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### Cover Page Footnote

I would like to thank Dr. Pauline Phipps for all of her help with this paper, and her mentor-ship for the last year as I try to navigate the complex field of the History of Sexuality.

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# Is There a Gay Brain? The Problems with Scientific Research of Sexual Orientation

Matthew McLaughlin

In 1991 neuroscientist Simon LeVay published “A Difference in Hypothalamic Structure Between Heterosexual and Homosexual Men”, which reported the discovery of a ‘region’ in the anterior hypothalamus of the brain that determined sexual orientation in men. LeVay investigated the volume of interstitial nuclei of the anterior hypothalamus – abbreviated as INAH – and found that the relative volumes were significantly similar between homosexual men and heterosexual women, yet significantly different between homosexual men and heterosexual men. The media sensationalized the publication, and the public came to believe that the neuroscientist had officially solved the mystery as to why some people are gay while the majority are straight. Even though LeVay’s study has been heavily criticized by academics in a variety of fields – including the scientific community – the media’s portrayal of his study successfully engrained a belief that homosexuality was a natural, biologically determined divergence of heterosexuality.<sup>1</sup> *Science*, a very popular and well respected academic journal published LeVay’s article at a time when the political fight for gay and lesbian rights was prominent in the United States and Canada. In their article “Scientific Communications about Biological Influences on Homosexuality and the Politics of Gay Right,” Garretson and Sunhay elaborate on the political climate that ultimately fuelled the necessity for a scientific explanation of homosexuality.<sup>2</sup> As a self-identifying gay man, LeVay was politically motivated in his pursuit for the biologically determining factor of homosexuality. During the time it was understood that a component of one’s personality that was immutable had to be biologically determined. LeVay attempted to contribute to the political

debate of gay and lesbian equality, as he believed by proving that homosexuality was biological (not a choice), homosexuals should be afforded the same civil liberties and rights as heterosexuals. LeVay's intended audience was clearly two-fold; he initiated a discussion and scientific investigation into the relationship between sexual dimorphism and sexual orientation, while actively participating in interviews on popular television shows and news broadcast to state his findings within an accessible platform.<sup>3</sup>

The resulting popularity of "A Difference in Hypothalamic Structure Between Heterosexual and Homosexual Men" offers insight into public understanding of sexual orientation, as well as how cultural and political structures construct scientific understandings of human biology. LeVay rooted his investigation within the binaries of heterosexuality/homosexuality and masculinity/femininity, which had dominated North American scientific discourse for almost a century. These assumptions are evident in the way he framed his hypothesis and published the data. By asserting that homosexual men and heterosexual women possessed similar brain morphology, he reinforced the belief that being sexually attracted to men is a feminine characteristic, grounding his conclusion in the masculine/feminine binary. LeVay effectively "cast [gay men] as an 'intermediate' sex... effeminate men."<sup>4</sup> 'Effeminate' because gay men eroticize the sexual object choice of heterosexual women. Public acceptance of his claims and the scientific studies that followed this 1991 publication demonstrate how authoritative the masculine/feminine and homosexual/heterosexual binaries were and continue to be within popular and academic understandings of human sexuality.

In addition to LeVay's use of binarized categories to investigate male homosexuality, the literature he cites illuminates how fundamentally flawed his study was. One of the first attempts to isolate a biological structure in the brain that was supposedly 'responsible' for the development of sexual orientation was a scientific study involving rats. This study reported that by varying the amount of testosterone male rat embryos were exposed to in utero, as well

as altering the configuration [connectivity] of specific brain structures, scientists were able to compel adult rats to deviate from male-typical behaviour.<sup>5</sup> LeVay fell into the same trap that these animal researchers did. His hypothesis was rooted in socially constructed binarized categories, which ultimately lead to his findings being used to perpetuate and maintain socially constructed ‘biological’ classifications. Another popular study LeVay cited was the 1990 publication of Swaab and Hofman, which attempted to prove that the suprachiasmatic nucleus of the hypothalamus was directly involved in the development of an individual’s sexual identity.<sup>6</sup> LeVay believed the research team failed to validate their hypothesis because they traced the biological basis of homosexuality to the wrong brain structure. As a permanent characteristic of an individual sexual orientation was absolutely biologically based, even though all previous attempts to prove this had failed. LeVay’s political and personal motivation to prove that male homosexuality was biologically determined lead to the re-appropriation of previously published works, despite the failures of the experiments he cites.

LeVay’s study offers an impressive insight into the tendency of individuals in North American culture to understand the self in binarized terms, yet when his findings are juxtaposed with critical scientific literature a new understanding of “the natural diversity of human sexualities” is revealed.<sup>7</sup> Through her analysis of the neurological data present in the article, Elizabeth Wilson offers an impactful alternative interpretation of LeVay’s data. The sheer variation of measured INAH volumes among the homosexual men that were sampled, the variation among heterosexual men, as well as the discover that “[t]he second largest INAH 3 was in a homosexual man, the volumes of the three smallest nuclei in heterosexual men closely matched those of the homosexual men,” all belabor the fact that LeVay’s results do not support a binarized notion of sexuality.<sup>8</sup> LeVay failed to acknowledge the diversity among and between the respective homosexual and heterosexual men that were sampled, due to the authority of understanding sexuality within binarized categories. Examining the variety of

INAH 3 volumes among the men in the study emphasizes how there is a natural variety among alleged ‘dimorphic’ structures, which illuminates how commanding the binaries of heterosexual/homosexual and masculinity/femininity were, seeing as LeVay ultimately ignored the biological diversity and published his misguided results.<sup>9</sup>

Few scientists have been critical of LeVay from a social/political perspective, but William Byne – neuroanatomist and psychiatrist – has written extensively and critically on the ethics of scientific research on sexual orientation, and how neglecting social structures is detrimental and reductionist when attempting to understand human sexuality. One of the most cited articles in the scholarship that critiques the biological research of sexual orientation is “Ethical Implications of Scientific Research on the Causes of Sexual Orientation”, which is co-authored by Byne and Edward Stein, a philosopher who has also explored scientific research into sexual orientation. Byne offers important insight into the flawed ways through which science attempts to research human sexuality. Byne addresses how cultural structures and socially constructed binaries shaped and were ultimately shaped by the history of biological research into human sexuality. He also criticizes previous research into male homosexuality; the hormonal studies in the 1930s and 1940s, the dimorphic studies [similar to LeVay] in the 1980s and 1990s, and genetic research that plagued the later half of the 90s [Hamer and LeVay, 1993]. He is not only critical of the ‘scientific’ approach these researchers adopted, but illuminates how reducing sexual orientation to a biological debate is both harmful and theoretically limiting, since the categories being adopted for the research are recent historical constructions.<sup>10</sup>

As a philosopher, Stein incorporates Byne’s critical analysis of the scientific research into a discussion of the contemporary social structures that reinforce the dualistic masculine/feminine, heterosexual/homosexual binaries. Stein offers a compelling discussion regarding if “biological evidence is relevant to gay rights.”<sup>11</sup> He concludes that even if researchers successfully identify a biolog-

ical factor that is responsible for determining one's sexual orientation, it would not help the political movement to secure equal rights for homosexuals. If homosexuality is biological, it is possible (and likely) that individuals will attempt to find a cure, especially in a heterosexist culture that idealizes heterosexuality. Stein argues that any attempt to reduce sexual orientation to a biologically determined characteristic "unwittingly contribute[s] to the persecution of homosexuals by stigmatising them as biologically defective."<sup>12</sup>

Byne and Stein offer two relevant perspectives on the scholarship of biological research into sexual orientation; a combination of science and philosophy. The flawed approach LeVay adopted to researching the complex concept of human sexuality, the detrimental reductionist framework he employed, and the short-sighted idea that biological essentialism provides social and political security for non-heterosexuals are all explored in this article. The two conclude with a quote from Frank Kamey: "[w]hy we are negroes, Jews, or Homosexuals is totally irrelevant, and whether we can be changed to Whites, Christians or Heterosexuals is equally irrelevant."<sup>13</sup> As the pair state, it is impractical for individuals to "look towards science for liberation", and "potentially dangerous to attempt to make such a connection<sup>14</sup>."<sup>14</sup> An alternative approach to understanding sexual orientation must be proposed, to account for the complexity of social construction and biological essentialist components, a concept which appears to have evaded Simon LeVay.<sup>15</sup>

As a neuroanatomist and psychiatrist, Byne's personal research is concerned with "correlations between brain structure and behaviour."<sup>16</sup> He has established a career in "investigating hypothalamic variation associated with sex, sexual orientation, and HIV status."<sup>17</sup> Published in the same year as his co-authored "Ethical Implications" paper, "Why We Cannot Conclude That Sexual Orientation Is Primarily a Biological Phenomenon" offers a more science-based discussion of the problematic research into the biological causes of male homosexuality. Byne uses his extensive

scientific knowledge to explain biological investigations into the causes of homosexuality so that they are accessible to everyone. With this new-found availability of the scientific literature, Byne incorporates the social/cultural component needed to emphasize how LeVay was reductionist and misguided in his attempt to use the scientific method.[18](#)

Referencing the scientific literature, Byne offers insight as to how popular assumptions of binaries – male/female, heterosexual/homosexual – have been validated, reinforced, and remained unquestioned throughout the ‘scientific’ process. He continues to explain why animal models for studying sexuality – which LeVay relied heavily on – are impractical, ineffective, and lead to misinterpreted data and a fundamental misunderstanding of human sexuality. He concludes by discussing how biological research is “not helpful in distinguishing between biologics and environmental influences”, and “how one interacts with the environment in constructing social relationships and experiences which sexual orientation” is created.[19](#) The most important contribution Byne offers is the point that “this debate not in the biology of human brains, but within the cultures those brains have created.”[20](#) By focusing on culture and how interacting with one’s environment constructs social relationships and experiences, he forces the reader – and future academics writing about and researching the material – to consider socially constructed binaries and identities and their context within scientific research. By adopting a framework that integrates biology and cultural factors, future biologists will avoid the inadequate approach LeVay deployed 27 years ago.[21](#)

William Jenkins attempts to further Byne’s critical analysis of the scientific research into sexual orientation, yet his article “Can Anyone Tell Me Why I’m Gay? What Research Suggests Regarding The Origins of Sexual Orientation” fails to offer the desired insight, as Jenkins remains incapable of removing the binarized language that plagued scientists for decades from his analysis. As a psychologist Jenkins has the background to assess the sci-



entific research conducted, yet the language he uses to criticize the published findings is extremely problematic. Twenty years after LeVay's initial publication, the psychologist offers a historical analysis of research into sexual orientation. Jenkins is addressing the academic community to highlight the misguided nature of previous attempts to understand human sexual orientation. He may be aware that "conceiving of individuals' sexual orientations in binary terms is overly simplistic and potentially misleading", yet Jenkins is incapable of offering an analysis not framed in a binary.<sup>22</sup>

Jenkins' belief that "[t]he utilization of naturally occurring animal models of sexual orientation is also a promising approach" proves that he cannot separate himself from a binarized conceptualization of sexual orientation.<sup>23</sup> Animal models were the basis for LeVay's 1991 study; when animals emulate sexual behaviours [and inferred desires] that can be categorized within socially constructed, binarized categories, those classifications are understood to be biologically essential. Through quotes like "feminizes male sexual behaviour and brain morphology", and a discussion of how deficient testosterone relates to the 'feminization' of male sexuality, Jenkins' replicates the inadequate approach LeVay adopted twenty years earlier.<sup>24</sup>

One of the main reasons scientific publications in the past and present rely heavily on binaries (as proven by LeVay and Jenkins) when researching sexual orientation is because human biology is conceived of and taught within such binaries. Broadway's "Queer (v.) queer (v.): biology as curriculum, pedagogy, and being albeit queer(v.)" does not offer an analysis of the research being conducted on biological processes or human characteristics; instead he offers an explanation as to why queer theory needs to be applied to biology textbooks being taught in secondary schools so that individuals can understand human biology [and sexual orientation] without the limitations of binaries. This is an important concept that must be addressed when considering why the masculine/feminine binary remains uncontested when biological research into sex,

gender, or sexuality is conducted. This can be further employed to understand why LeVay uncritically adopted the ‘natural’ assumptions of heterosexual/homosexual and masculine/feminine binaries. By “using quotation marks around apparently self-evident terms in order to problematize them”, future researchers can avoid the detrimental assumptions LeVay employed when conducting his research.<sup>25</sup> By critically addressing the language used in biology textbooks, the cultural and social understandings of human biology will be dismantled and individuals will understand sexual orientation without the imposition of binaries.<sup>26</sup>

Elaborating on this approach of queering biology in schools, Broadway incorporates the publication of Bazzul and Sykes (2011), which explains that “queer organizes sexual practice and bodily pleasure in ways that are quite different from, and hence contest, dominant approaches to sexuality with their attending normative notions about sexual identities.”<sup>27</sup> This article was intended to be read by those instituting curriculums in secondary schools and those who adopt a queer theoretical approach in their research, but the implications of what Broadway is arguing has serious implications for the general population. By deploying queer theory into the teaching of biology, one immediately dismantles the institutionalized presence of the masculine/feminine and heterosexual/homosexual binaries that dominate research of sexual orientation. This article, in a way, defends Simon LeVay’s attempt to establish morphological similarities within binarized categories. Because the pedagogy of biology does not enable the conceptualization of sexuality removed from binaries, the only way LeVay could frame his research was within the language and binarized categories available to him.<sup>28</sup>

Elizabeth Wilson’s “Neurological Preference: LeVay’s Study of Sexual Orientation” was published eleven years before Broadway’s “Queer (v.) queer (v.),” and her use of science to reinterpret LeVay’s data further asserts Broadway’s argument. She does not offer a critical analysis of LeVay’s, nor does she address the flaws in scientific research of sexual orientation. Wilson explores

neurological sexual dimorphism in the brain, and offers insight into the “exceptional neurological and sexual forms that [LeVay’s] data discloses.”<sup>29</sup> By addressing natural variation in neurological ‘wiring’ and brain morphology, Wilson offers an exceptionally clever way to criticize the notion of male-typical and female-typical sexual dimorphism and/or behaviour. One of the most eye-opening statements is how “[t]he second largest INAH 3 was in a homosexual man, the volumes of the three smallest nuclei in the heterosexual men closely matched those of the homosexual men.”<sup>30</sup> Despite the fact that the data was ‘significant’ in supporting similarities between homosexual men and heterosexual women, and differences between homosexual men and heterosexual men, the sheer variation among those studied emphasizes how human biology cannot be reduced to two dominating, binarized categories.<sup>31</sup>

Wilson continues her discussion of LeVay’s data by asking “how to account for a body of data that both clusters in a statistically significant dimorphic pattern and manifests exceptional, outlying measurements that directly contradict this pattern.”<sup>32</sup> The outlying data “are a part of the natural diversity of human sexualities”, and as such call into question the naturalness and stability of the binaries LeVay rooted the assumptions for his study in.<sup>33</sup> She concludes by stating that “LeVay’s data has facilitated a literature that reduces sexuality to binarized forms, [but] it also opens sexuality into a broader field of material instantiation.”<sup>34</sup> The language she uses to articulate her ideas and the sheer complexity of human neurology she addresses makes this article accessible only to those with a post-secondary education in biology and/or neuroscience. Interestingly, by applying a purely biological approach to interpreting LeVay’s data, one challenges the binarized identities of homosexual and heterosexual his publication somehow naturalized. Wilson has established a platform in which biological diversity can be used to challenge popular assumptions – the binarized cultural classifications most researchers have assumed to be natural – that plagued LeVay’s (and many others) approach to researching the biological cause of homosexuality.<sup>35</sup>

The most recent article, Andrew Griffith's "Queer Genes: Realism, Sexuality, and Science" offers the most effective and comprehensive critical analysis of cultural understandings of sexuality, incorporating critical theories into the problematic scientific research that Byne, Stein, Jenkins, and Wilson previously addressed. By applying queer theory to the 'gay gene', Griffiths can critically address the use of binarized categories into the 'scientific' research of sexual orientation. Griffith initially criticizes a biological approach when attempting to understand sexuality because it "play[s] up the importance of the biological at the expense of the social... as opposed to seeing the biological and the social as complexly co-forming."<sup>36</sup> He then proceeds to explain why the notion of a gay gene satisfies public anxiety regarding individual characteristics, as "mapping the human genome, or reading the book of life" accurately explains human behaviour and desire.<sup>37</sup> This analysis helps the reader understand why LeVay was so insistent on discovering a biological cause for homosexuality – it would subdue public anxiety and aid the political movement for equal rights.<sup>38</sup>

With this acknowledgment, Griffith provides a considerable explanation of how "[q]ueer... is a social process and a negotiation of normativities, rather than an exploration of particular sexual identities."<sup>39</sup> The remainder of the article explains how 'three key resources': feminist epistemologies, agential realism, critical realism, can work in conjunction with queer theory to explain how genes "become real through specific material-discursive arrangements of the agency of the world."<sup>40</sup> By investigating why Western culture requires biological essentialism as an explanation for sexual variations, Griffith navigates the binarized terminology that plagued LeVay's attempt to research sexual orientation. By providing explanations for the three key resources, Griffith successfully integrates theoretical frameworks into the analysis of scientific research of sexual orientation, opening the discussion to academics from different disciplines.

Lynda Birke must be included, as the language she uses to defend

her central argument offers an exceptionally well articulated, clear, and concise recapitulation of the other six academics that have been addressed in this paper. Birke does not offer any additional analyses of the research of sexual orientation that Byne, Stein, Jenkins, and Griffiths did not cover. It is the language in her article, which is intended for a wider audience, that provides an accessible framework for individuals to understand how binarized categories dominated ‘scientific’ research. One particularly effective quote: “we who are lesbian or gay are cast as an ‘intermediate’ sex, we are mannish women or effeminate men. Sexuality is once again collapsed onto gender, and the diversity of sexual and personal expression among our communities ignored.”<sup>41</sup> Birke has reiterated what a decade of literature before her has argued – the masculine/feminine binary is an authoritative structure that has plagued public understanding of sexual orientation, which makes it almost impossible to understand sexual orientation without this binary.<sup>42</sup>

Simon LeVay’s attempt to isolate a biological cause for human sexuality was both politically and personally motivated, as the gay neuroscientist believed that establishing homosexuality as a natural (biological) sexual orientation would help the gay rights movement. Unfortunately, any attempt to use science to explain a complex socio-cultural phenomenon like human sexuality is overwhelmingly problematic, as the works of Byne, Stein, Jenkins, Wilson, Griffiths, and Birke have demonstrated. The scientific method itself is a socially constructed process that was created within culturally specific social ideals, and as a result scientists have unproblematically adopted the socially constructed binarized categories of male/female, masculine/feminine, and heterosexual/homosexual into their research and as ‘naturally’ occurring categories. The scientific method has successfully naturalized socially constructed classification systems within Western cultures while simultaneously asserting itself as an objective discipline capable of establishing the ‘truth’. To reevaluate contemporary approaches when studying sexuality researchers must acknowledge that science itself is a socially constructed discipline, that classification systems which label individuals are the result of complex socio-

cultural interactions, ultimately reframing their understanding of gender and sexuality by incorporating a queer approach to studying biology. Sexuality is a convoluted element of the human experience, one which science is incapable of truly appreciating, and must reevaluate its approach when studying the complexity of human sexuality.

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