

OBJECTIVITY AND ORGASM

Samantha Wakil Al Ghoul

A thesis submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Arts in the Department of Philosophy.

Chapel Hill
2018

Approved by:

John Roberts

Alan Nelson

Gillian Russell.

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ABSTRACT

Samantha Wakil Al Ghouli: Objectivity and Orgasm
(Under the direction of John Roberts)

Lloyd (2005) analyzes every proposed evolutionary explanation of female orgasm and argues that all but one suffer from serious evidential errors. Lloyd attributes these errors to two main biases: androcentrism and adaptationism. But, there is an alternative explanation for the discrepancies in the case of the female orgasm that Lloyd's analysis overlooks. I present and argue for the plausibility of this alternative explanation. In short, the alternative explanation is that an imprecise definition of orgasm is what's partially responsible for the missteps in this research domain. Further, Lloyd takes her analysis to support Lonigno's (1990) Contextual Empiricist model. Insofar as Lloyd's analysis fails to capture an important part of scientific practice the alternative explanation picks out, this might reveal a shortcoming for Contextual Empiricism.

ACKNOWLEDGEMENTS

I would like to thank John Roberts for his invaluable guidance on this project, my readers Alan Nelson and Gillian Russell for their insightful comments and helpful suggestions. I also thank my friends and family for their love and support. In particular, I especially thank my mom who always encouraged and raised me not be afraid to ask questions about sex and female sexuality.

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I. INTRODUCTION

Science is often given a special—privileged—status over other forms of inquiry. Presumably, it is the success of scientific methods which justifies the intellectual authority of the scientific community and supports the claim that science can accurately describe, discover, and underwrite knowledge about the natural world. Many claim it is the objective character of scientific reasoning that is responsible for its incomparable epistemic success. (Popper 1959, 1972; Jeffery 1956, Levi 1960; Carnap 1967; Betz 2013) To characterize the methods and results of science as objective is to express the idea that it is free of any individual or community wide values, biases, or personal interests. But, the fact scientific research is a human activity threatens to undermine this idea and any associated concept of objectivity. Criticisms of scientific practice show that contextual values and bias can, and often do, negatively impact both the theoretical and experimental aspects of research. (Kuhn 1962; Rudner 1953; Douglas 2009; Longino 1990)

In an effort to save scientific objectivity Longino (1990) defends a view that embraces contextual values within scientific practice. Aptly called Contextual Empiricism the view is based on a social epistemology; it assumes knowledge (especially scientific) is a social process and product. Science can be considered objective to the degree the scientific community engages in transformative criticism which requires ‘intersubjective interactions’ amongst scientists. These interactions are what facilitates the transformation of the subjective into the objective, enabling the scientific community to form a consensus on what qualifies and is incorporated into the body of scientific knowledge. Importantly, Contextual Empiricism rejects any independent standards by which to assess scientific theories, methods, and results. This radically departs from other standard

accounts which attempt to specify cognitive values that explain the epistemic success of science and serve as norms to guide scientific assessments. Values such as simplicity, breadth of scope, consistency, empirical adequacy, and explanatory power are well known candidates. But, Longino (1996) argues that in certain research contexts these traditional “cognitive” values can be politically regressive and lead to empirically inadequate science.¹ Thus, even the values we might characterize as cognitive are in fact contextually dependent.

Blurring the distinction between cognitive and noncognitive values bolsters the Contextual Empiricist model and supports Longino’s claim that only a social and pluralist account can maintain the objectivity of science. To augment the failings of the traditional values Longino proposes mutuality, novelty, applicability to human needs, diffusion of power, and ontological diversity as new values that ought to be contextually adopted. However, both the traditional and Contextual Empiricist set of values fail to identify a core and common error afflicting scientific practice. As such, even when combined the aforementioned values are insufficient as a normative guidelines and explaining the unparalleled success of science.

The error is using an imprecise definition of the target phenomenon being studied. Analyzing a case study about female orgasm research illustrates the error clearly, thereby exposing the deficiency in both sets of values. Lloyd (2005) claims androcentric and adaptationist biases have misled evolutionary explanations for the origin of female orgasm. Out of the 21 explanations offered Lloyd claims only one is empirically adequate. Importantly, Lloyd endorses the Contextual Empiricist model. Lloyd not only uses the model as a diagnostic tool but argues that adhering to

¹ Consider the influence social ideologies of gender had on gametic fusion research. Gendered characterizations of an “active” sperm on a “mission to assault” the “passive” and “awaiting” egg misled scientists about the contribution the egg plays in the fertilization process. (Martin 1991) According to Longino this example shows how it can be a theoretical virtue to consider causal processes as mutual rather than having a single causal factor; which Longino considers a traditional though non-Kuhnian value.

Contextual Empiricism would have helped researchers avoid producing and accepting faulty science. I argue however that the contention surrounding the case of the female orgasm is due to an imprecise definition of the trait in question. Further, I propose that the absence of an exact definition is what enabled the biases Lloyd identifies to seep into this research domain. Section 2 summarizes Lloyd's critique of research on the female orgasm. Section 3 explains the shortcomings of Lloyd's critique. Section 4 teases apart the various ways orgasm might be defined and takes this variance as the basis for a new analysis of what went wrong in the case of the female orgasm. Section 5 concludes by examining the implications of this new analysis for the concept of scientific objectivity.

II. FEMALE ORGASM

Lloyd argues that ardent adaptationism is the most destructive bias in evolutionary accounts of the female orgasm. Adaptationist explanations assume the presence of the female orgasm trait is due to its being naturally selected for. The most common type of adaptationist explanations are 'pairbonding' accounts; 11 out of the 21 proposed evolutionary explanations take this form. The hypothesis is that orgasm helps ensure a monogamous relationship with a sexual partner. Monogamy could, theoretically, provide many reproductive advantages. Consequently, these explanations claim orgasm helps create pair-bonds which in turn motivates individuals to have intercourse with the same person.

The empirical discrepancy with pair-bonding accounts is the significant gap between the occurrence of intercourse and the occurrence of orgasm.² An average of 32 studies examining the frequency between intercourse and orgasm indicates only 25.3 percent of women reliably orgasm

² Of course, a present gap between orgasm and intercourse does not establish that there was a gap in the evolutionary past when the adaptation supposedly evolved.

with intercourse. (see chapter 2 in Lloyd 2005). In fact, orgasm is much more common during self-masturbation and homosexual sex acts (Garcia et al. 2014) making its adaptive value for reproductive sex dubious.

In response to the negative frequency between intercourse and orgasm several sperm competition explanations have been proposed. Most notably is the ‘up-suck’ hypothesis which claims that orgasm creates a sucking mechanism within the uterus that helps propel sperm into the reproductive tract, which supposedly increases the chance of fertilization. There are several problems with the up-suck hypothesis. First, there is no evidence that orgasm increases the probability of conceiving and there is no association between orgasm and number of offspring. (Zietsch and Santtila 2013) Second, the evidence that there is a sucking-like mechanism is at best equivocal. Some studies have even recorded a reduction in uterine pressure after orgasm. (see chapter 7 in Lloyd 2005) Finally, while fertility is necessary for reproductive success, reproductive success depends on more than merely the ability to get pregnant.³ Trade-offs between the number and quality of offspring, and between adult reproductive effort and mortality, are constantly occurring. Additionally, the costs and benefits of such trade-offs are not fixed and vary significantly in response to changing environmental factors. The sperm competition explanations on offer fail to even consider these ecological and evolutionary complexities.

i. Androcentrism

The other bias Lloyd argues has misled scientists is androcentrism. Lloyd defines androcentrism as viewing things from an exclusively male perspective. There are two variants of androcentrism specifically regarding female orgasm. First, that female sexuality is analogous to male

³ While I agree with Lloyd on this conceptual point, the former (reproductive success) necessarily depends on the later. Therefore, the focus on fertility doesn’t appear to be a totally baseless starting point for sperm-competition accounts.

sexuality. This means assuming males and females have the same physiological and psychological sexual responses. Second, that female sexuality is reproductive sexuality. In other words, that procreative—i.e. heterosexual vaginal intercourse—is the only evolutionarily significant type of sex. Lloyd argues both of these assumptions should be rejected. (see chapter 8) Unsurprisingly, these assumptions often appear together. For example, one hypothesis suggested that the function of female orgasm is to communicate sexual satisfaction to a male. The male's ability to identify female orgasm derives from female orgasm resembling male orgasm, and the communication of sexual satisfaction is supposedly adaptive because it could protect the female from retaliation of her male partner who suspected infidelity: "men had to be sure that their females were going to be faithful to them when they left them alone to go hunting." (Morris 1967, p 64)

This account flies in the face of the available evidence. Compared to females who do not show any or much sexual excitement, females who show more excitement or can orgasm easier tend to have a statistically significant greater number of sexual partners. (Wolfe, 1979) Additionally, several studies report large success in women faking orgasms (see Hamilton, 1929 and Thornhill et al. 1995) calling into question male's ability to recognize when a woman has orgasmed. Finally, cross cultural studies indicate that most men are not concerned with female sexual satisfaction at all. (Davenport, 1977)

ii. The By-product Account

This account claims females have the potential to orgasm because of the strong selection on males to orgasm and their shared embryologic origins. Orgasm is necessary for male reproductive success, as the contractile pulses serve as the sperm-delivery system. Thus, there is strong selective pressure for the materials needed in male orgasm development. The tissues and muscle fibers associated with orgasm develop in the embryo before the respective sex organs gain their distinctive features. During the first eight weeks of development male and female embryos have no

differentiating characteristics except for the chromosomes. If the embryo is male, after eight weeks of gestation there is a release of hormones that triggers the development of the male sexual apparatuses and female sexual organs develop otherwise.⁴

One piece of evidence supporting this account is that the penis and clitoris appear to be homologous organs. There is a shared organ between male and female embryos that only develops into the respective sex organs after the dose of hormones it receives at the eight week gestation period. The clitoris and penis have the same erectile tissue, nerve tissue, and muscle fibers which are involved in sensing sexual excitement and producing orgasmic contractions. Lloyd also claims the by-product account fits with data regarding masturbation techniques amongst women (which almost never includes penetration) and the infrequency of orgasm with heterosexual intercourse. As mentioned before, this same data seems to be inconsistent with evolutionary explanations that assume female orgasm is related to the potentially reproductive aspect of heterosexual intercourse.

Furthermore, it follows from adaptive accounts that males should be incentivized to either choose females who can easily orgasm or prioritize making their mate orgasm. But cross-cultural evidence suggests that in typical communities “men take the initiative and, without extended foreplay, proceed vigorously towards climax without much regard for achieving synchrony with the women’s orgasm...coitus is primarily completed in terms of the man’s passions and pleasures, with scant attention paid to women’s response. If women do experience orgasm, they do so passively.” (Davenport 1997, p149; quoted in Lloyd 2005 p115) Finally, of the few nonhuman primate species that appear to have orgasm the orgasms most frequently occur during self-masturbatory or

⁴ The male nipple is an analogous by-product example. There is a strong selection pressure for female nipples in mammals due to its reproductive necessity to feed offspring. Male mammals acquire nipples from the same early embryological form with females. (See Symons 1979)

homosexual sex acts. Thus, there is no evidence which suggests orgasm has a reproductive role in female primates. (See chapter 5 for a complete presentation of the by-product account)

According to Lloyd, the upshot is that the byproduct account does not share the background assumptions which seem to have implicated the other accounts with serious evidential problems. It does not assume the female orgasm is an adaptation, leading scientists to generate procreative hypotheses. Nor does it assume androcentrism, motivating hypotheses based on the false idea that female sexual response is analogous to male sexual response. Out of all 21 evolutionary explanations for the female orgasm Lloyd claims the byproduct account is the most empirically supported. Lloyd concludes that “there is a direct tie between making these background assumptions and making the specific evidential errors that I have detailed [] when it comes to explanations of female orgasm.” (2005 p256) Despite the depth of Lloyd’s analysis it misses an additional (perhaps more fundamental) error in the case of the female orgasm. As the next section will argue, the by-product account Lloyd defends is guilty of the androcentric bias she claims is partially responsible for the evidential errors of the competing theories.

III. TWO DEFINITIONS OF HOMOLOGY

The by-product account of female orgasm is based on the concept of homology. The standard notion of homology in evolutionary biology refers to the divergent development of structures or processes from a common origin. It’s clear Lloyd has this developmental definition in mind. In support of the by-product account she says “The penis and clitoris have the same embryological origins and are thus called ‘homologous’ organs.” (Lloyd 2005, p108) But, there is a different way of defining homology. Crucially, this alternative definition is the one operative in Symons (1967) by-product explanation which Lloyd claims to explicate and defend.

An interesting historical analysis reveals Symon used a non-developmental concept of homology based on a congruence between genetic sex and behavioral sex; according to which there are distinct male and female sexual behavior patterns. (Lee 2013) For example, “mounting” is supposedly a male behavior. Behaviors that match the genetic sex of the individual displaying the behavior are “homologous” while behaviors that match the opposite genetic sex are “heterologous”.

These two definitions of homology lend themselves to radically different interpretations of the potential for females to orgasm. On the developmental reading it refers merely to the shared prenatal tissues that develop into either a penis or clitoris, supplying females with the physiological materials required to potentially orgasm. But on Symon’s idiosyncratic definition it refers to the potential for an individual to have both male and female behavior patterns. According to Symon the adaptiveness of orgasm in males makes it a specifically male sex response. Thus, when men orgasm “it is homologous because the behavior matches the genotypic sex, in females it is heterologous, because it does not match....her mating response to a male is female behavior [but] her orgasm is a male behavior. Her behavior is male and female at the same time.” (Lee 2013 p1025)

Symon’s definition of homology—by claiming orgasm is a distinctly male trait and using male orgasm as the proxy for characterizing female orgasm— is dripping with the androcentrism Lloyd defines as “not treating female sexuality as autonomous from male sexuality or male reproduction” (2005 p236) and “assuming females response is like males response” (2005 p237). Importantly, the evidence Lloyd cites in favor of the by-product account does not distinguish between the two different interpretations; both are equally supported by the available evidence. In other words, if we hold fixed what is common between the two interpretations, intervening on the androcentric bias won’t have any effect on the core hypothesis that females have the potential to orgasm in virtue of selection for male orgasm. Thus, it seems the biases Lloyd identifies cannot fully account for the missteps in this research area.

So, what can we say about the case of the female orgasm? Early in the book when explaining the basics of female orgasm Lloyd makes a passing claim which, I think, contains a potential answer: “...orgasm is a significant and crudely quantifiable aspect of sexual response that has caught the attention of evolutionists.”(Lloyd 2005, p23) It is the “crudely quantifiable” bit that I think has understated importance. My hypothesis is that the lack of a precise definition of ‘orgasm’ has been (and still is) the primary obstacle for this domain. It’s important to clarify before moving on that when I refer to the definition of orgasm I am not making any claims about what the ordinary everyday notion of orgasm is, means, or refers to. The concern here is with the way statements about the explanandum are characterized. The starting place for any evolutionary inquiry requires getting as clear as possible on what exactly it is we are trying to explain; and for the sake of generating testable hypothesis and critical predictions this must involve specifying measurable features of the trait in question.(Sober 1999) The ordinary concept of orgasm is too elusive to meet this criteria, yet it has been featured in many prominent scientific accounts of female orgasm. The next section will illustrate the different ways orgasm may be defined and argue that more precise characterizations of the trait are what account for improved empirical adequacy of current orgasm research.

IV. WHAT EXACTLY IS AN ORGASM?

Canvassing the relevant literature immediately reveals the obvious lack of an explicit definition.⁵ What exists is a mishmash of physiological, behavioral, and phenomenological descriptors: “the mounting of tension and peak of sexual response.” (Bancroft 1989 p81), “Climax of intense feeling followed by feeling of relief and relaxation.” (Wallin 1960) “Reflexive clonic

⁵ There are two potential problems here. First is the plurality of definitions and second the imprecision of the various definitions. I am only identifying the latter as the problem in this case study. Though I have strong pluralist predilections, I make no claims here about the former.

contractions of pelvic/abdominal muscle groups.” (Mould 1980), “Stretchreflex release of genitopelvic muscular vasocongestion” (Sherfy 1972), and my personal favorite “a capacity to surrender to flow of biological energy” (Reich 1973). Despite the wide disparity, the various definitions of female orgasm can be taxonomized under two broad categories: classificatory and quantitative.⁶

Classificatory definitions merely identify orgasm as particular point during sexual activity. The most widely used model of the sexual response cycle is Masters and Johnsons four stage model (1966). The four stages are: excitement, plateau, orgasm, resolution. Orgasm is a classificatory concept on this model, used to identify a specific stage in the cycle. They do state orgasm involves muscular contractions, and through observational reports they claim the muscular contractions can be in the vagina, uterus, rectum, or a total body contraction, and is followed by a “release”. Prause (2012) highlights the limitations of what I’m calling a classificatory definition of orgasm. Most studies she notes “commonly describe orgasm as a ‘peak sensation of intense pleasure’ without citation [] which should be attributed to a lack of evidence to cite.” (Prause 2012, p7) Further, the limited data collected from studies which use a classificatory definition (including Master and Johnson) rely on self-reports, but “self-reports are of unusually limited utility in the study of female orgasm...many women are unsure whether they even experience orgasms...it also appears difficult or impossible for women to identify sites of orgasm stimulation reliably (see also Levin, 2012).” (Prause 2012 p8) Thus, Prause rightly concludes “studies should include other measures of orgasm in addition to self-report whenever possible...studying physiological responses warrants inclusion of

⁶ I’m borrowing this terminology from Carnap’s classification scheme for the explication of empirical concepts. Explication is a tool for transforming or replacing imprecise concepts with new more exact concepts. There are three categories: classificatory, comparative, and quantitative. Quantitative is the most precise, classificatory the least. (Carnap 1950)

physiological measures whenever possible. A number of methods are available (Bohlen and Held, 1979; Levin, 2004; van Netten et al., 2008). It is surprising these have not been used.” (2012 p8)

The imprecise classificatory notion can easily be contrasted with a quantitative concept of orgasm. By using an insertable device that combines photoplethysmograph (blood-flow sensor) and electromyograph (muscle activity sensor) technology researchers can directly measure the pressure, pattern, and duration of pelvic and genital contractions during sexual activity. Additionally, the levels of various hormones can, and in some cases have been, recorded to characterize orgasm. Although there are the tools available to quantitatively characterize orgasm, as Prasue notes these tools “will not be acceptable to many volunteers and will bias participation.” (2012 p8) Despite these practical difficulties some research, which will be discussed later in this section, has shifted to more precise definitions of orgasm. With the distinction between a classificatory and quantitative definition of orgasm now delineated a different explanation of the case study presents itself. Interestingly, there seems to be a strong correlation amongst the theories Lloyd critiques: the most empirically inadequate theories (which according to Lloyd are guilty of the most evidential errors) use a classificatory definition while the most empirically supported appeal to a more precise—partially quantified—definition.⁷ Further, I claim that a close examination of some of the studies Lloyd criticizes suggests that the use of the imprecise concepts is what enabled the biases Lloyd identifies to infiltrate this research area. We will examine one such case next.

- i. The explication explanation

⁷ See page table 2 on page 104. All of the studies that have 6 or more of the problems Lloyd identifies either do not define orgasm at all or merely appeal to the Masters and Johnson classificatory notion. Ironically one of these studies, Beach (1976), explicitly acknowledges a problem with the definition “rapidly increasing precision and sophistication in endocrinological and neuroendocrinological techniques have not been accompanied by comparable advances in the definition and measurement of behavioral variables.” (p105 italics my emphasis)

Consider the assumption that female sexual response is analogous to males' sexual response. Several accounts have been developed on the basis of this assumption (see Lloyd chapter 5). For example, that the adaptive function of female orgasm is to convey sexual satisfaction to males in order to protect females against violent retaliation in cases of suspected infidelity. Another example comes from Gallup and Suarez (1983). They claim that orgasm keeps a woman lying down after a man ejaculates and this increases the probability of conceiving. The intuitive (but false) idea was that the ability for sperm to reach the cervix would be threatened by gravity if a woman were positioned upright after a man ejaculates (Morris 1967). In support of their hypothesis they note "the average individual requires about five minutes of response before returning to a normal state after orgasm." (Gallup and Suarez p195). Lloyd correctly criticizes Gallup and Suarez's evidential basis. In support of their claim about post orgasm resting period they cite Kinsey et al (1948); a study which only contained trials only on males' post orgasm response. This makes it clear Gallup and Suarez are guilty of assuming female orgasm response is the same as males'. In fact, women are typically in a higher state of arousal and restlessness directly after orgasm. Women are also more likely to orgasm when 'on top', regardless of when or if her partner orgasms. (see Lloyd chapter 3) Importantly, this contradictory evidence was available several years prior to Gallup and Suarez's 1983 paper.

For a theory about the evolution of the female orgasm, the total disregard for any female data might be taken as the perfect example of androcentric bias subverting scientific practice. But, androcentrism does not account for another error Gallup and Suarez make: they never actually define orgasm. The most they say is that "at orgasm there are muscular contractions..." (ibid. p195) and do not characterize these contractions (quantitatively or otherwise) any further beyond stating that they occur. While an explicit definition of orgasm from Gallup and Suarez is lacking, there are clues which suggest they had the classificatory concept in mind. Their entire theory is centered on an observed 'sedative effect' following orgasm in males. Their reference for this phenomena is Masters

and Johnson's work on the sexual cycle. Recall, on this model orgasm is a classificatory concept and the sedative effect described falls under the resolution phase of the model.

Lloyd is correct that Gallup and Suarez's use of male specific data is a major flaw in their study. Further, androcentrism very well may explain why Gallup and Suarez (and others) assume the male and female sexual responses are analogous in the first place. But I think it is mischaracterization of trait itself that actually accounts for the failure of their evolutionary explanation and, relatedly, that it is the vague definition that undergirds the problematic assumption.⁸

Whether we should accept this depends on what evidence there is for the following counterfactual: had scientists used a more precise definition of orgasm they would not have (or at least been less likely) to make the androcentric assumption that male and female sexual responses are analogous. Without an experiment to test this prediction no direct evidence is available. But, there are several reasons that make the hypothesis quite plausible. First, consider the response to the following objection: It is, at best, underdetermined whether a more precise concept would have kept Gallup and Suarez from making the evidence errors they did. Had they not assumed female and male sexual response was analogous they would not have used data collected only from males and this would have been sufficient for rejecting their evolutionary hypothesis. It seems likely that a study merely asking females to report their energy levels post orgasm would have been enough to demonstrate females are not in a sedative-like state. This objection misses the mark in two respects: (1) had Gallup and Suarez kept a vague definition of orgasm but dropped the androcentric assumption they might have been able avoid the evidential errors they made. But, while they potentially could have avoided the specific errors Lloyd charged them with, they would not be

⁸ In fact, Lloyd at one point states that "...faulty descriptions of the trait being explained maybe be a sufficient reason to reject an evolutionary account." (Lloyd 2005, p59)

safeguarded from other errors related to the methodological concerns mentioned before regarding the unreliability of self-reports and merely behavioral observations; and (2) the objection simply does not do justice to the fact that studies which have made some increase in precision are responsible for establishing that male and female sexual responses are analogous is an indefensible assumption (see Stoleru et al. 2012 and Wise et al. 2017). Relatedly, facts about brain activity can be separated from Gallup and Suarez's specific claim that orgasm keeps a female lying down after orgasm. Females may be observed to remain lying down after orgasm, even with increased brain activity.

Second, imprecise concepts are rarely components of substantive wellconfirmed generalizations: 'germ', 'life', 'substance', 'essence', 'aura', and 'life-force' for example. On the other hand, enhancing precision typically facilitates increasing experimental testability, measurability in the field, theoretical unification, mathematical rigor, etc. (Justus 2012). Finally, and complementary to this last point, there is a new theory about the origin of female orgasm which begins by emphasizing how vague definitions of the trait have confounded researchers. Importantly, their theory (which while tentative seems to have strong evidential support) uses a very precise definition of orgasm. Looking at the details of this explanation makes clear the epistemic gains that come from increases in precision.

ii. Orgasm induces ovulation

Pavlicev and Wagner (2016) propose a new explanation about the evolution of the female orgasm. They make a targeted criticism against the current explanations on offer (including the by-product account). That is, the competing explanations all appeal to evidence from current human biology and this evidence is relevant to the modification of the trait, not its evolutionary origin. Tracing the evolutionary history of the trait requires identifying its homologue in other species.

But, they note a problem with the way orgasm is usually defined “Human orgasm is often described as a climax, followed by a sudden discharge of sexual arousal. Defined this way, the presence of female orgasm is hard to establish with certainty beyond primates, and hence little has been found about its distribution.” (2016 p 327) Instead, they propose to describe orgasm specifically by a neuroendocrine discharge, in particular a surge of prolactin. Pavliceve and Wagner argue that this surge may reveal the homolog of human female orgasm, as it occurs in many other mammals is a measurable trait across species. They reason that the “surge serves a range of important but variable reproductive functions across mammals, [and] may have become modified to what we understand as female orgasm in humans, as its ancestral reproductive function became less important or obsolete” (2016 p327). More specifically, they hypothesize that the ancestral reproductive role preceding human female orgasm was that orgasm would induce ovulation. This is in fact what the phylogenetic evidence and comparative anatomy suggests. Not only is spontaneous ovulation derived within placental mammals post the evolution of copulation and environmentally induced ovulation, but the evolution of spontaneous ovulation is correlated with an increasing distance of the clitoris from the vaginal canal across mammal species.

V. CONCLUSION

As mentioned before, Lloyd takes her analysis of the case of the female orgasm to support the Contextual Empiricism model. In light of the new analysis presented here it’s worth considering what implications (if any) it has for Contextual Empiricism and the notion of objectivity in general. Longino critiques other models of objectivity—like Kuhn 1962; Kitcher 1993; Soloman 1995, 2001; Alvin Goldman 1995—for ignoring the very process that generates scientific knowledge. (Longino 1990; 2002) Science, Longino claims, can be considered objective “to the degree that it permits transformative criticism.” (1990 p76). Transformative criticism is achieved by ‘intersubjective interactions’ and Longino specifies four evaluative criteria of intersubjective interactions (1990 p76):

- (1) Avenues of criticism: public forums to criticize evidence, methods, assumptions, and reasoning.
- (2) Uptake of criticism: theories and beliefs must change over time as a result of critical discourse.
- (3) Shared standards: publicly recognized standards used to evaluate theories, observations, and hypotheses.
- (4) Equality of intellectual authority: The consensus of the community must result from critical dialogue where all relevant perspectives are represented.

The most contentious feature is the third requirement, the shared standards of evidence. What exactly these should constitute is unclear. Longino explains the shared standards are supposed to serve as ideals that regulate normative discourse, and this is where cognitive values are typically invoked. But, Longino denies that the traditional cognitive values typically thought to be part of the shared standards are always reliably truth conducive because socio-political factors can taint the evaluation of theories, hypotheses, and even observations. (1996) Assuming this is correct, a more pressing question remains. Even Longino admits that in many cases the traditional cognitive values are a good criteria for making scientific judgments. So, what is it about socio-political factors that potentially undermines the truth conduciveness of traditional cognitive values? Contextual empiricism does not provide much insight on this question. But, the explication explanation points to one potential answer. As we saw in the case of the female orgasm, failing to use a precise definition of the target phenomena was correlated with theories having serious evidential discrepancies and the biases Lloyd identifies. Therefore, it might be that using classificatory or

comparative concepts is what enables social-political factors to enter into scientific discourse; allowing them to contaminate the usual success of traditional cognitive values.⁹

To put the upshot another way, Contextual Empiricism is motivated by Longino's view that any inquiry "must characterize its subject matter at the outset in ways that make certain kinds of explanation appropriate and other inappropriate. This characterization occurs in the very framing of questions." (1990, p98). What this analysis reveals is that there is something prior to the framing of questions: precisely defining the phenomena we generate questions about! Contextual empiricism, and all other accounts of scientific objectivity Longino criticizes for that matter, fail to recognize this vital component of scientific practice.¹⁰ Not only does explication provide a framework for evaluating how researchers define the concepts they seek to study, but given the correlation established in the case of the female orgasm it might turn out that an emphasis on explication could potentially guard against the sociopolitical factors that can poison epistemic success.

⁹ Of course, having a quantitative concept is not sufficient for a 'good' theory e.g. I.Q testing, supply-side economics, astrology.

¹⁰ Although, sometimes a precise definition of the phenomena is the aim of scientific inquiry.

REFERENCES

- Bancroft, J. (1989) *Human Sexuality and Its Problems*. New York: Churchill Livingstone.
- Betz, G. (2013), "In defence of the value-free ideal", *European Journal for the Philosophy of Science*, 2: 207-220.
- Carnap, R. (1967) *The Logical Structure of the World*, Rudolf Carnap, tr. By Rolf. A. George, University of California Press, Berkeley/Los Angeles.
- (1950) "Empiricism, Semantics, and Ontology" *Revue Internationale de Philosophie* 4 (11):20-40.
- Davenport, W.H. (1977) "Sex in cross-cultural perspective." In *Human Sexuality in Four Perspectives*, ed. F. Beach, pp.115-163. Baltimore: Johns Hopkins University Press.
- Douglas, H. (2009), *Science, Policy, and the Value-Free Ideal*, Pittsburgh: University of Pittsburgh Press.
- Gallup, G. and Suarez, S. (1983) "Optimal reproductive strategies for bipedalism. *Journal of Human Evolution* 12:193-196.
- Garcia, J., Lloyd, E., Wallen, K., Fisher, H. (2014) "Variation in Orgasm Occurrence by Sexual Orientation in a Sample of U.S Singles" *The Journal of Sexual Medicine* 11(11): 2645-2652
- Goldman, A. (1995) "Psychological, social, and epistemic factors in the theory of science" In *Proceedings of the Binnial Meeting of the Philosophy of Science Association*, 1994 ed. R. Burian, M.Forbes, and D.Hull, pp 277-286. East Lansing, MI: Philosophy of Science Association.
- Hamilton, G.V (1929) *A Research in Marriage*. New York: Albert & Charles Boni.
- Kinsey, A., Pomeroy, W., Martin, C. (1948) *Sexual Behavior in the Human Male*. Philadelphia: W.B. Saunders.
- Kitcher, P. (1993) *The Advancement of Science: Science without legend*, Objectivity without Illusions. Oxford: Oxford University Press.
- Lee, D.(2013), "Homology, female orgasm and the forgotten argument of Donald Symons", *Biol Philos.* 28:1021-1027.
- Levi, I.(1960) 1960, "Must the Scientist Make Value Judgments?", *Journal of Philosophy*, 57: 345-357.
- Longino, H. (1990) *Science as Social Knowledge: Values and Objectivity in Scientific Inquiry*, Princeton: Princeton University Press.
- 1996, "Cognitive and Non-Cognitive Values in Science: Rethinking the Dichotomy", in *Feminism, Science and the Philosophy of Science*, L.H. Nelson and J. Nelson (eds.), Dordrecht: Kluwer, 39-58.
- Lloyd, E. (2005) *The Case of the Female Orgasm: Bias in the Science of Evolution*. Harvard University Press.
- Jeffrey, R. (1956), "Valuation and acceptance of scientific hypotheses", *Philosophy of Science*, 23(3): 237-246.
- Justus, J. (2012) "Carnap on Concept Determination: Methodology for Philosophy of Science." *European Journal for Philosophy of Science* 2 (2012): 161-179.

- Kuhn, T. (1962 [1970]), *The Structure of Scientific Revolutions*, Second edition, Chicago: University of Chicago Press.
- Martin, E. (1991) "The Egg and the Sperm: How Science Has Constructed a Romance Based on Stereotypical Male-Female Roles" *Signs*. Vol. 16, No. 3 pp. 485-501.
- Masters, W.H.; Johnson, V.E. (1966), *Human Sexual Response*. Toronto; New York: Bantam Books.
- Mould, D. (1980) "Neuromuscular aspects of Women's Orgasms" *The Journal of Sex Research*. 16(3): 193-201.
- Morris, D. (1967) *The Naked Ape: A Zoologist's Study of the Human Animal*. New York: McGraw-Hill.
- Pavlicev, M. and Wagner, G. (2016) "The evolutionary origin of female orgasm" *JEZ-B Molecular and Developmental Evolution*. 326 (6): 326-337.
- Prause, N. (2012) "The human female orgasm: critical evaluations of proposed psychological sequelae." *Sexual and Relationship Therapy*, pp 1-14.
- Popper, K. (1972), *Objective Knowledge: An Evolutionary Approach*. Oxford: Clarendon Press.
-(1959) *The Logic of Scientific Discovery*, translation of Logik der Forschung, London: Hutchinson.
- Reich, W. (1973) *The function of the orgasm*. Farrar, Straus and Giroux.
- Rudner, (1953), "The Scientist Qua Scientist Makes Value Judgments", *Philosophy of Science*, 20: 1-6.
- Sherfey, M.J. (1973) *The Nature and Evolution of Female Sexuality*. New York: Random House.
- Sober, E. (1999) "Testability" *Proceedings and Address of the American Philosophical Association* 73 (2):47 - 76.
- Solomon, M. (1995) "Multivariate models of scientific change" *Proceedings of the Binnial Meeting of the Philosophy of Science Association*, 1994 ed. R. Burian, M.Forbes, and D.Hull, pp 287-297. East Lansing, MI: Philosophy of Science Association.
-(2001) *Social Empiricism*. Cambridge: MIT Press.
- Stoleru, S., Fonteille, V., Cornelis, C., Moulrier, V. (2012) "Functional neuroimaging studies of sexual arousal and orgasm in healthy men and women: a review and meta-analysis" *Neuroscience and Biobehavioral Reviews* 36: 1481-1509.
- Symons, D. (1979) *The Evolution of Human Sexuality*. New York: Oxford University Press.
- Thornhill, R., S.W. Gangestad, and R.Comer. (1995) "Human female orgasm and mate fluctuating asymmetry." *Animal Behavior* 50: 1601-1615.
- Wallin, P. (1960) A student of orgasm as a condition of women's enjoyment of intercourse. *Journal of Social Psychology* 51:191-198.
- Wise, N.J., Frangos, E., Komisaruk, B.R., (2017) "Brain Activity Unique to Orgasm in Women: An fMRI Analysis" *J Sex Med* 14(11): 1380-1391.
- Wolfe, L. (1979) "Behavioral patterns of estrous females of the Arashiyama West troop of Japanese macaques (*Macaca fuscata*)." *Primates* 20 (4): 525-534.

Zietsch, B., Santtila, P. (2013) "No direct relationship between human female orgasm rate and number of offspring" *Animal Behaviour*. <http://dx.doi.org/10.1016/j.anbehav.2013.05.01>