs of brothers whose genetic makeup contradicted his finding (Horgan 1995:26). If true, these allegations seriously undermine Hamer's credibility as a scientist and raises doubts about the trustworthiness of his research findings.

With regard to the concerns raised by Rice et al, Hamer has pointed out that the way the latter selected the families in their study would tend to hide Xq28 contribution (Wickelgren 1999: 571). These researchers made no effort to select families that display the maternal pattern of inheritance. Hamer has also been at pains to point out that the gene does not influence all cases of homosexuality but only those that are maternally transmitted.

On the whole, there is much work to be done before it can be taken as settled that genes at region Xq28 determine the sexual orientation of some males. However, even if the gene for homosexuality were to exist, biologists would still have to explain how such a gene could

survive given that homosexuals are reproductively disabled. In the following section I will discuss a number of theories that have been advanced within the biological research program to explain the persistence of homosexuality.

#### ***4.6 Sociobiological Explanations of Homosexuality***

As I have just indicated, one of the main problems for genetic theories of homosexuality is to explain how a gene for homosexual orientation could continue to exist in the population. Critics of the biological research programme have pointed out that if homosexuality had a genetic basis, it should have disappeared long ago since homosexuals have reduced reproduction. Indeed, several empirical studies have shown that homosexual men and women reproduce less than their heterosexual counterparts (Bell et al 1978, Saghir et al 1973, Curran et al 1957). One possible explanation for the persistence of homosexuality is that it is a continuously occurring mutation with no adaptive value. In other words, it is suggested that maladaptive genes for homosexuality do indeed rapidly die, but new mutations are created at a rate high enough to compensate for the loss of the old mutations from the gene pool. This hypothesis is weakened by the observation that most maladaptive genes rarely exceed 1 percent of the population, while homosexuality apparently occurs much more frequently (Whitam and Mathy 1986, Gadpaille 1980). Indeed, if homosexuality were a product of mutation, as some people have suggested, the number of homosexuals would not be as high as it is today.

Workers in the biological research program have advanced a number of theories to explain why the homosexual gene has not been weeded out of the population. Their central claim is that all aspects of both human and animal behaviour are coded in the genes and have been moulded by natural selection. In the following three sections I will describe and appraise four

main sociobiological theories for explaining sexual orientation. These are: balanced superior heterozygotic fitness, kin selection and parental manipulation.

#### ***4.7 The Balanced Superior Heterozygotic Fitness Hypothesis***

According to this theory phenotypic homosexuality is the result of homozygosity for homosexual genes. This theory was first formulated by Hutchinson in 1959. Hutchinson theorised that if homosexuality were indeed controlled by a gene, those who carry only one copy of the gene must have a reproductive advantage over those who do not.

Advocates of the superior the heterozygote theory maintain that a gene may confer a differential reproductive advantage despite its harmful nature. On this view, there can be recessive genes for a trait that inhibits the reproduction of an organism, but which, when co-occurring with the dominant trait-suppressing allele, give rise to an organism more inclusively fit than a comparable organism with two dominant alleles. The most well known example of this kind of phenomenon is sickle cell anaemia, a genetic condition that occurs in African and Asian populations. Sickle cell anaemia partly results from an inherited genetic defect in the instructions that code for the development of haemoglobin, the oxygen-carrying pigment in red blood cells. This result in blocked blood vessels, severe pain, anaemia and damage to the kidneys, lungs and liver. If an individual is homozygous for sickle cell anaemia, that is, if he has inherited a gene for sickle cell from both parents, he or she will develop severe form of anaemia and may even die before having children. On the other hand, if the individual is homozygous recessive, that is, has the weak gene from both parents, he or she will not develop sickle cell anaemia but will be susceptible to having malaria. However, if the individual is heterozygous for the sickle cell allele (i.e. has one allele for sickle cell haemoglobin and one for normal haemoglobin), not only does he not develop sickle cell

anaemia, but he also has resistance for malaria and he therefore goes on to have children. This ensures that the gene for sickle cell anaemia is preserved in the gene pool. Another gene that is preserved in the population by natural selection in a similar manner is the gene for cystic fibrosis, an inherited disease that mostly afflicts Caucasians. Persons with cystic fibrosis have difficulties absorbing fat-soluble vitamins and suffer from frequent respiratory infections. Two different studies have shown that individuals who carry just one copy of the cystic fibrosis gene (and thus don't suffer from the disease) have increased resistance to cholera and typhoid-or rather to the diarrhoea that often kills people with cholera or typhoid (see Gabriel et al 1994, Meindl 1987). Like the sickle cell anaemia gene, if the cystic fibrosis mutation were merely a killer and did not have some benefit to the person who carries it, natural selection would have eliminated it from the population long ago.

Applied to homosexuality, the superior heterozygotic fitness theory holds that homosexuality is the result of homozygosity for homosexual genes. In other words, since the gay gene is presumed to be inherited in a recessive manner, a person will only become homosexual when he inherits one copy of the homosexual gene from each parent. It is also assumed that the homosexual gene, like the sickle cell gene, confers some benefit to heterozygous carriers. This ensures that the gene for homosexuality is maintained in the population even if individuals with two copies of the gene have reduced fitness.

Psychologist Jim McKnight has suggested that the homosexuality gene survives because the gene for homosexuality makes straight men more successful heterosexuals (McKnight 1994). It has also been suggested that those straight men that carry only a single copy of the homosexual gene may have a higher libido and, as a consequence, leave more children than either homozygote. They may also be better at caring for the young, which may make them

better fathers. In addition, such individuals may possess longer penises, more vigorous and fresher sperms, a higher concentration of sperm per ejaculation, and shorter refractory period between sexual encounters (incidentally a study by Bogaert (1999) reported that homosexual men had larger penises, both in terms of length and girth than heterosexual men). This, it is claimed, would ensure that they enjoy a sperm competitive fertility advantage, compared to heterosexual men who don't carry the homosexual gene (MacIntyre and Estep1993).

Some theorists have also postulated that heterozygotes may be better at detecting the peak ovulation periods of their sex partners compared to heterosexuals who don't carry the homosexual gene (McKnight 1994). Others such as William Turner have claimed that the homosexual gene persists because it confers resistance to small pox on heterozygous individuals who carry the gene (see LeVay 1996: 189). Thus, according to this view, homosexuality persists in populations, not because gay men, as such, are adaptive, but because the homosexual gene makes straight men (those who carry one copy of the gene) more successful heterosexually.

Unfortunately, there is very little evidence to suggest that certain individuals are heterozygous for the homosexual gene, assuming that such a gene exists. Nor, as Michael Ruse has pointed out, 'has any study shown that over a number of generations the ratios and distributions of homosexual to heterosexual offspring match those to be expected were a balanced heterozygotic mechanism at work (Ruse 1982: 15). The matter is complicated by the fact that we have no way of distinguishing homozygous carriers of the gay gene from the heterozygous carriers of the same. Furthermore, if male homosexuality, like sickle cell anaemia, consisted of a simple possession of two copies of the homosexual gene, then all MZ twins would be concordant for sexual orientation. This prediction is contradicted by a number of studies that

have reported identical twins that are discordant for sexual orientation (Rainer et al 1960, Green and Stoller 1971, Bailey and Pillard 1991). In fact, if one twin is homosexual, the other is almost always heterosexual. The matter will only be settled if the gene for homosexuality, like the gene for sickle cell anaemia, is discovered. However, it is highly unlikely that a single gene controls sexual orientation.

#### ***4.8 The Kin Selection Hypothesis***

The second theory that has been put forth by sociobiologists to explain the persistence of homosexual genes in the population is called kin selection. This theory was first proposed by W.D. Hamilton as an explanation for apparently altruistic acts in certain animal species (Hamilton 1964). Kin selection modifies natural selection by replacing the individual with the gene as the unit of selection. According to this theory, what matters is how many genes are passed on to the next generation and not the mode of transmission. In fact, Hamilton proposed that in addition to producing offspring directly, an individual could ensure that copies of his or her genes are passed on the next generation if he or she helped close relatives such as brothers and sisters to reproduce.

The essentials of kin selection theory are summarised in the following formula known as Hamilton's rule:  $C/B < r$ . According to this equation, if the altruistic individual is to survive natural selection, then the cost  $C$  (the loss in reproductive success arising from altruistic behaviour), divided by the benefit  $B$  (which is the kin's expected reproductive success) must be less than  $r$  (which is the probability that the relatives have the same allele). Put differently, Hamilton's rule says that kin selection will occur if the altruist gains more from his relatives' increased reproductive success than he loses by foregoing reproduction. Altruistic behaviour is common in many species especially birds, insects and mammals. It may take the form of

giving a warning call to a group that a predator is near, sharing food, grooming others to remove parasites, and adopting orphans.

Applied to homosexuality, the kin selection theory holds that although the male homosexual necessarily leaves very few offspring, if any, the gene pool is preserved because his altruistic behaviour results in increased reproductive fitness of his close family members who share the recessive gay gene. In other words the homosexual produces not directly, but through relatives. The assumption here is that every individual shares half of his genetic characteristics with his brothers and sisters, and about a quarter of this with his nieces and nephews. Accordingly, if such an individual is homosexual and assists his close kin in ways that promote their reproduction, he will in effect be guaranteeing the perpetuation of his own genes. And as Edward Wilson, a leading sociobiologist puts it:

The celibate monk, the maiden aunt, or the homosexual need not suffer genetically. In certain societies their behaviour can redound to improved fitness of parents, siblings, and other relatives to an extent that selects for the genes that predisposed them to enter their way of life (1975: 343).

Elsewhere Wilson has described homosexuality as a 'distinctive beneficent' behaviour that evolved as an important element of early human social organisation. He speculates that, freed from the need to direct energy toward raising their own children, homosexual members of primitive societies may have helped (by resource allocation and childcare) their close family members to reproduce more successfully. Indeed, Wilson compares homosexuals to worker-bees, who are sterile yet reproduce themselves indirectly by devoting all their energies to rearing their sisters (Wilson 1978). However, it is important to note that the worker-bees referred to here are not homosexual but asexual.

Wilson has also postulated that in pre-industrial societies, homosexuals may have played the role of seers, shamans, artists, and keepers of tribal knowledge, which could have benefited

study reported that heterosexual men were more likely to provide financial support to their siblings than would homosexual men. In addition, the study found that homosexual men were more alienated from other family members (especially from fathers and oldest siblings) than the other heterosexual siblings.

Lewontin (1979) criticises the application of kin selection hypothesis to homosexuality arguing that homosexuality is dependent on history and culture and that there is no evidence to suggest that it has a genetic basis. There is also no evidence to suggest that homosexual offspring do really increase the fitness of their relatives and thus indirectly increase their own inclusive fitness (McKnight 1997: 129). In fact, no proof has yet been offered showing that immediate relatives of homosexuals are markedly more productive than the population average. It is also important to note that in many societies today homosexuals are often alienated from their families.

The fact that parents in most societies have a negative attitude towards homosexuals must also be an embarrassment to the advocates of kin selection hypothesis. Parents would not be expected to be homophobic if by foregoing reproduction their gay children would be in better position to help their siblings reproduce (Dickemann 1995: 176). Also if homosexuality resulted in benefits to kin as sociobiologists claim, child-care should be a major component of gay culture but as a number of studies have clearly shown this is in fact not the case (Steen 1996). In actual fact, one stereotype about homosexuals is that gay men have a tendency to molest children. Moreover, rather than aiding their kin, it has been observed that many gay people invest most of their energy, time and money supporting the gay community and defending gay rights. And as LeVay asks, 'why do gay men waste so much time cruising each other, time that according to this theory would be better spent baby-sitting their nephews and

nieces?’ (LeVay 1994: 129). The same point is echoed by Bobrow and Byne when they note that the ‘amount of time and effort that homosexual men spend pursuing non-reproductive sex and relationships must be at the expense of distributing resources towards kin’ (Bobrow and Bailey 2001). Indeed, from an evolutionary point of view, it would make more sense for these individuals to be asexual rather than homosexual.

The proponent of the kin selection might of course respond by saying that the modern environment, unlike the environment of evolutionary adaptation, is not conducive to homosexuality. But as a number of critics have noted, if individuals are to devote their energies to helping relatives, it would make more sense for them to be asexual rather than homosexual since the latter would require that they expend their efforts pursuing members of their own sex. Furthermore, as McKnight has pointed out, even ‘if homosexuals were to commit a large measure of resources helping their kin produce they would simply be aiding the decrease of their overall genetic contribution by having more homosexual relatives who will not be able to reproduce’. Indeed, McKnight has demonstrated mathematically that the gene for homosexuality is not likely to survive if homosexuals are simply helping kin to reproduce. He notes: ‘Kin selective breeding success ensures more relatives but more reproductively disabled ones in your direct line. So as advantage turns to a disadvantage, producing more homosexual kin reduces genetic representation in subsequent generations’ (McKnight 1997: 135). According to this viewpoint, although kin selection may help the homosexual gene spread initially, it does not aid its ultimate survival. From the foregoing, it should be clear that whatever the merits of kin selection, direct reproduction is the best way of ensuring that one’s genes are passed to the next generation. Furthermore, as already indicated, it is not clear why some people would become homosexual rather than asexual if the ultimate aim is to help their relatives reproduce.

#### ***4.9 The Parental Manipulation Hypothesis***

This hypothesis was first presented by Trivers (1974) and later elaborated by Ruse (1988). It is based on the assumption that sometimes it is more beneficial to a parent's inclusive fitness to limit an offspring's reproduction. Accordingly, parents may unconsciously manipulate some of their children to become homosexual in the expectation that instead of having their own children, homosexual offspring will direct their kin investment toward their siblings' children, and that this would contribute to their parents' inclusive fitness. As Ruse explains 'if the genes could give rise to behaviour in one or both parents that would in some way and under special circumstances cause one offspring to be a non reproducer, and if this were in the parent's reproductive interests, such genes would be preserved and even multiplied by selection (Ruse 1985: 12). This hypothesis differs from the other three in that it postulates that the phenotype, which is passed on genetically is not homosexuality per se, but the parental behaviour, which leads them to manipulate the child to become homosexual. It is also to be distinguished from kin selection hypothesis in that the beneficiary of the homosexual's altruistic act is not the homosexual himself, but his parents whose genes he helps to propagate (Trivers 1974).

No systematic study has been specifically carried out to test this hypothesis. However, the same evidence that refutes kin selection hypothesis would seem to refute parental manipulation hypothesis. As our discussion of kin selection hypothesis has shown, there is no evidence to suggest that families with a homosexual member are more reproductively successful, compared to those whose members are exclusively heterosexual. Homosexuals do not seem to provide greater services than people who are heterosexual. And although Ruse (1988) and Weinrich (1976) have cited cases where parents in certain societies encouraged

their children to change their gender role, most of those examples are anecdotal and in any case change of gender role is not the same as change in sexual orientation. Furthermore, even if it could be shown that there is a correlation between homosexuality and certain kinds of parental behaviour, such kind of behaviour could very well be the consequence of homosexuality rather than the cause of it. In fact, it is difficult to distinguish this particular hypothesis from the psychodynamic theories of homosexuality discussed in chapter four.

Another objection to the parental manipulation hypothesis is that although it may very well explain why parents would want some of their children to forego reproduction, it does not explain why such children become homosexual. As mentioned previously, these individuals would be in a better position to assist their kin if, like worker-bees, they were simply asexual.

The parental manipulation hypothesis is also at odds with another evolutionary based hypothesis, which postulates that there has been selection for parents to counter any social process that would increase the chances of any of their children becoming homosexual (Gallup 1995). Gallup's reasoning is that homophobia may have evolved as a means of minimizing the chances that offspring would become homosexual. The assumption here is that contact between adult homosexuals and children would increase the chances of one's child becoming homosexual and this would lower the parent's inclusive fitness. Why parents would display negative attitudes towards homosexuals and at the same time manipulate some of their children to become homosexual must be regarded as an anomaly for this particular subprogram. Again, as was pointed out earlier, the best way to get maximum returns on genetic investment would be to ensure that all offspring reproduced profusely.

Sociobiological explanations of homosexuality are very speculative and assume a priori the existence of homosexual gene(s). In fact, they have been criticised for being too gene-centred and deterministic. However, as the forgoing evaluation has shown, these theories have been subjected to empirical tests and although they have been found wanting, they do at least meet the Popperian criterion of falsifiability.

#### ***4.10 Conclusion***

In this chapter I have considered a number of genetic hypotheses advanced by workers in the biological research program. I have shown that many of these hypotheses have been falsified. Moreover, studies claiming to provide evidence in support of some of these hypotheses have been found to suffer from a number of conceptual and methodological problems. However, compared to the rapidly degenerating experientialist research program discussed in the previous chapter, the biological research program does appear to have a more powerful positive heuristic, which explains why many researchers continue to invest their energies in it. But as William Byne has cautioned the popularity of current biological theories of homosexuality may derive more from discontent with current status of experiential (psychosocial) explanations rather than a substantiating body of experimental evidence (Byne 1993). In the next chapter I will examine hormonal hypotheses, which also fall under the biological research program. These hormonal studies, as we shall later see, claim to show that homosexuality is biologically influenced. Nevertheless, as we saw in chapter four, we should bear in mind that human behaviour cannot be reduced to distinct biological or environmental causes. We should be wary of an extreme biologism for rarely do either genes or the environment determine a trait. Usually, as Susan Oyama has repeatedly pointed out, phenotypes are the products of interactions between genes and the environment (Oyama 1985, 2000). What this study has demonstrated so far is that although the experiential explanations

discussed in chapter 4 have been discredited, a *simple* genetic account of homosexuality is not strongly supported by current evidence either.

## **Chapter 5**

### **Biological Research Program: Hormonal Hypotheses**

#### ***5.1 Introduction***

In addition to the genetic explanations discussed in the previous chapter, biologically oriented researchers have hypothesized that hormones play an important role in the development of human male homosexuality. Two main hormonal hypotheses can be distinguished: the postnatal and the prenatal hormonal hypotheses. According to the postnatal-hormone hypothesis, homosexual men have lower levels of testosterone and higher levels of estrogen in their bloodstream than their heterosexual counterparts. In other words, the ratio of testosterone and estrogens is disproportionate in male homosexuals. The prenatal-hormone hypothesis, on the other hand, postulates that male homosexuality is caused by androgen deficiency during the prenatal period of hypothalamic differentiation. According to this view, homosexual men were exposed to androgens at a certain point in development and this gave them a male anatomy, but the quantity of these androgens was not high enough and this resulted in a feminized brain. Whereas the postnatal hormonal hypothesis has been discredited and abandoned by most investigators, the prenatal-hormone hypothesis has continued to attract the attention of endocrinologists as a possible explanation for homosexuality.

#### ***5.2 Hormones, Sex and Behavior***

Because of the important role that sex hormones play in the development of secondary sex characteristics in both men and women, workers in the biological research program

have speculated that they could also play an important role in the development of homosexual orientation.

There are two types of sex hormones: androgens and estrogens. The two hormones are present in both sexes but in different amounts; estrogens are generally higher in females and androgens higher in males. Estrogens are primarily produced by the female's ovaries and are responsible for the stimulation of the growth of a woman's sex organs, breasts, pubic hair and other secondary sex characteristics although the absence of androgens also plays a role in this. In fact, in the absence of testosterone, estrogen serves as the default hormone and causes female development (see Delcomyn 1998).

Androgens, on the other hand, are mainly produced by the male testes, but are also produced in small amounts by the female ovaries and by the adrenal glands in both sexes. Androgens are responsible for the stimulation of the development of the testes and penis in the male fetus as well as other male sex characteristics such as the deepening of the voice and the growth of beards. Studies have shown that too much androgen during the critical period of sexual differentiation can make an organism that is chromosomally female have a male appearance, including the outer sex organs. Similarly, androgen deficiency during a can produce female sexual characteristics in a fetus that is genetically male.

### ***5.3 The Postnatal Hormonal Hypothesis***

The hormonal theory of homosexuality was first formulated in the 1930s following the isolation and identification of sex hormones in the 1920s. C.A Wright expressed this theory when he wrote:

All individuals are part male and part female, or bisexual, and this fact is substantiated by hormone assays in the urine. The urine of the normal man or woman shows the presence of hormones of both the male and female types... In the normal male, the female hormone predominates: in the normal female, the female hormone predominates. This, in my opinion, is the cause of the normal hormone attraction. In the homosexual the dominance is reversed. In the homosexual man there is predominance of the female element and in the homosexual woman a dominance of the male factor (Wright 1938: 249).

Earlier on, Magnus Hirschfeld had observed that the human embryo underwent a process of sexual differentiation, which entailed a stage of 'ontogenic' bisexuality. He went on to suggest that the 'study of endocrine secretions was the most promising way to arrive at a greater clarity about the ultimate causes of homosexuality' (Hirschfeld 1914: 378). A similar observation was made by the English sexologist, Havelock Ellis, when he pointed out that homosexuality might be linked to some abnormality in the process of sexual differentiation, probably having 'a fundamental source ...in the stimulating and inhibiting play of the external secretions (Ellis 1948: 310-316). Indeed, by the late nineteenth century, it had been firmly established that the fetal tissue that eventually developed into either male or female was undifferentiated until about the seventh week of pregnancy and that certain 'secretions' played a role in this differentiation. These secretions turned out to be the sex hormones: testosterone and estrogen.

A number of studies were carried out in the 1930s and the 1970s to test this hypothesis but the results met with little success. Wright himself tested this hypothesis and found various degrees of reversal of the normal androgen-estrogen ratio in 49 homosexuals. He reported that most of the homosexual men had lower concentration of androgen levels and higher concentration of estrogens than the heterosexual men in the study (Wright 1935). Similarly, Glass and McKennon (1937) demonstrated these differences but their data turned out to be insufficient for statistical analysis. Two other studies by Glass, Deuel and Wright (1940) and Neustadt and Myerson (1940) reported reduced androgens and elevated estrogens in most of their gay subjects as compared to heterosexual controls.

It is noteworthy that some investigators resorted to *ad hoc* hypotheses to explain away those cases that did not fit their predictions. For example, Wright (1940) suggested that the few homosexual men in his study with high androgen-to-estrogen ratios were not true homosexuals, while the heterosexual men with low androgen-to-estrogen ratios were latent homosexuals. The problem with this kind of theorizing is that it is insulated from any possibility of being contradicted by fact. Recall that according to the MSRP, in degenerating programs theories are fabricated only in order to accommodate known facts.

Acting on the assumption that there is a relationship between sex hormone levels and sexual orientation and without questioning its validity, attempts were made to 'cure' gay men of their homosexuality by injecting them with high doses of androgen. This method of treatment, also known as organotherapy, was especially popular in the 1940s. In one such case, out of 11 homosexual men treated with androgen, 8 experienced no change in

Loraine *et al.* (1970) reported abnormally low urinary testosterone in two exclusively homosexual men. A third man who was bisexual was found to have no such abnormality while normal levels of testosterone were found in four female homosexuals. A more ambitious study by Kolodny *et al.* (1971) reported significantly lower plasma testosterone levels for a group of 30 male homosexuals (5 and 6 in the Kinsey scale), in comparison to a control group of 50 heterosexual subjects. Studies that followed Kolodny's reported contradictory results; while some supported the hormonal imbalance hypothesis (e.g. Starka *et al.* 1975), others (e.g. Birk *et al.* 1973) refuted it. Evidence from one study indicated that the low levels of testosterone reported by Kolodny *et al.* (1971) were probably due to greater marihuana use in the homosexual group (Gatrell 1982).

Inconsistencies in methodology and outcomes make these studies inconclusive. Apart from being based on fairly small sample numbers, most of them failed to control for confounding variables such as the general health of the experimental subjects, age, diet, physical and emotional stress, alcohol, and the use of recreation drugs such as marihuana. All these factors are known to influence the level of hormones circulating in the bloodstream of an individual. Furthermore, hormone levels are known to fluctuate throughout the day and some of these studies did not take this variable into account (Gooren 1995). Emotional stress is particularly important because many homosexuals live in very stressful conditions arising from homophobia and irrational prejudice. Studies have shown that stress affect the functioning of the pituitary and this in turn lowers the amount of testosterone secreted by the testes (Rose 1969). For this reason, the differential hormone levels reported by some researchers might in fact have been the

effect of homosexuality rather than the cause of it. Indeed, most of the studies that controlled for these factors did not record any significant differences in the testosterone levels of homosexual and heterosexual men.

A review of twenty five studies of hormone levels and sexual orientation carried out between 1970 and 1984 found that only 3 studies had indicated lower testosterone levels in male homosexuals, while 20 studies found no differences. Two studies reported elevated levels in male homosexuals (Meyer-Bahlburg 1984). It would be safe to say that, presently, there is no conclusive evidence that the hormone levels of adult heterosexuals and homosexuals differ uniformly in any substantial way as predicted by the postnatal hormone hypothesis. This has induced most workers in the biological research program to stop using the postnatal hormonal hypothesis as a theory for explaining human sexual orientation. Psychoendocrine research is now focused on the role of hormones during the prenatal period.

#### ***5.4 The Prenatal Stress Hypothesis***

The prenatal hormonal hypothesis of homosexuality predicts that, regardless of the genetic sex of the individual, the presence of androgens in fetal life contributes to the development of a sexual orientation toward females while the deficiency of prenatal androgens or tissue insensitivity to androgens leads to a sexual orientation toward males.

This hypothesis rests on findings from a series of laboratory experiments with rats conducted in the late 60s and early 70s. Günter Dörner, a German endocrinologist, had

shown that male rats exposed to androgen deficiency during the critical period of fetal development displayed female-typical sexual behavior (e.g. lordosis, the typically female act of submitting to being mounted) in adulthood, which he equated with homosexuality (Dörner et al. 1968, 1969, 1970). In contrast, male rats castrated two weeks after birth and given androgen in adult life showed preference for partners of the opposite sex. Similar behavioral patterns were reported by Ward (1977) in a number of experiments that involved subjecting pregnant rats to prenatal stress. When these rats were confined in narrow spaces and then exposed to very bright lights, most of them gave birth to male offspring that displayed feminized and demasculinized sexual behavior. In addition, these rats were found to have low levels of testosterone in their blood stream. The results of these studies led researchers to conclude that maternal stress altered the testosterone levels circulating in the fetus's blood and this in turn led to demasculinization and feminization of its brain. Consequently, by the time a rat reaches adulthood, its sexual orientation is permanently fixed. It would seem that the absence or presence of high levels of testosterone play the most important role in brain sexual differentiation. Estrogens seem to play a role only in puberty when they are secreted by the ovaries.

Dörner has extrapolated these observations in rats to humans. He postulates that homosexuality may be caused by a pregnant mother's stress hormones blocking the masculinization of her unborn child. This is the so-called prenatal stress hypothesis. Dörner maintains that stressful events in life such as war, matrimonial conflict, unwanted pregnancy arising from rape, and bereavement could cause a drop in fetal androgen levels in pregnant women, which can in turn make their offspring homosexual. In a study

involving 865 gay men attending venereal diseases clinics in the then German Democratic Republic (GDR) and published in *Endokrinologie*, one of the oldest and highly regarded journals of endocrinology, Dörner reported that significantly more homosexuals were born during the stressful period of the second world war than in the years before or after this stressful period (Dörner 1980). He ruled out the possibility of father-absence and malnutrition arising from food shortage as possible reasons for increased frequency of homosexual males born in this period, arguing that most children born at the beginning of the war had a paternal deficiency for many postnatal years yet they did not become homosexual. In addition, he says that there was no food shortage in Germany during the war years.

In another study, Dörner (1983) asked 100 heterosexual and 100 homosexual and bisexual men about the possible stressful events that may have occurred during their prenatal life. As predicted, he found greater incidence of stressful events during the pregnancies of women whose sons eventually became homosexual than in those of women whose sons became straight. Over 60 percent of the mothers of the male homosexuals recalled severe stressors such as the death of a close relative and divorce compared to 30 and 6 percent of the mothers of bisexual and heterosexual men respectively. Dörner went on to suggest that the prevention of unwanted pregnancies and war could prevent homosexual orientation (Dörner 1983: 87). In an earlier study, he had suggested that neuroendocrine-conditioned male homosexuality could also be prevented by androgen administered during the critical period of brain differentiation (Dörner and

Hinz 1972). This suggestion was severely criticized by the German Society for Sex Research on both scientific and ethical grounds (Sigusch 1982).

Dörner's stress theory has not stood up to critical examination, however. Michael Bailey, for example, interviewed 215 women who had given birth to straight and gay sons and found no difference in the frequency or severity of stressful events in the gay and straight pregnancies (Bailey et al 1991). Another study by Günter Schmidt et al (1995) found no evidence for the claim that more homosexual men are born in times of war than in times of peace. German cities that were most affected by war did not record a higher birth rate of homosexuals than the cities that were not affected.

Dörner's study also suffers from a number of methodological flaws. In the first place the sample was highly selected. All the subjects were VD patients and the study was carried over a very limited period of time. In addition, there is no indication that interviews were conducted blind to the subject's sexual orientation. The interviewers, as LeVay (1996) points out, may have unknowingly pressured the gay men to report more stressful events. It is also not clear why the patients in this study found it necessary to disclose their sexual orientation to the hospital workers.

Because all the subjects in Dörner's study were patients attending venereal disease clinic, the high incidence of homosexuality that he found among the men born between 1939 and 1945 (the war years) may actually only reflect the incidence of sexually transmitted diseases in homosexual and heterosexual men (Mondimore 1996). Furthermore, even if

homosexuals are born more often during wartime than peacetime, experientialists might interpret this as confirming their prediction that a father's absence from home may contribute to male homosexuality. (There is greater likelihood of fathers being away from home during wartime).

Another problem with Dörner's stress hypothesis is that it contradicts the maternal dominance hypothesis, which seeks to explain why more boys than girls are born in times of stress such as famine, epidemics and wars (see Grant 1998). As Richard Badock explains, 'this comes about because women respond to stress by producing more testosterone, which in turn predisposes them to giving birth to more sons (Badock 2000: 181). It is noteworthy that while Dörner believes that stress causes a drop in testosterone levels in pregnant women, proponents of the maternal dominance hypothesis actually think that stress induces women to produce more testosterone. One or both of these two theories must be false.

The major problem with Dörner's theory stems from the fact that it is based on an inappropriate model -the 'rat copulation' model. Defining rodent homosexuality raises conceptual difficulties. Dörner defines a gay rat as one that shows female-typical sexual behavior such as lordosis regardless of the sex of the partner and a male heterosexual rat as one that shows male-typical behavior such as mounting again regardless of the sex of the partner. A parallel argument holds for female homosexual and heterosexual rats respectively. This is what might be described as a behavioral definition of homosexuality. Although it has been established that mating behavior in rats is clearly affected by early

hormone exposure, neither mounting nor lordosis behavior is directly analogous to human sexual orientation in which the sex of attraction is primary. Hormonal manipulation resulting in male rats mounting male rats and female rats, female rats, cannot by any stretch of the imagination be equated with human homosexuality in which the psychological components are more important than the physical act. Unlike rats, human males and females do not display rigidly different sexual behaviors. Indeed, there is no single position or pattern of movements that human beings are obliged to follow in order to copulate. The term 'homosexuality' which Dörner uses for his rats has no obvious relation to what the term 'homosexuality' denotes in the humans. Furthermore, in humans and other animals in the evolutionary scale, sexual behavior is largely independent of immediate control of sex hormones.

Curiously enough, in Dörner's rat experiments, the male that allows itself to be mounted by another is considered homosexual, but the one that does the mounting is considered heterosexual. On the other hand, a female rat that mounts another is considered homosexual while the one that shows receptivity to mounting is considered heterosexual. From these definitions it would seem that there are no *same-sex* couples in the neuroendocrine laboratory (Byne and Lasco 1997). Paradoxically the only instance when you can have two gay rats in a sexual encounter is when one is male and the other female but both displaying opposite sex behavior.

Although in sexual intercourse between two human males one partner takes a receptive role (insertee) and the other takes an active role (the inserter), neither of the participants

in the sexual act can be said to be assuming the role of the opposite sex. They are both considered homosexual. In any case, most homosexuals often perform both often in the same sexual episode. Indeed, although the distinction between the 'inserter' and the 'insertee' in homosexual intercourse was once considered important, it is no longer considered operationally useful. As we saw in chapter one, the basis for ascribing human sexual orientation depends primarily on the *morphological* sex of persons to whom one is sexually attracted, rather than the specific motor patterns of copulation. I emphasize the term *morphological* because a male who falls in love with a male-to-female transsexual (that is, one who has undergone gender reassignment) cannot possibly be regarded as homosexual. The same applies to a woman who is sexually attracted to a male-to-female transsexual.

It should also be pointed out that if the level of androgens during fetal development determines sexual orientation in humans, the effects should be seen in the choice of one's sexual partners rather than the kind sexual positions that one prefers when having sex. In any case, the sexual postures displayed by rats in the endocrine laboratory are mechanical reflexes and can even be induced by the researchers hand (Byne 1994). And as Simon LeVay explains, 'the fact that a female rat readily mounts other rats does not necessarily mean that she prefers males as sexual partners, nor does the fact that a male rat submits to being mounted necessarily mean that he prefers males as sexual partners' (LeVay 1996: 120). As already indicated, in humans what is important is the sex of the person that one is sexually attracted to and not the role that one takes when he or she has sex. Furthermore, there is no indication that the hormonally manipulated male rats were ever

given a chance to choose their sex partners, something one might think important in drawing conclusions about sexual orientation.

Another finding that greatly weakens the prenatal hormone hypothesis is that manipulation of hormones in rats during the prenatal stage of development results not only in changes of sex dimorphic behavior such as mounting and lordosis, but also in corresponding alterations of the external genitalia. This is not the case with humans. The typical human homosexual, as Meyer-Bahlburg notes, 'has normal gender, appropriate genitalia as well as normal secondary sex characteristics' (Meyer-Bahlburg 1984).

Dörner has responded to some of these criticisms by saying that he only 'cautiously' compared neonatally castrated rats with male homosexuals. In addition, he argues that there are apparent evolutionary continuities between humans and animals and that even some of the great men of science such as Aristotle and Galen extrapolated from animals to man. He also rightly points out that a model can only approach reality, not represent it (Dörner 1979). While these observations have some merit, Dörner's case would have been much stronger had his experiments been based on apes, which are man's nearest relatives and have a more sophisticated sexual life. The analogy between rodent sexual behavior and human homosexuality has been pressed too far. Indeed, such an analogy, as Beach rightly points, 'will remain scientifically meaningless until both phenomena have been examined by a common analytical procedure and in terms of similar dimensions' (Beach 1979).

### ***5.5 Estrogen Feedback Effect***

The hormonal research program predicts that male heterosexuals and homosexuals should differ in their luteinizing hormone (LH) response to estrogen exposure. (This response is known as endocrine feedback effect or EFE in short). According to this view, homosexuals should exhibit an estrogen feedback effect that is intermediate between that of heterosexual men and heterosexual women. This was a novel prediction in Lakatos' sense. Again this hypothesis is based on the study of rats. In a series of experiments, Dörner had observed that male rats deprived of testosterone during the critical period of brain differentiation responded to increasing levels of estrogen with a surge of ovulation hormone known as luteinizing hormone (LH). A positive endocrine feedback effect (also known as Hohlweg effect) could not be elicited from male rats and female rats that were neonatally androgenized. Instead, a negative endocrine feedback effect was observed. (In mammalian females, a rise in estrogen levels causes a rise in LH levels, which in turn triggers the release of the ovum from the ovary).

The results of this study led Dörner to conclude that androgens have an organizing action on the developing brain, abolishing the ability of estrogen to exert positive feedback on LH release. He went on to hypothesize that because male homosexuals are supposed to have suffered androgen deficiency during the critical period of brain differentiation, they should show an LH response to estrogen administration that is between that of heterosexual men and normally menstruating women. (In heterosexual human males, a rise in estrogen levels usually suppresses LH, thereby producing a negative feedback).

This hypothesis has been tested by a number of endocrinologists but inconsistent findings have been reported.

Dörner et al (1975) has tested the EFE in heterosexual, homosexual and bisexual men and heterosexual women. As predicted, in 21 homosexual men injected with estrogen, a decrease of serum LH levels followed by an increase above the initial LH values was reported. In contrast, in 20 heterosexual and in 5 bisexual men, estrogen injection was not followed by a surge in LH. Interestingly, the LH response of bisexual men was more 'masculine' than that of heterosexual men. From this study, Dörner has concluded that the elicitation of a positive feedback effect in the majority of gay men suggests that homosexual men may have a female differentiated brain. Even so, it is important to note the rise in LH in the homosexual men was weaker and more delayed than that found in homosexual women in the control group.

Dörner's experiment was later replicated by Gladue et al. (1984). Gladue's study involved 12 heterosexual women, 17 heterosexual males and 14 homosexual males. All the subjects were given an estrogen injection and luteinizing hormone and testosterone levels were measured. The study found the pattern of secretion of LH hormone in homosexuals in response to estrogen to be intermediate between that of heterosexual men and that of straight women thus corroborating Dörner's earlier findings. However, it should be pointed out that although Gladue's research was well controlled for factors such as stress and the use of drugs, some of the subjects in the study were infected with HIV, which is known to depress the level of testosterone in the bloodstream. This may

have contributed to the positive feedback response that he observed. Also, given the small number of subjects in the study, it would be too quick to conclude that Dörner's hypothesis has been confirmed.

The victory of Dorner's endocrine feedback hypothesis was short lived. His prediction that homosexuals will show an estrogen feed back effect appropriate to the opposite sex was been refuted by Gooren in two ingenious experiments (Gooren 1986a, 1986b). In the first study, he tested the EFE in 6 male transsexuals and 6 female transsexuals undergoing gender reassignment. The male-to-female transsexuals displayed 'male' response to estrogen injection before gonadectomy and cross-gender therapy and a 'female' response after. On the other hand, the female-to-male transsexuals displayed 'female' response to estrogen injection before gonadectomy and cross-gender therapy and 'male' response after. In my judgment, these experiments can be described as crucial and should have settled the question whether EFE response can be used as criterion for distinguishing homosexuals from heterosexuals once and for all. These findings were consistent with an earlier study by Goh et al (1984), which showed that estrogen treatment lasting for four months or more can elicit an LH surge in nonorchidectomised male to female transsexuals.

In demonstrating that the LH response to estrogen exposure can be altered in the same individual, Gooren was able to demolish Dörner and Gladue's basic premise that the positive feedback response can be used as an indicator of early sexual differentiation of the brain in primates and in man. He was also able to show that the LH response to

estrogen injection is not sexually dimorphic in humans nor is it permanently imprinted in the prenatal brain as Dörner had suggested. On the contrary, the type of feedback response elicited is determined by the hormonal status of an individual at the time of estrogen administration rather than chromosomal sex or sexual orientation of the individual concerned.

In a second study, Gooren (1986b) was unable to demonstrate a statistically significant difference in LH response between homosexual men and their heterosexual counterparts. In 11 out of 23 homosexual and 5 out of 15 heterosexual men, LH levels rose at day 4 following estrogen injections above pretreatment values (a female-type response). Of the remaining 10 heterosexuals and 12 homosexual men, LH levels on day 4 after estrogen administration were lower than pretreatment values (a male-type response). In fact, some heterosexual men showed an LH response to estrogen administration that was similar to that reported in homosexual men by Dörner. Gooren also noted that the LH response to estrogen administration was weakest in men who had the weakest production of testosterone regardless of the sexual orientation.

From Gooren's study, it is clear that although males and females may display different patterns of LH secretion, this is because they have different levels of hormones in circulation and not because they have differently organized brains. Furthermore even in rodents, as Kawakami and Kimura (1978) have shown, the male brain is formed independently of future luteinizing hormone response. Gooren's findings are also consistent with an earlier study by VanLook et al (1977), which showed that genetic

human males with the complete androgen insensitivity syndrome (AIS) displayed an estrogen feedback effect appropriate to their chromosomal sex. If Dörner's theory were valid, these individuals should have displayed a positive estrogen feedback effect, considering that they lacked the specific protein receptors required to utilize testosterone at the target cell level during early fetal development.

There is another problem with Dörner's endocrine feedback hypothesis as an index of homosexuality. It predicts that lesbians will display a male-like endocrine feedback response on estrogen administration since they have a masculinized brain. This theory is contradicted by the observation that most homosexual women have normal menstrual cycles and are even able to conceive and give birth. As previously indicated, a positive endocrine feedback effect is required for the ovum to be released from the ovary in all mammalian females. Workers in the hormonal subprogram have not been able to account for this anomaly.

Gooren suspects that the positive endocrine feedback response reported by Dörner and Gladue in male homosexuals could have resulted from testicular dysfunction. As already indicated, a number of factors such as aging, alcohol and viral infections are known to interfere with testicular functioning. In this regard, it is noteworthy that some of the subjects in Dörner's study were drawn from venereal disease clinics. Sexually transmitted diseases such as AIDS and the drugs used to treat them are known to interfere with the hormonal balance. This might have caused a positive endocrine feedback effect following estrogen administration.

It is also useful to note that LH response in several species of primates has been found to be different from that found in rats. Among rhesus monkeys and marmosets, for example, investigators have shown that estrogen exposure leads to LH surges in both males and females (Karsch, Dierscke and Knobil 1973). This finding raises doubts about the appropriateness of using the rat as a model to explain human sexual behavior.

### ***5.6 Human Experiments of Nature***

Because of ethical considerations, human beings cannot be manipulated experimentally as can laboratory animals. For this reason, proponents of the hormonal research program have relied on a number of naturally occurring endocrine disorders to test the validity of the prenatal hormone theory for human sexual orientation. Indeed, these disorders have been used as the human experimental analogs to androgenized female rats or castrated male rats. I will discuss some of these endocrine disorders in the following three sections. These disorders are known to alter the production or receptivity of hormones in the individuals affected. Proponents of the hormonal research program have claimed support for their program by saying that the hormonal imbalance that affects the phenotype of these individuals also determines their sexual orientation. On the other hand, experientialists have claimed support for their program by saying that irrespective of hormonal imbalance, the way these individuals were reared turned out to be the most influential in shaping their sexual orientation. Unfortunately, as we shall presently see, empirical studies of individuals with hormonal abnormalities don't provide unambiguous evidence linking homosexuality with hormones.

### ***5.7 Congenital Adrenal Hyperplasia (CAH)***

Congenital adrenal hyperplasia (CAH) is an inherited endocrine condition that is characterized by an enlarged adrenal gland, which produces abnormally large quantities of plasma androgen. When present in genetic females, the additional androgen partially masculinizes the external genitalia, producing an enlarged clitoris with the urethral opening at the base, and partially fused labia that resemble a scrotum. In most cases, these individuals are treated with glucocorticoids to halt excess androgen production and their external genitalia are surgically modified to more closely resemble those of females. Males affected by this syndrome are erotically attracted to females but they tend to be excessively aggressive and competitive.

Several studies have found high rates of male-typical behavior in women with CAH, including preference for masculine toys, rough and tumble play, and other tomboyish behavior (Berenbaum and Hines 1992, Ehrhardt 1985). CAH women have also been found to be more likely to become bisexual or homosexual in adulthood than do comparison groups of women such as unaffected sisters (Money and Russo 1979, Dittmann et al 1992). A similar study by Hines (2000) arrived at the same conclusion. Some investigators have argued that the atypical sexual orientation of CAH women results from the high levels of androgens to which their brains were exposed to during fetal life and that this supports a hormonal theory of homosexuality. But in a recent survey of CAH research, Angela Pattatucci concluded that because a majority of CAH women develop a heterosexual orientation, 'CAH plays a minor role in the overall

variability of women's sexual orientation within the general population' (Pattatucci 1998: 27-28). For those CAH women who do not become lesbians, LeVay (1996) has offered the following auxiliary assumptions:

- (i) the androgen levels may not have been high enough;
- (ii) the time of the increased androgen levels may not have coincided with the critical period of brain differentiation;
- (iii) the women under study may not have been followed long enough to allow their true sexual preference to be apparent.

However, none of these hypotheses has been independently tested, and they are therefore all *ad hoc*.

Although the CAH syndrome has been interpreted as supporting the prenatal theory of homosexuality, it could also be interpreted as supporting the experientialist research program. Some authors sympathetic to this program have suggested that the heterotypical behavior displayed by CAH women may actually be a psychological consequence of the realization that their genitalia are not entirely normal (Rubin et al 1981). Thus the environment of CAH children is likely to be remarkably different from that in which normal children would grow up in. Their ambiguous genitalia might confuse their parents and this may in turn influence the gender identity and sexual orientation that these individuals adopt. Unfortunately, as Meyer-Bahlburg has pointed out, the available data is not sufficient to settle this matter (Meyer-Bahlburg 1994: 382).

### ***5.8 Androgen Insensitivity Syndrome (AIS)***

Another of nature's experiments is the condition known as androgen insensitivity syndrome. This syndrome is caused by a genetic mutation that prevents the formation of functioning androgen receptors. In order to have a masculinizing effect, testosterone in the bloodstream must combine with a receptor on the surface of a cell. Genetic males affected by this syndrome develop intra-abdominal testes that produce testosterone but because they have no functioning androgen receptors, they develop female external genitalia despite having internal male organs. These individuals are responsive to the estrogens produced by their testes and are therefore able to develop a feminized phenotype.

In most cases AIS individuals are naturally raised as girls and their true genetic sex is only discovered at puberty when they fail to menstruate. Studies have shown that these genetic males have no problem with their female gender identity although they are infertile. Since these individuals have a feminine body structure and are erotically attracted to males, they are socially regarded as heterosexual. However, since genetically they are males, these individuals could be considered homosexual if by 'homosexual' we mean being sexually attracted to a person of the same genetic sex. The genetic male who is attracted to these individual could also be defined as homosexual if we adopt the narrow definition of a homosexual as one who is attracted to members of his own genetic sex. Some proponents of the prenatal hormonal theory of homosexuality believe that AIS syndrome offers strong support for their theory. In fact, Dörner and his co-workers

believe that male homosexuality is a mild case of androgen insensitivity syndrome (Dörner et al 1991).

However, given that AIS individuals are raised as females and have a normal female appearance, it would be wrong to attribute their female gender identity to androgen insensitivity alone. That these genetic males are erotically attracted to men may actually be a logical consequence of having a female body rather than the possession of a feminized brain. Furthermore, a study by Anono et al (1978) found that unlike normal women, individuals with complete androgen insensitivity syndrome are unable to generate a positive LH response on estrogen injection, which contradicts Dörner's claim that these individuals have a female-like brain.

It is also important to note that the vast majority of homosexuals do not have a history of atypical endocrinological development. Indeed, there is no evidence to suggest that homosexuals have a higher incidence of intersexed genitalia or of sex chromosome abnormalities than heterosexuals. It is also noteworthy that unlike homosexuality, whose genes are yet to be identified, the genetic basis of androgen insensitivity syndrome is well understood and its genetic markers have even been identified (McPhaul et al 1993).

### ***5.9 5 Alpha Reductase Deficiency (5-ARD)***

This is another condition in which the genetic sex and the phenotypic sex are in conflict. Proponents of the hormonal research program have interpreted this endocrine condition as supporting their prediction that homosexuality is a function of hormones. This

syndrome is caused by a defect in the reductase enzyme, which leads to abnormally low conversion of testosterone to a more physiologically active hormone known as dihydrotestosterone (DHT). Since DHT is required for the formation of the male phenotype, chromosomal males with this condition are born with ambiguous genitalia and are raised as females. However, with testosterone surge at puberty the phenotype changes to male: the testes descend, the penis enlarges and becomes capable of erection, the voice deepens and a male psychosexual orientation develops.

Imperato-McGinley and his co-workers (1979) have reported a study of a unique subgroup of children in the Dominican Republic who were affected by this condition. The study involved 38 individuals, 18 of whom appeared to be girls at birth and were raised as females. At puberty, these children underwent a physical transformation to maleness, including growth of the penis and descent of the testes. Sixteen of these children were able to make the social and psychological transition to male roles with ease despite 12 years of female socialization. They were also erotically attracted to women and considered themselves as male. Only one subject continued to maintain a female gender identity after puberty.

The results of this study would seem to contradict the experientialist program and to support the prenatal hormonal hypothesis, which postulates that hormones operating during the critical period of sexual differentiation determine an individual's sexual orientation. Indeed, Imperato-McGinley and her co-workers interpreted the data as showing that nature was more important than nurture because the individuals concerned

were able to move easily into a masculine gender role at puberty despite having been raised as female. Imperato-MacGinley postulated on the basis of these observations that prenatal exposure to testosterone must have shaped the sexual orientations of these individuals irreversibly.

However, proponents of the environmentalist research program have attempted to explain this apparent anomaly by pointing out that in the Dominican Republic where this hormonal disorder was first reported women are afforded very low status and the children in Imperato-McGinley's study may have been pressurized to adopt a male gender identity once they reached the age of puberty. This explanation has some merit. In the United States where this syndrome has been reported, it has been shown that most genetic males affected by this syndrome continue to live as females even after the bodily changes at puberty (Benderly 1987).

It is also useful to note that the transition from a girl to a boy at puberty was a common occurrence in the Dominican society and the locals had even invented a name for it - *guevedoces* or penis at twelve (the Sambia of the highlands of Papua New Guinea use the term *kwolu-aatmwol*, which has a similar meaning (Herdt 1990)). Given that this transition was known to occur and considering that these children had ambiguous genitalia, it is unlikely that they were reared unambiguously as girls (Sagarin 1975).

There are also some methodological problems in Imperato-McGinley's study that weaken her findings. In the first place, critics have noted that the subjects were not actually

observed as children or as adolescents. Besides, the researchers obtained information about the subject's gender identity and sexual orientation by hearsay as no attempt was made to interview them directly (Money 1977). A re-evaluation of the Dominican Republic study revealed that most of the subjects in the study had realized at an early age that they were different from other girls and were even associating with boys before they reached puberty (Rubin et al 1981). Again this raises doubts about the claim that these individuals were unambiguously brought up as females.

### ***5.10 Summary and Conclusion***

I began this chapter by examining the postnatal hormonal hypothesis. This hypothesis has been shown to be false. There is no consistent evidence to suggest that homosexual men are different from heterosexual men in their circulating hormone levels. Nevertheless, consistent with the teachings of Lakatos, this has not led to the abandonment of the hormonal research program. Instead, investigators have shifted their focus to prenatal hormones. Unfortunately, the prenatal hormonal theory is also beset with numerous difficulties. Most of the predictions derived from this theory have been falsified. The prediction that homosexuals and heterosexuals will differ in their luteinizing hormone (LH) response to estrogen administration, for example, has not been refuted. Furthermore, we have seen that the prenatal hormone hypothesis is based on an animal model whose relevance to the understanding of human homosexuality is suspect. Turning to naturally occurring endocrine disorders, we saw that studies of individuals with these disorders are open to contradictory theoretical interpretations and in any case most homosexuals have no measurable hormonal abnormalities. More research, which includes

larger sample sizes and better methodological control, is needed before a causal link between homosexuality and hormones can be established. But perhaps more important an attempt should be made to find out how hormonal and experiential factors could interact to influence sexual orientation.

## **Chapter 6**

### **Biological Research Program: The Brain Structure Hypotheses**

#### ***6.1 Introduction***

In addition to the hormonal hypotheses discussed in the preceding chapter, workers in the biological research program have hypothesized that there exist anatomical differences in the size and cell number of various nuclei in the brains of homosexual men as compared to heterosexual men. This particular subprogram relies on the idea that the brains of gay men are characteristically feminized, and hence assumes that if men desire other men they must be like women. Thus gay men are to be viewed as failed men while lesbians are to be viewed as failed women. Indeed, according to this line of thinking, homosexuality should be viewed as a 'hermaphrodisism' of the brain. The brain structure hypothesis can also be viewed as a subset of Gunter Dörner's prenatal-hormone theory (which was discussed in the previous chapter) in that it assumes that androgen deficiency during the critical period of fetal development feminizes the male brain while androgen exposure masculinizes the female brain (Dörner 1976). According to Dörner's theory, homosexual men, are, in hypothalamic terms, like women. But the idea that homosexuals are cross-gendered is not entirely new. Karl Ulrichs, a nineteenth century thinker and father of the gay rights movement, conceived of homosexuals as a distinct class of people in that they possessed the bodies of their biological sex but the minds of the opposite sex (Kennedy 1988).

In this chapter I will focus on three studies that have reported differences between the brains of homosexual and heterosexual men in three different regions of the

hypothalamus. These are: the third institial nucleus of the anterior hypothalamus (INAH3), the anterior commissure (AC) and the suprachiasmatic nucleus (SCN).

## ***6.2 The Search for Neuroanatomical Differences***

The existence of structural anatomical differences correlated with sexual dimorphism in the human brain has implicitly been presumed since the days of Aristotle. However, the actual research into these differences can be traced back to the late 1970s, when Roger Gorski and his co-workers discovered a group of cells in the medial preoptic part of the rat's hypothalamus that was 5 to 6 times larger in volume in males than in females (Gorski 1978). This sex difference was so clear, it could even be observed without the aid of a microscope. Gorski and his group named this cell group the 'sexually dimorphic nucleus of the preoptic area', or SDN-POA. This region of the hypothalamus has long been associated with general life functions such as eating, sleeping and reproduction. In rats, the SDN becomes sexually dimorphic as a result of perinatal hormone exposure. Investigations have shown that prenatal stress or castration of male rats on the first day of life reduces the volume of this nucleus permanently (Gorski 1984, Gorski et al 1978, Anderson et al 1985). Conversely, when newborn female rats are injected with tamoxifen (an anti-estrogen) the volume of their SDN-POA is decreased, suggesting demasculinization (Hines et al 1987). Although the hypothalamus in general is a crucial area for the regulation of sexual drive and behavior, the exact function of the SDN is not known. However, a study by De Jonge et al (1989) has shown that lesioning the SDN in male rats produces lordosis and affects their libido.

The human analogue of the SDN-POA is thought to be contained in one of the four interstitial nuclei of the anterior hypothalamus or INAH, but precisely which of the four is unclear. One morphometric study of what Swaab and Fliers considered to be the human SDN-POA (formerly known as the intermediate nucleus), revealed that the volume is more than twice in men as it is in women and contains twice as many cells in men (Swaab and Fliers 1985). In other words, like the rat SDN-POA, the human SDN-POA was found to be sexually dimorphic. It is important to note that no difference in SDN cell number was observed between homosexual and heterosexual men. This finding has been interpreted as refuting Dörner's hypothesis, which holds that male homosexuals have a female hypothalamus.

Nevertheless, the existence of sexual dimorphism in the SDN-POA is somewhat controversial, as two other groups of researchers have failed to confirm the initial report (Allen et al 1989, LeVay 1991). Swaab has tried to account for this apparent anomaly by pointing out that the subjects in their own study and that of Allen et al were drawn from two different age groups. He notes that while in Allen's study 70 percent of the adult subjects came from the age group in which SDN size difference is minimal (50 to 60 years), in their own study (Hofman and Swaab 1989) only 29 percent of the subjects came from that group. Unfortunately, this argument cannot be applied to LeVay's study, which also failed to find a sex difference in the volume of this nucleus in spite of the fact that his subjects belonged to the same age group as the subjects in Hofman *et al's* study.

Other regions of the brain that have been found to be sexually differentiated include the third and second interstitial nucleus of the anterior hypothalamus, corpus callosum, massa intermedia, amygdala, the bed nucleus of stria terminalis, the anteroventral periventricular nucleus and the anterior commissure. These findings have led some investigators to speculate that the same regions could also vary according to sexual orientation.

### ***6.3 The Suprachiasmatic Nucleus***

As already indicated, the brain structure hypothesis predicts that there should be differences in the size of certain nuclei in the brain of homosexual and heterosexual males. The first attempt to test this hypothesis was made by Swaab and Hofman (1990) and involved a region of the brain known as the suprachiasmatic nucleus, or SCN in short. The SCN acts as the body's internal clock by generating circadian rhythms. It regulates and coordinates the body's daily rhythms such as sleep, temperature, mental alertness, physical activity and the secretion of hormones.

Swaab and Hofman's study involved 34 postmortem subjects; 18 of whose sexual orientation was not known which also served as a control group, 10 homosexual men who had died of AIDS, 4 heterosexual males who had died of AIDS and 2 heterosexual women who had died of AIDS. The study reported that the SCN of homosexual men was larger in volume and number of neurons than that of heterosexual men. The SCN volume in homosexual men was 1.7 times as large and contained 2.1 times as many cells as the SCN in heterosexual men. Interestingly, the only difference that this study found between

heterosexual men and heterosexual women in this area was one of shape. In heterosexual men, this region was shaped like a sphere while in heterosexual women and homosexual men it was more elongated.

Since the SCN also acts as a biological clock, Swaab and Hofman have further hypothesized that sleep patterns of homosexual men should differ from those of heterosexual men. Some limited support for this prediction comes from Hall and Kimura's study, which found that homosexual men had a rise-and-retire pattern that was more like that of heterosexual women than of heterosexual men. On average, homosexual men tended to get up and go to bed earlier than heterosexual men just like heterosexual women (Hall and Kimura 1993). However, it is not clear why the sleeping patterns of homosexual men should resemble those of heterosexual women given that the size of the SCN itself was not found to vary according to sex.

This study can be criticized on both methodological and conceptual grounds. In the first place the researchers relied on hospital records to arrive at the sexual orientation of the experimental subjects. The investigators had no access to the subjects' own assessments of their sexual orientations or to the history of their same-sex or heterosexual contacts. As noted in chapter two, assessing an individual's sexual orientation is a complicated affair and different types of rating scales have been developed to deal with this. We don't know how the hospital workers assessed the sexual orientation of these subjects but it is unlikely that a sexual orientation scale was used. Since most of the experimental subjects had died of AIDS, the hospital records may only have indicated how the patients acquired

the virus e.g. through same-sex contact, heterosexual contact or intravenous drug use. This kind of information can only suggest a behavioral rather than a dispositional account of sexual orientation and is therefore not very helpful. Furthermore, as we saw in chapter two, evidence of sexual relations with members of the same gender is not a suitable criterion for assuming homosexuality. Some heterosexuals may engage in homosexual behavior due to situational unavailability of members of the opposite sex, as happens in monasteries, boarding schools and prisons. It would be wrong to classify such individuals as homosexual if by a homosexual we mean a person who has a sustained erotic attraction to people of the same gender. Indeed, as was pointed out in chapter one, it is logically possible for an individual to have a sexual orientation that is discordant with his or her sexual behavior.

Another major difficulty with this study is that although the homosexual and the heterosexual subjects died of opportunistic infections arising from AIDS, they were not matched for clinical diagnosis. In fact, only one set of subjects were diagnosed as suffering from the same type of illness i.e. cytomegalic infections. The rest were diagnosed as suffering from different combinations of illness. It is a well-known fact that many viruses that attack the brain target specific regions and this might have contributed to the SCN differences that Swaab et al reported (Rogers 2001: 65). It is also important to note that, although the SCN is located within the hypothalamus, which is intimately involved in sex hormones and sexual behavior, the SCN is not known to play any direct role in sexual behavior. It is therefore difficult to understand its relationship to sexual orientation or to see any significance in Swaab et al's findings.

Some critics have also suggested that homosexual behavior may actually have increased the neuronal number in the SCN of the brains of the homosexual men that Swaab et al studied. This hypothesis is not completely implausible. Laboratory experiments on rats have shown a close correlation between the size of the sexually dimorphic nucleus and the level of sexual activity. Unless and until brain tissue from homosexual men dying of other causes becomes available, this possibility cannot be completely ruled out. Also, at the moment, it is not possible to test whether measuring the SCN in life could allow one to predict future sexual orientation. Another important point to note is that the size of the SCN did not vary with sex. The cell number in the SCN of both heterosexual men and women was the same and this again contradicts Dörner's hypothesis that homosexuals have an intersexed brain.

#### ***6.4 LeVay and the Third Interstitial Nucleus of the Anterior Hypothalamus (INAH-3)***

Another attempt to test the brain structure hypothesis was carried out by Simon LeVay and focused on another part of the brain known as the third interstitial nucleus of the anterior commissure or INAH-3 in short. LeVay's research into the brain differences of homosexual and heterosexual men was motivated by the work of Laura Allen who had identified four small groups of neurons in the anterior portion of the hypothalamus, which she called the interstitial nuclei of the anterior hypothalamus (INAH) 1, 2, 3 and 4 (Allen 1989). This study had shown that INAH-3 and INAH-4 were sexually dimorphic in human beings. They were significantly larger in men than in women. LeVay's hypothesized that INAH-2 and/or INAH-3 were large in individuals sexually oriented

toward women (heterosexual men and homosexual women) and small in individuals sexually oriented toward men (heterosexual women and homosexual men). The study consisted of forty-one postmortem brains. Nineteen of these belonged to self described gay men, all of whom had died of AIDS; sixteen presumed heterosexual men, six of whom had died of AIDS and were intravenous drug users, and six presumed heterosexual women, one of whom had died of aids. It is important to note that there was no brain tissue from homosexual women available. LeVay reported that the INAH-3 was half the size in women and homosexual men as it is in heterosexual men. In other words, in addition to finding that INAH-3 was larger in heterosexual males than in heterosexual women, he also found that it was smaller in homosexual men than in heterosexual men. He could not find any differences between the INAH-1 of heterosexual and homosexual men.

Two recent studies have partly corroborated LeVay's findings by showing that INAH-3 occupied a significantly greater volume and contained significantly more neurons in males than in females (Byne 2000, Byne et al 2001). However, it is important to note that the size differential was not as large as that reported by LeVay in his 1991 paper. Like LeVay, Byne et al postulate that the sex differences in the human INAH-3 may partly depend on sex differences in developmental exposure to gonadal hormones but he also points out that early experience can influence brain structure and that major expansion of the human mind occurs postnatally. In the second study, Byne did not find any difference in the number of neurons within the INAH-3 based on sexual orientation

but the same nucleus was found to occupy a smaller volume in homosexual men than in heterosexual men (Byne 2001).

On the surface, LeVay's findings might appear to offer strong evidence in support of the biological research program. However, closer examination reveals that there are major conceptual and methodological flaws, which weaken the study's conclusions. As a number of critics have pointed out, subjects were drawn from a small, highly selected and unrepresentative sample consisting mainly of AIDS patients. A larger sample will be required for a correlation between INAH-3 and sexual orientation to be established.

Another problem with LeVay's study concerns the way he determined the sexual orientation of the deceased subjects whose brain tissues he was examining. Those subjects who did not die of AIDS were assumed (in the absence of any evidence to the contrary) to be heterosexual. This, obviously, was a major flaw in scientific method and a peculiarly heterosexist assumption for a gay researcher to make. It is also important to note that LeVay assumed that all the men who died from AIDS but whose sexual orientation was not indicated in the medical records were heterosexual. Again this was a wrong assumption to make given that when this study was carried out AIDS was confined to homosexual and bisexual men. These assumptions may have led LeVay to classify some of the heterosexual men as homosexual and vice versa. Furthermore, LeVay failed to take into consideration possibility that some of the subjects were bisexual who contracted AIDS through homosexual intercourse. With regard to the brain tissue of the 'homosexual' subjects, he relied on hospital records to establish the subject's sexual

orientation. He made no effort to find out how the sexual orientation of these subjects was determined by the hospital workers. And since all the brain tissues studied were obtained posthumously, there is no way that LeVay could have used any of the sexual orientation rating scales discussed in chapter 2 to determine the range or extent of the subjects' sexual orientation. Furthermore, by adopting a bipolar view of sexual orientation, LeVay eliminated the possibility of a person with a sexuality that is neither heterosexual nor homosexual.

More importantly, some of the individuals that LeVay identified as gay had an INAH-3 that was larger than the average size of the INAH-3 of the heterosexuals and some of the heterosexuals had an INAH-3 that was smaller than that of the gay men. In other words, the differences were statistical rather than absolute. What this in essence means is that although the two groups considered as groups showed some clear differences, one could not tell an individual's sexual orientation by simply looking at his INAH-3. Indeed, if all that we know about LeVay's subjects is INAH-3 size, we can't predict whether they are heterosexual or homosexual. LeVay also does not give a satisfactory explanation of why the only bisexual subject in the study had an INAH-3 that was the same size as that of heterosexual subjects. Another important criticism of LeVay's study is that the baseline species variability in regard to INAH-3 is not known. In a larger sample of both heterosexual and homosexual men, as philosopher Timothy Murphy rightly points out, "the differences reported might vanish given the broad range of INAH-3 size that occurs regardless of sexual orientation" (Murphy 1997: 27).

It is also noteworthy that one investigator carried out all the tissue processing as well as anatomical measurements and anatomical tests in this study. A double blind approach would have been more appropriate in order to minimize personal bias. This, as Byne says, 'is the standard practice even in animal work' (Byne 1994). Moreover, INAH-3 is quite small and it is questionable whether it can be accurately measured considering that it is made up of the same type of cells as the surrounding tissue. Indeed, scientists disagree on the question of whether this nucleus should be measured by its volume or by the number of neurons. Swaab, as quoted in Marshall (1992), argues that the results of LeVay's study could have been stronger had he counted the actual number of neurons within INAH-3 instead of just measuring the volume. This, he says, would have gone a long way in ruling out errors that may have been caused by swelling or shrinkage.

A more profound objection to the findings of LeVay's study is that all homosexual subjects had died from complications arising from AIDS, but most of the control group of heterosexual men had died of other causes. People with AIDS are known to suffer from testicular dysfunction and this may directly affect their brains (see Byne and Parsons 1993). A related point is that some of the drugs used to treat opportunistic infections associated with AIDS, such as *ketoconazole*, may have lowered the level of testosterone in the bloodstream of the study subjects and this could have had an effect on the size of the INAH3 (Croxson et al 1989, Burr 1996). What this means is that the differences in the size of INAH3 that LeVay observed may actually have been caused by endocrine imbalances associated with AIDS. Research by Deborah Commins and her co-workers, as reported by Byne (1995), has shown that the size of the SDN-POA of Mongolian

gerbils, which is thought to be analogous to INAH-3 in humans, varies with the level of the circulating testosterone (Commings et al 1984). It is also noteworthy that when this study was carried out, those who contracted AIDS through homosexual intercourse tended to receive better medical care than those that contracted the disease through other means such as intravenous drug use. What this in essence means is that the homosexual patients may have lived longer than non-homosexual patients. This may have affected the hypothalamic structures differentially.

LeVay has countered this objection by pointing out that: (i) The INAH-3 size difference was apparent even when comparing homosexual men with heterosexual AIDS patients; (ii) the volumes of the other nuclei (INAH 1, 2 and 4) were not affected by AIDS and (iii) there was no correlation between the volume of INAH3 and the length of survival from the time when the subjects were diagnosed with AIDS. (If AIDS had an effect on this nucleus, those who had suffered from the disease longest should have had a smaller INAH3 than those who did not). These may appear to be strong arguments in defense of the study. However, taking into account that the number of heterosexuals who died of AIDS was very small, it is still possible that the observed differences in the size of INAH-3 resulted from complications associated with AIDS. Furthermore, LeVay's findings are partly contradicted by William Byne's study, which found that AIDS significantly influenced the volume of INAH-1 in both heterosexual men and women (the nucleus was 8 percent larger in heterosexual men and women with AIDS relative to individuals who did not have AIDS) (Byne 2001). Interestingly, the other three INAH

were not influenced by the HIV status of the study subjects, which makes LeVay's findings difficult to interpret.

Some critics have gone on to postulate that the length of the time between death and autopsy may have affected the hypothalamic structures that LeVay studied. It is also important to note that LeVay based his study on the assumption that the human INAH-3 was essentially the same as the SDN-POA in rats yet, as mentioned previously, the SDN-POA does not play a critical role in male-typical behavior in rats although it is located in area that is associated with sexual behavior. It is not clear whether it is INAH-3 or INAH-2 that actually corresponds to the SDN-POA of the rat (Allen et al 1989: 501).

On a more theoretical level, one could argue that even if LeVay was able to establish a correlation between homosexuality and INAH-3, he did not establish a causal connection. It remains to be proven that the enlarged INAH-3 was the cause rather than the result of altered sexual orientation. Indeed, we do not have any proof that the size of INAH-3 has any causal effect on sexual orientation, heterosexual or homosexual. LeVay himself has admitted that the results of the study do not allow one to decide whether the size of the INAH-3 in an individual is the consequence or the cause of that individual's sexual orientation. It is possible that the enlarged INAH-3 that LeVay observed in the brains of homosexual men was in fact the result rather than the cause of homosexual behavior. As Harrison et al explain, 'the promiscuous behavior and associated lifestyle likely to have been common among the homosexual men who die of AIDS may have caused the shrinkage of the INAH-3' (Harrison et al 1994: 815). This possibility cannot be

completely ruled out. Brain's neural networks are known to reconfigure themselves in response to certain experiences. For example, research has shown that when blind people learn Braille, the area of the brain that controls their reading finger becomes more active and enlarged (Pascual-Leone et al 1993). As another example, Eleanor Maguire and her co-workers at the University College London have shown that the hippocampus (a region of the brain involved in navigation and memory) of licensed London taxi drivers is larger compared with that of non-taxi drivers (Maguire 2000). The effect of behavior on selected brain cells has also been demonstrated in studies of cichlid fish (Hofmann et al 2000). Research has shown that specific cells in the preoptic area of the brains a male cichlid fish become enlarged when it acquires territory after dominating others. However, these particular neurons shrink in size when the same male loses its territorial status. Thus it is possible that differences in brain structure between homosexuals and heterosexuals that LeVay observed were caused by the frequency of sexual activity. Indeed, a number of studies have shown that homosexual men are sexually more active than heterosexual men (Bell and Weinberg 1978, Symons 1979, Johnson et al., 1994).

A final point that is worth noting is that LeVay's INAH-3 paper was initially rejected and later accepted by the editors of *Science*, a journal that does not normally allow the resubmission of manuscripts publication. Why an exception was made in this particular case is not clear, but William Byne suspects that the paper was originally rejected because, in his own words, 'it did not meet the minimum standards to which animal research in this area is held' (Byne 1995: 334). Steen (1996) remarks that the poorly done comparison between homosexual and heterosexual men 'should have precluded

publication in a preeminent journal like *Science*', while Byne maintains that the editors of *Science* should have demanded that LeVay's measurements of the brain tissues be repeated and verified by independent investigators before the paper could be published. Unfortunately, Byne's request to *Science* that LeVay shares his materials with other anatomists was turned down. The editors of *Science* also rejected a technical comment by Byne himself arguing 'that considerable space had been devoted to LeVay's report' (Byne 1995: 335).

### ***6.5 The Anterior Commissure***

Shortly after the publication of LeVay's INAH-3 findings, Allen and Gorski (1991) reported another difference between the brains of homosexual and heterosexual men in another part of the brain known as the anterior commissure (AC). The anterior commissure is one of the two clusters of nerve fibers that connect the two hemispheres of the brain. It has been found to vary according to sex. The other commissure is known as the corpus callosum. The exact function of the AC is not known but it is unlikely to be directly involved in sexual behavior.

An earlier study by Allen and Gorski (1991) had shown that the anterior commissure is sexually dimorphic. This nucleus was found to be 12 percent or 1.17mm larger in females than in males. The results of this study led Allen and his team to hypothesize that the AC is also dimorphic according to sexual orientation. When Allen and Gorski compared the size of the structure in gay and straight men, they found that it was larger in the gay men than in heterosexual men. The size of AC of the homosexual men was found

to be 18 percent larger than in heterosexual men and 34 percent larger than in heterosexual women. This study supported the hypothesis that factors operating during the critical period of an individual's development 'differentiate sexually dimorphic structures and functions in a global fashion' (Allen et al.1992: 7202).

As LeVay has noted, this study seems to strengthen his earlier finding that the brains of homosexual and heterosexual men are in deed different. LeVay suspects that the size differences may have come about during the original sexual differentiation of the anterior commissure, either under the influence of gonadal hormones or as a consequence of developmental events in the cortical regions that it interconnects (LeVay 1994: 123).

This study suffers from many of the problems affecting LeVay's study. In the first place, the researchers relied on autopsied brains many of them from men who had died after a long period of being infected with AIDS. It is noteworthy that 24 out of the 30 homosexual subjects had AIDS while only 6 of the 30 heterosexuals died of AIDS. Although deliberate effort was made to exclude the brains of all persons who showed any evidence of pathology affecting the brain tissue, critics have pointed out that AIDS could cause subtle brain pathologies that might not be easily detected (Steen 1996). Moreover, as with LeVay's study, Allen did not obtain adequate information on the sexual background of his subjects. She relied on medical records to determine the sexual orientation of the subjects. We don't know how the health workers who were attending to these subjects as patients arrived at the conclusion that they were homosexual. Was it because they contracted AIDS through homosexual contact? How were they rated on the

Kinsey sexual orientation scale? It was not possible to verify the sexual orientation of these subjects since they were all dead. It is also noteworthy that the 'heterosexuals' were classified as heterosexual if the hospital records did not indicate otherwise. Again as with LeVay's study, given that homosexuality is a stigmatized trait, it is likely that some of the patients who were classified as heterosexual were in fact homosexual. Anticipating this criticism, Allen argues that erroneous classification is likely to have decreased the chances of observing significant differences rather than resulting in apparent non-existent differences. However, one could also argue that the significant size differences that were observed in spite of the misclassification may actually indicate that even within the two groups of subjects the variation in the size of the AC was very big. What this would imply is that the AC size might not be very helpful in distinguishing homosexuals from heterosexuals.

A related point is that male and female subjects were classified as heterosexual when the medical records did not indicate homosexual orientation. It is not clear whether those subjects that Allen et al classified as heterosexual (at least the ones who died of AIDS) were ever asked to state their sexual orientation. If this was done, why was the sexual orientation not stated in the medical records? Given that homosexuality is stigmatized in most societies, it is possible that some of the individuals who were classified as heterosexual were in fact homosexual.

As already pointed out, there is no proof as yet that the anterior commissure is directly involved in regulating sexual behavior. The only possible connection comes from the

observation that heterosexual men are more likely to be stutterers, left-handed or dyslexic than heterosexual men and women and these conditions are associated with the two brain hemispheres that are joined by the AC (Gotestam et al., 1992, Gotestam 2001, Larumiere 2002). Unfortunately, this possible connection is yet to be fully explored

It is also important to note that there was considerable overlap between the AC sizes of the two groups. The sizes of the AC in 27 of the 30 gay men in the study were within the range of sizes found among the 30 heterosexual men in the control group. This in made it difficult to determine whether a given brain specimen was from a homosexual or heterosexual male individual. Again, as with LeVay's study, the gay men in this particular study may have had a smaller anterior commissure as a result of years of action peculiar to a homosexual lifestyle, rather than the structure of the AC causing them to be homosexual. Another possibility is that there is no causal connection between sexual orientation and the size of the AC, but both co-vary under the influence of some third, unknown variable. Allen's hypothesis has been contradicted by two separate studies, the first by Demeter et al (1988) who found the AC to be larger in males than in females and a more recent one by Lasco et al (2002) who failed to detect any variation in the size of the AC with either sex or sexual orientation. Studies in rats have also produced discrepant results regarding possible sexual dimorphism of the AC (Bishops et al 1999, Jones et al 1997). The contradictory nature of these findings does not allow us to conclude that progress has been made in this particular subprogram.

## ***6.6 Conclusion***

In this chapter, we have seen that although an array of evidence has been adduced in support of the brain structure hypotheses, this evidence is riddled with inconsistencies and the studies designed to test this hypotheses suffer from methodological weaknesses that prevent us from arriving at a definite conclusion regarding the cause(s) of homosexuality. The findings are also open to different kind of interpretations. I contend that even if these studies are successfully replicated, it will not justify drawing extravagant conclusions. As already argued, finding a difference between the brain structures of homosexuals and heterosexuals is not the same as establishing a cause. The direction of causation may be difficult to establish, as behavior both affects and is affected by brain structure and function. In any case our current understanding of the brain is inadequate to explain how such quantitative differences could account for so complex a phenomenon as homosexuality. And as Marcia Barinaga comments 'it may be difficult ever to establish that INAH-3 or any other brain structure actually causes homosexuality, or to rule out the possibility that childhood or adolescent experience may have altered the size of INAH-3 in homosexuals' (Barinaga 1991: 957). Furthermore, the brain structure hypothesis is based on the questionable presumption that homosexual men more resemble females than males, and so one should expect to find a female brain in a male homosexual. This supposition, as a review of human sexual history reveals, is culture bound, inadequate and unsustainable. In some societies, those with predominantly same-sex desires were considered the 'most manly of men and womanly of women' (Byne 1994: 26). As we saw in chapter 2, among the Sambia of the highlands of Papua New Guinea and the ancient Greeks, for example, homosexual relations between men

was not only tolerated, but it was also regarded as perfectly compatible with masculinity. What this study has shown so far is that, like the environmentalist research program, the biological research sub-program has not made much progress. In fact, from the point of view of methodology of scientific research programs, the rise in popularity of biological explanations in the last two decades is not rationally justified as the available evidence is not convincing and not much has been achieved by way of predicting novel facts and accommodating anomalous data in a non-*ad hoc* way.

## Chapter 7

### Beyond the Nature-Nurture Dichotomy

#### 7.1 Introduction

In the preceding chapters, we saw that there are basically two rival research programs for explaining human sexual orientations, namely, the biological and experiential research programs. I also pointed out that although a number of scholars have suggested an interactionist model, most of them continue to accept the language and the thinking of traditional dichotomies: nature/nurture, innate/learned, organism/environment. Indeed, as a number of commentators have pointed out, the etiology of sexual orientation debate constitutes yet another round in the old nature/nurture controversy and perhaps it is this dichotomization that has prevented researchers from arriving at a satisfactory explanation of the etiology of homosexual orientation. It would seem that nature and nurture interact in subtle ways that have not yet been deciphered by these researchers.

In this chapter I shall explore the broad nature-nurture controversy with a view to identifying a more acceptable conceptual framework for studying the genesis of human male homosexuality. To this end, I shall examine two main approaches to the study of human behavior, which explicitly reject the nurture-nature dichotomy. I have in mind evolutionary psychology as developed in *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (1992) by Jeremy Barkow, John Tooby and Leda Cosmides and the developmental systems theory advanced by Susan Oyama in her book *Evolution's Eye: A systems view of Biology-Culture Divide* (2000).

## **7.2 Nature-Nurture Controversy**

To what extent is human behavior the product of biology (genetic factors) and to what extent is it determined by events in the external environment? These questions have pre-occupied the minds of thinkers throughout the ages. The pendulum of both scientific and public opinion has swung back and forth -sometimes favoring nature and sometimes favoring nurture.

The formulation of Darwin's theory of evolution in the eighteenth century led many theorists to place a lot of emphasis on the role of nature (heredity) in human development. In *The Descent of Man* (1871), Darwin had said that in addition to special tastes and habits, general intelligence, courage, bad and good tempers were passed on from one generation to another. This was an important idea because it implied that one could change the traits of animals by selecting for both psychological and physical qualities. Today, natural selection and the heritability of traits remain the central tenets of the theory of evolution, since new traits must be inherited for evolution to occur. Darwin's emphasis on the importance of heredity in determining both physical and psychological traits was instrumental in persuading generations of scientists to see the influence of genetics in almost every human trait.

One of the first people to study the differences between individuals and to demonstrate the importance of their basis in heredity was Francis Galton, a cousin of Darwin. Galton conducted the first systematic family studies that sought to show that behavioral traits run in families (Galton 1869). He went on to suggest that people with inherited disorders

should be discouraged from siring children while those who were genetically fit should be encouraged. In fact it is Galton who coined the term 'eugenics' to describe such a program (see Cartwright 2000: 21). He strongly believed that science would one day be able to direct, with absolute precision, the development patterns of human evolution.

Amongst those who were influenced by Galton's work was the French diplomat and writer, J.A. Gobineau, who in his essay on the 'inequality of the human races', asserted that differences in the abilities of men were entirely innate. Gobineau's standpoint was later taken up by the English-German political thinker Houston Stewart Chamberlain. It was put into practice by racists in Southern United States, and in the most extreme form, by Adolf Hitler and his followers during the Second World War (Steen 1996).

However, with the rise of behaviorism in the nineteenth century, the environmentalist position once again gained dominance. Behaviorists John B. Watson and B.F. Skinner, for example, maintained that early training could turn a child into any kind of adult regardless of his or her heredity. This view was forcefully articulated by Watson when he wrote:

Give me a dozen healthy infants, well formed, and my own specified world to bring them up in, and I'll guarantee to make anyone at random and train him to be any type of specialist. I might select -doctor, lawyer, artist, merchant, and, yes, even beggar man and thief, regardless of his penchants, tendencies, abilities, vocations, and the race of his ancestors (Watson 1924: 104).

Watson's position was that whatever might be regarded as innate or inborn properties of the organism could be explained in terms of conditioning processes begun at an early age. For him, such qualities as talent, temperament and mental constitution were acquired not

inherited. He thus advocated experiential determinism, which left no room for the effects of genetic or biological factors.

Of late, the popularity of genetic explanations has been on the rise. Genetic predisposition to everything ranging from cancer and obesity to criminality and homosexuality are being reported on a regular basis in scientific journals as well as in the popular press.

### ***7.3 Interactionism***

A number of investigators today proclaim that both nature and nurture interact continuously to guide development. They argue that none of the characteristics that a human being displays could occur in the absence of either an appropriate heredity or an appropriate environment. For example, the development of personality traits such as sociability, temperament as well as intelligence appears to be equally influenced by heredity and environment. What this means is that the effects of hereditary and environmental factors are not additive or cumulative, but rather that the nature and extent of the influence of each type of factor depends upon the contribution of the other. Any one environmental factor will exert a different influence depending upon the specific hereditary material upon which it operates. In the same vein, any hereditary factor will operate differently under different environmental conditions.

A classic example that is frequently cited to illustrate the gene-environment interaction is phenylketonuria (PKU), a genetic condition that results in mental retardation in humans if left untreated. PKU results from the inability of the body to metabolize phenylalanine, an

amino acid found in proteins. A build-up of this acid in the body causes a host of phenotypic and behavioral effects including severe brain damage. Today this condition can be treated effectively by placing affected individuals on a diet with restricted phenylalanine intake. This treatment is widely used and has been successful in reducing the effects of this disease. A century ago, the explanation why some people ended up with PKU syndrome while others did not was entirely genetic. The reason for this was that almost everyone ate diets containing phenylalanine. Today we know that genes and environment make a difference; PKU is as much influenced by environmental factors as it is by genetic factors (Burian 1983).

Another example of the dynamic integration of genes and environment is that of the coral reef fish, *Anthias squamipinnis*. These fish are able to change their sex in response to the presence or absence of a male. As Gottlieb reports:

These fish live in spatially well-defined, social groups in which there are many females and a few males. When a female dies or is otherwise removed from the group, one of the females initiates a sex reversal over a period of about two days in which she develops the coloration, behavior, and gonadal physiology and anatomy of a fully functioning male... Such sex reversals keep the sex ratios about the same in social groups of coral reef fish. Apparently, it is the higher-ranking females that are the first to change their sex and that inhibits sex reversal in lower ranking females in the group (1991: 9).

The point that needs to be emphasized here is that the same genotype can give rise to a wide variety of phenotypes depending upon the environment in which it develops. In other words, an organism's genotype sets the limits for the development of characteristics; but

the environment, interacting within these limits, plays an essential role in determining what the phenotype will eventually be.

A number of scholars such as the English psychologist Anna Anastasi have argued that science should aim to discover how hereditary and environmental factors work together to produce behavior. In her famous paper, published in the *Psychological Review* (1958), Anastasi pointed out that the difficulties in the nature/nurture controversy stem from the fact that investigators have been asking the wrong questions. They could not therefore get the right answers. Does nature or nurture provide the determinant source of human behavior? This is the 'which one' question. Those who formulate the question in this way assume the independent, isolated action of one or the other in providing a source of behavior. But this question is illogical and does not make much sense. As Anastasi rightly pointed out, there would be no one in an environment without heredity, and there would be no place to see the effects of heredity without an environment. Sandra Scarr and Richard Weinberg [1980: 859] made a similar point when they wrote: 'One cannot assess the relative impact of heredity or environment on intelligent, per se, because each person must have both a viable gene complement and an environment in which the genes can be expressed. Thus, no genes, no organism; no environment, no organism'. From the foregoing, we can see that although nature and nurture are inextricably bound. It would therefore be inappropriate to ask 'which one?' because both are completely necessary for the existence of any kind of behavior.

Of course some psychologists had recognized the inappropriateness of the 'which one' question long before Anastasi's 1958 paper was published. Yet others had asked another question that Anastasi maintained was also inappropriate, because it too led to a conceptual dead end. This is the 'how much' question. The problem with this kind of question is that it assumes that heredity and environment are additive, separately acting causes whose contributions to any characteristic can be separated statistically. In other words, the question assumes that nature and nurture (genes and environment) are related to each other in such a way that the contribution of the one is added to the contribution of the other to produce a particular trait. The truth of the matter however is that we cannot answer the question, 'how much' because the contribution that the two factors make to biological traits are not made in a common currency (Ariew 1999: 125). This question does not seem to make sense when applied to an individual organism. Indeed, every developmental biologist knows that every aspect of an individual's phenotype is a joint product of the interaction between its genes and its environment. Experiments on animal development have shown that these factors are interdependent causes that render statistical separation invalid.

The right question to ask, according to Anastasi, is 'how', that is, 'how do nature and nurture interrelate to provide a basis for behavior?' She believes that this is the correct way to formulate the nature-nurture issue because it is based on the interactive, multiplicative-action assumption. This implies that both nature and nurture are involved in development and cannot function in isolation from one another. The question 'how' leads

the psychologist to a consideration of the interactive effects of nature and nurture in providing a source of development.

Nevertheless, Anastasi recognizes that the part played by hereditary factors might be more fundamental in some aspects of development than in others. She suggests that hereditary influences are best understood in terms of a continuum of indirectness. At one end of the continuum are the contributions of heredity that are most direct, such as physical characteristics like eye color and chromosomal disorders like Down's syndrome. Contributions of heredity that are quite indirect such as the social stereotypes that the members of a given society attach to various categories of skin color and hair texture fall at the other end of the continuum (Anastasi 1958: 198). However, as will become clear in our discussion of developmental systems theory, Anastasi's formulation risks perpetuating the very nature/nurture dichotomy it seeks to eliminate. As Oyama [2000: 54] aptly puts it, 'replacing the nature-nurture dichotomy with a continuum does not solve the problem'. Indeed, despite protestations to the contrary, the nature-nurture debates live on and the terms of its closure are still the subject of contentious arguments.

### ***7.5 Developmental Systems Theory***

Developmental systems theory (hereafter DST) promises to offer a powerful explanatory framework with which to resolve the nature-nurture dichotomy discussed above. It challenges development accounts that are centered around a dichotomy between genes on the one hand and environmental factors on the other. DST theorists maintain that biological variables both influence and, reciprocally, are influenced by contextual ones.

Accordingly, stances about nature-nurture that stress the primacy of either context in human development are explicitly rejected by developmental systems perspective (Lerner 1985). On this view, it is impossible to assign causal primacy to either genes or environment for a particular phenotypic outcome.

DST sees individual development as hierarchically organized into multiple levels such as genes, cells, organ, system, behavior and environment; that can mutually influence each other. The most important feature of the DST, as Gottlieb (1991: 5) notes, 'is the recognition that the genes are an integral part of the system and that their expression is affected by events at other levels of the system, including the environment of the organism'. It would therefore be wrong to think that the causal role of genes in producing a particular trait is different in kind from that of non-genetic factors.

One of the chief proponents of developmental systems theory is Susan Oyama. In her book, *Evolution's Eye: A Systems view of Biology-Culture Divide* (2000), she draws on psychology, biology and anthropology, as well as philosophy and history, to explore the many ways that the nature/nurture opposition is expressed and the reason it continues to have such a powerful influence on research, theory, and interpretation. Oyama explicitly rejects the determinism inherent in the nature/nurture debate. She maintains that human behavior cannot be reduced to distinct biological or environmental causes. But Oyama is also quick to point out that what is required is a radical reformulation of both nature and nurture and not 'conciliatory declarations that they are both important'. She urges that 'if development is to re-enter evolutionary theory, it is the development that integrates genes

into organisms, and organisms into the very many levels of environment that enter into their ontogenic construction' (Oyama 2000: 113).

The interrelationship between nature and nurture, organism and environment is dramatically emphasized when man is exposed to an alien context. As Keith Richardson reports, to be able to walk on the moon, astronauts must practice here on earth under man-made gravitational conditions similar to those of the moon, yet walking is commonly considered to be a genetically programmed trait. Richardson goes on to ask 'if we can be wrong about something as relatively simple as walking, can we rely upon the validity of the two central assumptions of which it is supposedly just an obvious example, that 'nature/nurture' dichotomy and causal change by formation constitute a valid basis for psychological theorizing?' (Richardson 2000: 2)

Oyama contends that nature and nurture are not alternative sources of form and causal power. Instead, she says, 'nature is the *product* of the *processes* that are the developmental interactions we call nurture' (Oyama 2000: 48). According to this view, ontogenetic information, whether about our body or behavior, does not exist in our genes or the environment but is constructed in a given developmental context. It is therefore impossible to assign causal primacy to either genes or environment for a particular phenotypic outcome. What this in essence means is that nature and nurture are mutually facilitating and mutually constraining in influencing behavior. However, these influences are flexible, not absolute. The gene should not therefore be viewed as a privileged source of information containing blue prints or programs for phenotypic variation. Thus Oyama

exhorts us to recognize the systemic nature of interaction and development in which the boundaries between dichotomous categories dissolve.

These systems include the genes and developmentally relevant aspects of the environment. Organisms, according to DST, are not designed to solve problems presented by an independent environment. Rather, organisms and environments are co-evolving and mutually defining. Development is therefore to be looked at as a construction and not as a printout out of preexisting code (Oyama 2000: 22). This constructivist view enables us to eliminate the nature-nurture distinction while retaining an evolutionary perspective.

#### ***7.4 Evolutionary Psychology***

Another approach to the study of human behavior that explicitly rejects the nature/nurture dichotomy and which might prove useful to the study of homosexual behavior is evolutionary psychology. Recent trends in this field of study suggest that enduring human traits that are well above the mutational equilibrium and which are maladaptive today may have served a useful purpose in the past (Barkow et al 1992). Indeed, the primary goal of evolutionary psychology is to show how psychological adaptation underlies much of human behavior. It has been described as a 'progressive program capable of providing us with new knowledge of how the mind works' (Ketelaar et al 2000: 1).

According to this new and exciting field of inquiry, the human mind was designed by natural selection to solve the problems that our ancestors constantly encountered during the hunter-gatherer era in the African Savannah (Symons 1992). This approach is already

changing the way we look at many aspects of human behavior, which had in the past proved difficult to explain. The mind, according to this view, is not a blank slate or *tabula rasa* as philosopher John Locke said, but a collection of tools each specialized for solving a different ancestral problem. Evolutionary psychologists have likened the mind to a Swiss army knife with lots of different gadgets (modules) each of which is designed for a specific task. The adaptive problems that our hunter-gatherer ancestors faced ranged from acquiring mates and forming social alliances to avoiding predators and inedible plants.

Barkow, Cosmides and Tooby, the three pioneers of this field, have outlined the intellectual framework of this new discipline and set out an agenda for future research in their book, *The Adapted Mind* (1992). Evolutionary psychology rests on the following assumptions:

1. The human mind is made up of information processing systems that are extraordinarily efficient in handling specific kinds of stimuli and responses to them.
2. Human evolution has not changed much since the Pleistocene hunter-gatherer phase.
3. Human information processing systems were evolved because they solved recurrent, universal problems of survival and propagation associated with Pleistocene hunter-gatherer environment and more efficiently than earlier systems.
4. These systems are 'content specific' and generate many invariant aspects of human culture.
5. Our modern skulls house a stone-age mind.

(Adapted from Cosmides and Tooby (2000: 3-11))

The basic idea here is that by looking at the adaptive problems that our hominid ancestors faced in the environment of evolutionary adaptedness (EEA), we can predict what kind of adaptive mental mechanisms evolved to solve those problems. However, it is important to emphasize here that these mental mechanisms will only apply to the way of life of Pleistocene hunter-gatherers, and not necessarily to modern circumstances.

Accepting the new paradigm, as Tooby and Cosmides (1992) have pointed out, demands that we abandon the old paradigm that has guided the social sciences for the last 100 years or so. This old paradigm, also called the standard social science model (SSSM), is to be replaced by an integrated causal model (ICM). Whereas the SSSM holds that the contents of the human mind are social constructions and that the social sciences are independent and disconnected from any evolutionary or psychological foundation, the ICM accepts and makes use of the natural connections that exist amongst all the branches of knowledge. It makes use of these connections to construct careful analyses of the causal interplay among all the factors that bear on a phenomenon. Indeed, evolutionary psychology should be viewed as a paradigm for integrating psychology with the rest of science.

According to the critics of the SSSM, this model rests on a misunderstanding of the nature/nurture issues. It fails to 'appreciate the role that the evolutionary process plays in organizing our species-universal genetic endowment, our evolved developmental processes, and the recurring features of developmental environments' (Tooby and Cosmides 1992: 33). It also assumes that the phenotype can be divided into genetically

determined and environmentally determined traits. As Cosmides and Tooby further explain:

The critique of the SSSM that has been emerging from the cognitive and evolutionary communities is not that traditional accounts have underestimated the importance of biological factors in human life. Instead, the target is the whole framework that assumes that 'biological factors' and 'environmental factors' refer to mutually exclusive sets of causes that exist in some kind of explanatory zero-sum relationship, so that the more one explains 'biologically', the less there is to explain 'socially' or 'environmentally'. On the contrary, as we will discuss, environmentalist claims necessarily require the existence of a rich, evolved cognitive architecture (Tooby and Cosmides 1992: 33-34).

Thus evolutionary psychologists are not concerned about the relative importance of nature and nurture or heredity and environment in the development of human behavior. On the contrary, like the developmental system theorists, evolutionary psychologists explicitly reject these dichotomies as ill conceived and unnecessary. They stress the importance of understanding how genetic and environmental factors interact, and point out that genes often build different minds in response to different environments. In other words, they maintain that the behavioral differences that we observe arise from identical psychological mechanisms encountering different developmental inputs.

Although evolutionary psychologists are yet to come up with a comprehensive theory of homosexuality their approach to the study of human behavior must be taken seriously by anyone seeking to explain the genesis of human sexual orientations, and especially homosexuality. Evolutionary psychologists have repeatedly pointed out that human behavior as we observe it today is a product of contemporary environmental influences

acting upon ancestrally designed mental hardware. Consequently, the behavior that results from such interaction may not be adaptive in contemporary context. Homosexuality could very well be one such behavior. It is possible that this trait was shaped for some adaptive purpose long ago but its adaptive significance may not at all be obvious today. This is precisely what Frank Muscarella recently proposed.

In a paper titled 'The Homoerotic Behavior that Never Evolved' (1999) Muscarella laments that despite its richness in heuristic value, evolutionary psychology has failed to address the phenomenon of homosexuality. Indeed, as he rightly points out, the general consensus among evolutionary psychologists is that homosexuality could not possibly have evolved since it does not have an adaptive value. Muscarella identifies and discusses a number of factors that may explain why there are no models in evolutionary psychology for explaining homosexual behavior. These include what he calls a false dichotomization of human sexuality, ambiguous definitions of the term 'homosexuality', and the negative attitude that most researchers have towards homosexuality.

Muscarella accuses evolutionary psychologists of making the erroneous assumption that humans can be categorized as either homosexual or heterosexual. This, he says, has led to the dichotomization of homosexual behavior itself, with some homosexual behavior being considered 'real' and some 'incidental'. Muscarella argues that by focusing solely on homosexual orientation (Kinsey 6) and dismissing incidental homosexual behavior, theorists are missing an evolutionarily significant behavior pattern in human sexuality. He suggests that if evolutionary psychology is to develop alternative models for

conceptualization of homosexuality, the focus of study should be behavior itself and not and not the 'unreliable' concept of homosexuality. The benefits of adopting such an approach are several. Muscarella says that it will increase estimates of homosexual incidence and provide support for its universality in humans. In addition, he says that implications of adaptive value will arise, and an understanding of the behavior's evolutionary history will be more compelling. Such an approach will also help to generate testable hypotheses. For example, Muscarella suggests that studies could be carried out to ascertain the high incidence of homosexual behavior in sex-segregated environments (such as prisons and boarding schools) hypothesizing a greater incidence of homosexuality in those environments that most closely resemble the environment of evolutionary adaptedness.

Another potent factor hindering attempts to formulate an evolutionary account of homosexual behavior is what Muscarella calls resistance to change. As he rightly points out, homosexuality has been stigmatized in most western cultures and this has contributed to its neglect in many universities. Muscarella calls for a paradigm shift in evolutionary theory and suggests that evolutionary psychologists should be urged to pay more attention to homosexual behavior in their study of human sexuality. Indeed, they should apply the same careful evolutionary analysis to homosexual behavior that is applied to other human behaviors. In addition, he suggests that primatologists, comparative psychologists as well as cultural anthropologists should be encouraged to theorize about the possible adaptive value of homosexual behavior.

Muscallela (2001) and Kirkpatrick (2000) have gone on to formulate an account of homosexual behavior that is based on evolutionary psychology. The two authors posit that humans evolved a disposition for homosexual behavior because it aided same-sex affiliation and alliance formation among hominid males. This, in turn, may have contributed directly to survival and indirectly to reproductive success.

But what adaptive problem(s) did our hunter-gatherer ancestors face to necessitate the emergence of homosexual behavior? Muscarella postulates that hominid adolescents, especially males, may have gone through a period of sex segregation and physical peripheralization, as happens with many non-human primates. This, he argues, resulted in aggressive and fatal inter-group and intra-sex encounters. This may have left them defenseless, with an increased chance of mortality and reduced reproductive survival. Muscarella further speculates that the capacity to engage in homosexual behavior may have served as a mechanism of affiliation among same-sex peripheralised hominids. Same-sex partners may in turn have helped each other survive and reproduce by providing access to food and protection from aggression. A similar hypothesis based on primate and anthropological record has been advanced by Kirkpatrick (2001). He argues that homosexual behavior is a consequence of individual selection for reciprocal altruism, which would have contributed to resource exchange and reduction in inter-male aggression.

Support for this explanation comes from the study of non-human primates such as chimpanzees and bonobos, which are man's closest relatives. Homosexual behaviors are

common among these primates and have been known to play an important role in reducing intra-sex aggression (Hambright 1995). Further support for this hypothesis comes from primate literature, which suggests that no non-human primate is exclusively homosexual although they do engage in homosexual behavior (Vasey 1995). These observations suggest that a capacity for at least some kinds of homosexual behaviors may be an ancestral feature of human sexuality.

## ***7.6 Conclusion***

In this chapter I have briefly reviewed the history of the nature/nurture debate. I have also described the two recent approaches to the study of human behavior that seek to transcend the nature/nurture dichotomy, namely, evolutionary psychology and developmental systems theory. A fruitful study of the genesis of sexual orientations, and human male homosexuality in particular, must seriously take into account these two approaches to the study of human behavior. As this study has shown, research into the etiology of homosexuality is polarized into biological and environmentalist research programs. We have seen that dichotomies such as nature versus nurture and psychological versus biological do not seem to make sense especially when complex human behaviors and traits are considered. Indeed, we must take Michael Ruse seriously when he urges us to 'shuck off the outmoded nature/nurture dichotomy which in the past has taken us nowhere' (Ruse 1985: 149). Taken separately, these approaches are nonviable. The ultimate challenge must therefore be to break away from these dualistic thought processes and to find out how biological factors interact with environmental factors to shape an individual's sexual orientation. Our aim must be find a middle ground between extreme

etiology of homosexuality is published in psychiatric journals which he believes are 'inappropriate' to a progressive *biological* research area" (Suppe 1994: 261).

We have seen that much of the available biological evidence has not been successfully replicated. Moreover, as with the experientialist program, workers in the biological program have not been able to adequately deal with the numerous anomalies besetting their program. This observation notwithstanding, the biological research program does appear to have a more powerful positive heuristic than the experientialist program, which explains why many scientists continue to invest their energies in it. But as Elie Zahar has rightly pointed out, no matter how successful in generating new hypotheses the positive heuristic of a research program is, it will not be considered progressive unless these hypotheses are corroborated by empirical facts (Zahar 1976).

Of course it would be wrong to conclude that experiential factors have no role to play in explaining why some people become homosexual while others become heterosexual just because the few experiential theories that have so far been advanced have been refuted. As we have already seen, even MZ twins who share the same genome are not always concordant for sexual orientation. In fact, if one twin is homosexual, the other has a 50 percent chance of being heterosexual. This observation alone would seem to require that non-genetic and perhaps even experiential variables be taken into account when explaining the genesis of homosexuality.

William Byne, a neuroanatomist and psychiatrist and one of the leading researchers in the area of sexual orientation, has summarized the current state of homosexual orientation research in the following words:

Recent studies postulate biologic factors as the primary basis for sexual orientation. However, there is no evidence at present to substantiate a biologic theory, just as there is no compelling evidence to support any singular psychosocial (read experiential) explanation. While all behavior must have an ultimate biologic substrate, the appeal to current biologic explanations may derive more from dissatisfaction with the present status of psychosocial explanations than from a substantiating body of experimental data (Byne 1993: 228).

Philosopher Frederick Suppe, too, is aware of the degenerating state of the two research programs. He notes:

The difficulties encountered by biological theories of homosexual etiology, the impressive refutation of extant social learning theories of etiology by Bell, Weinberg, and Hammersmith study and the manifest epistemic inadequacy of psychoanalytic theories means that after 1000 studies of homosexual etiology, we really haven't established much of anything positive about the possible causes of homosexuality (Suppe 1994: 257)

From these two quotations, it is clear that the current situation of the two major research programs for explaining homosexual orientation can only be described as one of stagnation. Although the two programs have made specific predictions, they cannot be said to be empirically progressive since many of these predictions have not been corroborated. Consequently, from the point of view of the methodology of scientific programs, the two programs have not contributed to the growth of knowledge.

But could the failure to explain the genesis of homosexuality scientifically be due to the fact that homosexuality is not a natural kind as social constructivists have claimed? Is

homosexuality an entirely cultural artifact? I answered these questions in the negative. Contrary to what the social constructivists would have us believe, I argued in chapter 2 that the etiology of homosexuality is a legitimate scientific research problem. There is strong evidence to suggest that homosexuality transcends cultures and historical epochs and that the homosexual is not merely a cultural artifact. Furthermore, despite definitional problems and difficulties in measurement, studies have shown that the incidence of male homosexuality (it is understood to be between 4 and 10 percent of the general population (Bower 1993)) has remained fairly constant and does not appear to change with new moral codes, social mores or the passage of time. This suggests that sexual orientation is a natural kind and therefore an appropriate candidate for scientific investigation. However, this should not be construed to mean that social constructivism is entirely false or that it has nothing to offer. On the contrary, the ways in which sexual orientations are expressed is dependent on history and social context and social constructivism might be able to offer useful insights into the interpretations of homosexuality that have been created by the dominant heterosexual world.

What does this episode in the history of science tell us about the descriptive adequacy and normative appropriateness of Lakatos' model? Before attempting to answer this question, it would be useful to distinguish between descriptive and normative philosophies of science. A philosophy of science is said to be normative if its main concern is the formulation of standards by which scientific theories are to be appraised. Such a philosophy sets forth and recommends a set of principles, application of which will contribute to the growth of scientific knowledge. A prescriptive philosophy of

science need not rest upon, or take account of the history of science. However, for it to be taken seriously, it must give some plausible reconstruction of the history of science. Indeed, if it departs too radically from the actual practice of science, it will be considered unacceptable.

Descriptive philosophy of science, on the other hand, is restricted to revealing the methodological standards and procedures that have informed scientific practice. On this view, the descriptive philosopher of science does not make recommendations on how science ought to be practiced. On the contrary, he merely displays the methodological standards and procedures that have been used during various episodes in history. The descriptive philosopher of science should be distinguished from the historian of science. While the historian will make a deliberate effort to be as impartial as possible, the philosopher will seek to analyze, generalize and theorize and not just remain on the level of recounting what the scientists do. But the distinction between descriptive philosophy of science and history of science is not that sharp, there is considerable overlap between the two. As John Losse has pointed out, 'whereas the philosopher must examine the individual evaluative decisions of scientists in order to identify the standards that underlie this practice', the 'historian must be cognizant of the pervasive influence of evaluative standards in order to create effective explanatory narratives' (Losse 1987: 143). However, it is worth mentioning that most philosophers of science today are of the opinion that philosophy of science should be both descriptive and prescriptive.

Returning to the question raised above concerning the normative appropriateness and the descriptive adequacy of Lakatos' model, there are four main possibilities:

One possibility is that the MSRP is descriptively adequate but normatively inappropriate. By this I mean that although the MSRP may be consonant with certain episodes in the history of science, it is not a methodology that scientists ought to follow. It is quite possible for an account of science to descriptively fit an episode in the history of science and at the same time fail to be normatively desirable especially if it was derived from one particular branch of science.

A second possibility is that the MSRP is normatively appropriate but descriptively inadequate. By this I mean that although the MSRP may be a good method for doing and evaluating science, it does not fit the actual history of science. Epistemological naturalists such as Quine (1969) and Laudan (1990) would definitely reject this possibility. According to this school of thought, our normative investigation about knowledge must be absorbed into a descriptive inquiry about what we actually know. In other words, one cannot work out the principles of scientific rationality a priori. A good theory of rationality, on this view, must be based on the actual scientific practice. As already mentioned, a normative philosophy of science that is not consonant with the actual scientific practice is likely to be challenged.

A third possibility is that the MSRP is both normatively appropriate and descriptively adequate. On this view, the MSRP not only captures the actual history of science but is also a normatively appropriate way of doing and appraising science.

The fourth possibility is that the MSRP is neither normatively appropriate nor is it consonant with the actual scientific practice. Given that Lakatos' model was derived from the actual history of science and considering that it was primarily designed to offer guidance to historians of science, it is unlikely that it would fail to at least fit some episodes in the history of science. As he himself puts it in the first part of his famous dictum, philosophy of science without history of science would be empty.

To a large extent, the history of etiology of homosexuality research fits the methodology of scientific research programs. Consistent with the teachings of Lakatos, this case study has shown that the story of homosexual orientation research can be understood in terms of two rival research programs each with its own hard core, a positive heuristic and a negative heuristic. Furthermore, there are clear institutional boundaries such as journals as well as academic departments that tend to keep the two research programs separate. From a Lakatosian perspective the two programs can also be said to have stagnated since they have failed to make any empirical progress by way of making successful predictions.

Frederick Suppe, in an examiner's report on an earlier version of this thesis, has challenged the account given of MSRP on the grounds that it neglects the notion of a

problem-shift as an individuating component of research programs. He contends that this omission undermines my pronouncements about the descriptive adequacy of MSRP.

My response to this challenge is that Suppe is attaching too much importance to the notion of a problem-shift while underemphasizing the notion of a hard core. In my view, the most important characteristic of a research program is the commitment to hard core assumptions. The fact that no significant problem-shift can be discerned in *some* of the subprograms discussed in this thesis actually means that these subprograms have stagnated i.e. they have neither been theoretically nor empirically progressive. I think that Lakatos' treatment of some other cases suggests that his judgment would accord with mine on these ones. Part of the point of analysis like Lakatos' is to enable us pronounce normatively on research programs, including those that are less sophisticated in their methodological sensitivity than the classic, great programs that rightly dominate the Lakatosian literature. We should not find ourselves unable to apply the critique because researchers are found to be a bit dull-minded and make no attempt to absorb anomalies. In any case, I have tried to show that in some of the subprograms discussed (especially the biological ones), attempts have been made to account for the anomalies by adjusting the protective belt of auxiliary hypotheses while retaining the hard core assumptions intact. This is precisely what Lakatos has in mind when he talks of a problem-shift. It is also important to note that the theories discussed in each of the two programs are not entirely unrelated. As LeVay and Hamer (1994) have pointed out, a 'gay gene' may make a brain that fails to take advantage of androgens circulating in the blood stream so that the individual (male) becomes homosexual.

If the only task of philosophy of science is to formulate objective standards for evaluating episodes in the history of science, then Lakatos' model has some merit. As already pointed out, using this methodology one can distinguish between progress and degeneration in a research program. However, if the task philosophy of science is also to give guidance to practicing scientists, Lakatos' model has some specific weaknesses. In fact, he gives the scientist no consistent standards to follow. (Of course Lakatos has repeatedly said that his methodology was not intended as a source of advice to scientists, but as I remarked earlier, it is logically impossible to separate appraisal from heuristic advice). As we saw in chapter one, Lakatos distinguishes between progress and degeneration, but then says that a degenerating program can make a come back. In another place he says that the final defeat of a research program can only be identified with hindsight, that is, long after the event. He contradicts himself further when he says that editors of scientific journals should reject papers submitted by workers in a degenerating research program. The question that immediately arises is this: what if a rejected paper is one that would have resuscitated the degenerating research program? It is precisely this failure to offer unequivocal criteria for the rejection of a research program, or for choosing between rival research programs that has prompted Paul Feyerabend to describe Lakatos as a 'friend and fellow-anarchist' and to dedicate his book *Against Method* to him. Feyerabend himself believes that the idea that science should be run according to fixed and universal rules is unrealistic and inimical to the growth of scientific knowledge (Feyerabend 1977). For him, 'anything goes' is the only principle that does not inhibit progress in science.

As I see it lack of progress in sexual orientation research has come about as a result of the two groups of researchers, the biologists and experientialists, holding the hard cores of their respective research programs too dogmatically. The two programs are too rigid in their hard-core structure as they admit of no fundamental changes. Recall that the central thesis (or, to use Lakatos' own terminology, the hard core) of the MSRP is the claim that in the face of anomalies, scientists actually hold on to the most basic assumption of a theory and instead of abandoning it they manipulate the more situational and peripheral theories associated with it. As a historical claim about what *some* scientists do, this thesis is to a large extent supported by the present study. However, as a piece of advice to practicing scientists, this view has obvious defects. In fact, it is not a rule that a practicing scientist ought to follow for it can be a hindrance to the growth of knowledge as the present study has shown. The application of Lakatos' model may in fact thwart progress in some cases. Contrary to Lakatos' claim that competition between research programs produces rational and objective advances in scientific knowledge; in this particular case there has been no noticeable progress. But this should come as no surprise for as geneticist Fausto-Sterling aptly puts it, 'partitioning nature from nurture, is a *scientific dead end* 'and a bad way of thinking about development of human behavior (Fausto-Sterling 1999). As I have indicated several times in this study, the polarization of sexual orientation research into biology versus environment has impeded rather than promoted progress in this area.

Another problem with Lakatos' model is that it seems to have been primarily tailored for the physical sciences. Indeed, like most philosophers of science of his time, Lakatos seems to have classical physics in mind when talking about science. Without even bothering to advance an argument, he assumes that all science should in some fundamental sense be similar to the physics of the last three centuries. In the physical sciences, some hypotheses take the form of axioms, which cannot be modified or given up without abandoning the research program in which they are embedded. The three axioms of motion, which form the backbone of the Newtonian research program, are a case in point. This should not however be construed to mean that physicists are always unwilling to question the basic assumptions of their programs. As a matter of fact, certain hard-core assumptions are being questioned in theoretical physics today. In the behavioral sciences only neo-classical economics, which was modeled on Newtonian physics, appears to offer the possibility of an easy fit with Lakatos' model. Other sciences dealing with human behavior cannot easily fit into the Procrustean bed of the MSRP. As this case study has shown, rigidly clinging to selected hypotheses of a research program can in fact retard rather than promote the growth of scientific knowledge.

As I argued in the last chapter, for there to be progress in the etiology of homosexuality research, scientists must go beyond the nature-nurture dualism. Workers on the two sides of the debate must shake off their hard-core positions and embrace a more acceptable theoretical framework. What is required is an interactionist program -one that takes seriously the mutual causal relationship between nature and nurture in shaping sexual orientation. The approach to understanding homosexual behavior should include

assessment of the interaction of biological and psychosocial factors. In fact, it may well be that a person's biological disposition is such that given certain environmental conditions he or she might experience sexual attractions to others of the same sex. Adopting such a program, as I have already pointed out, would imply abandoning the determinist positions (both biological and experiential) that have been taken by researchers on the two sides of the debate. Homosexual orientation is too complex to be described by one simple causal model or a single research discipline.

One way of overcoming this impasse is to adopt a developmental systems approach. This approach provides a powerful explanatory framework that helps to eliminate the nature-nurture dichotomy from our thinking. As we saw in the last chapter, developmental system theorists deny that there are fundamentally two kinds of processes: one guided by genes, hormones and brain cells, the other by environment, experience and learning. Indeed, DST opposes the idea that it is coherent to compare traits, homosexuality included, for the degree to which they are genetically as opposed to environmentally caused. Instead of pursuing sterile disputes about the degree of heritability of a trait, advocates of this view recommend that we adopt a more illuminating study of the dynamics of development. The biological and environmental factors in an organism's life influence each other. Indeed, they are interdependent causes that render statistical separation invalid. This approach undermines any causal distinction between mostly genetic and mostly environmental traits. Fortunately, scientists are beginning to take the nature-nurture interaction seriously. One such scientist is William Byne who suggests that 'genes or hormones do not specify sexual orientation per se, but instead bias

particular traits and thereby influence the manner in which the individual and his or her environment interact as sexual orientation and other personality characteristics unfold developmentally' (Byne 1993: 237). And as he further explains, this kind of mechanism allows for multiple developmental pathways leading to homosexuality. It also accounts for the high degree of concordance for homosexuality observed among MZ twins reared together as well as for the failure of those theories that focus exclusively on the experiential factors. In addition to DST, those researching into the etiology of homosexual orientation could benefit from recent trends in evolutionary psychology, which suggest that enduring traits usually have some adaptive advantage and are unlikely to be due to chance. Homosexuality, as was pointed out in the last chapter, could very well have been an adaptive trait during the Pleistocene era.

To sum up, this case study is one in a series designed test the applicability of Lakatos' methodology. The initial case studies were carried out by Lakatos' pupils and colleagues at the London School of Economics and focused exclusively on historical episodes in the physical sciences. As essays in Howson (1976) reveal, these early studies confirmed the applicability of the MSRP in that it was able (i.e. the MSRP) to explain the historical episodes in question without appealing to external factors. In the present case study, I have shown that, to a large extent, the history of homosexual etiology research descriptively fits Lakatos' model. Normatively, however, I have argued that this case study undermines the generalizability of Lakatos' model. Indeed, whereas this model may be normatively appropriate for sciences that are axiomatically structured, this study

has shown that the Lakatosian way of doing science may not be normatively appropriate for sciences that deal with human behavior.

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