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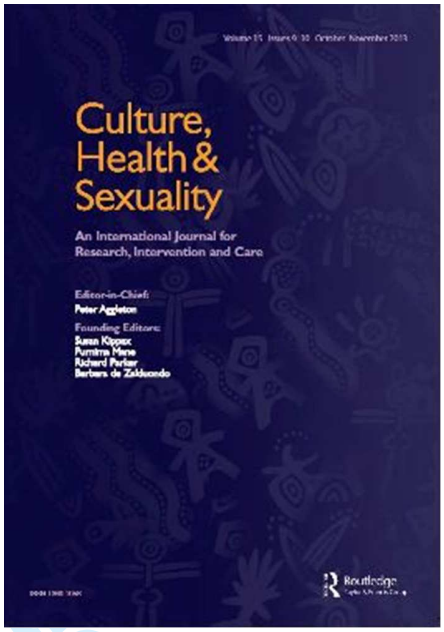

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False Beliefs Predict Increased Circumcision Satisfaction in a Sample of US American Men

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Abstract

Critics of non-therapeutic male and female childhood genital cutting claim that such cutting is harmful. It is therefore puzzling that 'circumcised' women and men do not typically regard themselves as having been harmed by the cutting, notwithstanding the loss of sensitive, *prima facie* valuable tissue. For female genital cutting (FGC), a commonly proposed solution to this puzzle is that women who had part(s) of their vulvae removed before sexual debut 'do not know what they are missing' and may 'justify' their genitally altered state by adopting false beliefs about the benefits of FGC, while simultaneously stigmatising unmodified genitalia as unattractive or unclean. Might a similar phenomenon apply to neonatally circumcised men? In this survey of 999 US American men, we find that greater endorsement of false beliefs concerning circumcision and penile anatomy predicts greater satisfaction with being circumcised, while among genitally intact men, a trend in the opposite direction occurs: greater endorsement of false beliefs predicts less satisfaction with being genitally intact. These findings provide tentative support for the hypothesis that the lack of harm reported by many circumcised men, like the lack of harm reported by their female counterparts in societies that practice FGC, may be related to holding inaccurate beliefs concerning unaltered genitalia and the consequences of childhood genital modification.

Keywords: circumcision, sexual experience, satisfaction, FGC, FGM, USA

Introduction

Male circumcision is the surgical removal of part, or all, of the penile prepuce (foreskin; see Figure 1) (Taylor, Lockwood and Taylor 1996). Circumcision is by far the most common paediatric surgery performed in the USA (Witt, Weiss and Elixhauser 2014), while it is much less common in other industrialised nations (Morris et al. 2016; UNAIDS 2010; Wallerstein 1985). Although this surgery is in rare instances indicated as a medical treatment for a specific foreskin-related problem (chiefly for recurrent, pathologic phimosis due to balanitis xerotica obliterans), it is overwhelmingly performed on healthy infants or young children for perceived prophylactic, cultural/cosmetic, or ethno-religious reasons (Rickwood 1999; Sneppen and Thorup 2016; UNAIDS 2010).

When circumcision is performed in the absence of a strict medical indication, and on babies and young children who cannot provide their own consent, it raises a number of complex ethical issues (see, e.g., Benatar and Benatar 2003; Darby 2015, 2016; Foddy 2013; Hellsten 2004). Such non-therapeutic childhood male circumcision (NTC) has come under increased scrutiny in recent years, with some authors claiming it is a harmful practice, or even a violation of a child's right to bodily integrity (e.g., Fox and Thompson 2005; Frisch et al. 2013; Myers 2015; Svoboda 2013; Svoboda and Van Howe 2013; Ungar-Sargon 2015; for further discussion, see Earp 2017; Sardi 2011). Against this view, supporters of NTC often argue that the majority of men who were circumcised in infancy or early childhood do not regard themselves as having been harmed by the procedure – setting aside surgical mishaps – but rather see it as a neutral issue or even an improvement compared to the natural state (e.g., Jacobs and Arora 2015; Mazor 2013; Shweder 2013, 2016). Since most circumcised men do not regard circumcision as a harm, according to this view, there is little reason to attempt to curtail the practice.

Critics of NTC typically concede that most circumcised men do not regard themselves as having been harmed by circumcision. But they qualify this concession in one of two ways. First, they draw attention to the minority of circumcised men who do regard themselves as having been harmed by circumcision—regardless of the occurrence of surgical complications—and suggest that the proportion of such men,[1] plus the magnitude of discontent expressed by some of them (despite barriers to reporting caused by social stigma, community pressure, fear of not being taken seriously, and so on), is great enough that reform is in fact needed (e.g., Boyle et al. 2002; Goldman 1999; Hammond 1999; Hammond and Carmack 2017; Watson 2014; see also Bossio and Pukall 2017). The second way they qualify their concession is to note that similar claims of feeling unharmed are expressed by the majority of 'circumcised' women (see Shell-Duncan and Hernlund 2000, for a discussion of this terminology) in societies where non-therapeutic female genital cutting (FGC) is culturally normative, including its most invasive forms (e.g., Darby and Svoboda 2007, 305; Hammond and Carmack 2017, 196).

In other words, despite the fact that FGC is generally understood—at least by Western observers and by local dissenters[2]—to be extremely harmful, most women who have actually undergone FGC do not regard themselves as having been harmed on balance by the intervention, much less "mutilated," to use the terminology of the World Health Organization (WHO 2008; see, e.g., Ahmadu 2000, 2007; Davis 2001; Obiora 1996; Public Policy Advisory Network on Female Genital Surgeries in Africa 2012). Instead, similar to many circumcised men in the USA, Israel, some Muslim-majority countries, and very often in their own communities,

these women tend to perceive their modified vulvae as improved or enhanced compared to the natural state (e.g., 'cleaner,' more 'feminine,' more aesthetically appealing: see, e.g., Ahmadu and Shweder 2009; Manderson 2004; Shweder 2000).

One possible explanation for this discrepancy, i.e., between the harm judgments of critics and supporters of FGC, is that the latter may be on average or in certain respects less knowledgeable about the anatomy, functions, and sensory implications of surgically unmodified female genitalia (see, e.g., Abu-Sahlieh 1993; Ekwueme, Ezegwui, and Ezeoke 2010; Rahlenbeck and Mekonnen 2009; Sagna 2014, 615). This hypothesised asymmetry in knowledge could be due, at least in part, to a lack of personal experience with the relevant tissue among 'circumcised' women (especially post sexual debut; see Figure 2): in other words, if they were 'circumcised' early enough, they cannot truly 'know what they are missing.' The hypothesised asymmetry could also be due to certain false and stigmatising beliefs among such women about the dangers of leaving a girl 'uncircumcised' (see Figure 3), for example, the belief that girls with intact genitalia will be stubborn, promiscuous, or unable to control their sexual desires; that genital cutting is necessary for good hygiene or to prove virginity; or that babies will be harmed if they come into contact with their mother's external clitoris during childbirth (Ekwueme, Ezegwui, and Ezeoke 2010; Gruenbaum 2005; Johansen 2017; Merli 2010).

In like manner, critics of NTC suggest that its supporters may also possess, either on average or with respect to certain issues, less knowledge about the anatomy, functions, and sensory implications of surgically unmodified male genitalia, while simultaneously being more likely to adopt false beliefs that appear to 'justify' the irreversible bodily alteration that has already taken place (Goldman 1997; Taylor, Lockwood, and Taylor 1996). For example, they may falsely believe (see Sneppen and Thorup 2016) that failure to undergo circumcision in infancy or early childhood will result in a high likelihood that the individual will need a circumcision 'anyway' for medical reasons later on (see, for example, Haaf 2006).

Consistent with these predictions, Goldman (1997) reported that only about 50% of the circumcised men in his survey who either did not mind, or had positive attitudes about, being circumcised were aware that the foreskin had any purpose (see Figure 1). By contrast, of the circumcised men in his sample who wished that they had not been circumcised, 100% reported awareness that the foreskin had a purpose. In addition, Goldman found that those men who were glad to be circumcised were more likely than the others to underestimate the surface area of the adult foreskin. As Goldman (1997) notes: "These results suggest that the more awareness a man had of the impact of circumcision (i.e., that it involves the loss of a significant amount of tissue that has a purpose), the more likely he would be dissatisfied with being circumcised. Conversely, those who knew less about the impact of circumcision were more likely to be glad (or not care) that they were circumcised" (104).

Why might circumcised men know relatively little about the impact of circumcision, in terms of the genital structure it is designed to remove (i.e., the foreskin)? There are several possible explanations. One stems from the 'cognitive dissonance' hypothesis proposed in Figure 3, which predicts less motivation to learn, believe, or recall positive information about the foreskin if one has been circumcised. Moreover, in addition to a lack of personal experience with the relevant tissue, there may also be a paucity of reliable information about the foreskin in general in circumcision-majority societies, including among medical professionals (e.g., Goldman 2004). Consistent with this view, a study of US medical textbooks found that the majority of those sampled failed to provide complete and accurate information about the penis in its natural state (Harryman 2004). For example, some textbooks depicted the human penis

only in a post-surgical condition (i.e., circumcised), with no description of the tissue that must first be removed for the penis to appear that way. In such circumstances, it would be easy to form the impression that the foreskin is an expendable body part without significant value, a view that appears to be relatively uncommon outside of circumcising societies (see Androus 2013; Dekkers 2009; for further discussion, see Frisch and Earp 2016a).

To test these ideas, we conducted a survey of circumcised and non-circumcised US men. We assessed the degree of satisfaction they felt toward their circumcision status (i.e., circumcised vs. not circumcised) as well as their endorsement of various beliefs, both true and false, pertaining to circumcision and intact male genitalia. Following Goldman (1997), we hypothesised that, among circumcised men, greater endorsement of false beliefs would predict greater satisfaction with their circumcision status. Since such beliefs tend to normalise circumcised penises and/or stigmatise intact male genitalia—at least in majority (male) circumcised societies such as the USA—we predicted that the opposite relationship would hold for genitally intact men. That is, the greater number of false beliefs they endorsed, the less satisfied we expected them to be with not being circumcised.

While building on Goldman's (1997) preliminary research, our study differs from his in several important ways. First, Goldman's study used a non-representative convenience sample of persons attending a men's conference. As he notes, "Attendees to a men's conference are likely to be more sensitive to men's issues and to have had exposure to men's publications that might have discussed circumcision" (Goldman 1997, 104). By contrast, we framed our study in a general way to avoid such biased sampling, and drew from a more demographically diverse population of Amazon Mechanical Turk (MTurk) workers (see Buhrmester, Kwang and Gosling 2011).[3] Second, Goldman's sample size was relatively small (N = 56), while ours was relatively large (N = 999). Finally, Goldman used just two questions to assess men's knowledge about foreskin size and function, whereas we worked with experts to develop a more robust, 10-item measure assessing men's knowledge of foreskin anatomy as well as circumcision-related issues more generally.

Method

Participants

There are no effect size estimates in the literature for studies employing these materials and methods. Moreover, our hypotheses concerned the existence and direction of the predicted effects rather than their magnitude. Therefore, initial power analyses to establish desired sample size were not performed. Sample size was instead determined by available funding.[4]

A total of 999 US participants completed the entire survey. To take the survey, participants had to agree that they were a man of at least 18 years of age. Participants were excluded if they did not know, or preferred not to report, their circumcision status; if their circumcision took place after the infant period (up to 1 year old); if they failed at least one of two embedded attention checks; or if they chose not to answer one of the main outcome variables.

This left 902 male participants, ranging in age from 18-75 (M = 34.0, SD = 10.0). Of those 902 participants, 732 identified as circumcised and 170 as non-circumcised. Additional demographic information can be found in the Appendix (see Supplementary material).

Measures

Circumcision status

To assess circumcision status, participants were asked "To your knowledge, are you circumcised?" They were given the option of answering "Yes," "No," "I don't know," and "Prefer not to answer." Participants who responded "Yes" were asked to report, if they knew, when their circumcision occurred and whether there were any complications. Additional items asking about the reasons why participants were circumcised or not circumcised, where they were circumcised, etc., were also administered, but these data were not analysed for the present report. Only participants who answered "Yes" or "No" were included in subsequent analyses.[5]

False beliefs

This measure consisted of 10 items, and was presented to participants as a "Penile Anatomy and Circumcision Quiz." In designing this measure, the present researchers were sensitive to several issues. First, we needed to include items for which there was an objectively correct answer, or at least an answer about which there is very little disagreement among qualified experts. This was deemed to be important because many common assertions about circumcision, including claims about its effects on sexual function, the likelihood and magnitude of various benefits and risks that are associated with it, and so on, are hotly contested even among scholarly authorities (Collier 2012); indeed, the literature in this area is polarised (see Earp 2015b; see also Earp and Darby 2017). Second, we needed to make sure that there was a reasonable mix of 'positive' and 'negative' claims about circumcision (and the foreskin), so that participants would not feel that there was a bias to the questions one way or the other, which might raise suspicions or possible experimenter demand issues. Third, we needed to make sure that the assessed beliefs covered a range of areas—from facts about anatomy, to medical consequences, to prevalence estimates, to cultural norms—so that results would not be confounded by having been drawn from too narrow a domain of interest. Finally, we needed to make sure that the quiz was not too long, such that participants would be more likely to complete the entire survey.

To aid with these issues, we recruited two outside experts—one who is well-known for arguing in favour of the permissibility of NTC, and one who is well-known for arguing against its permissibility—to provide feedback on our initial list of items. We asked the experts to assess the degree to which there was one, and only one, correct answer for each question (on which both critics and proponents of NTC would agree), and to suggest any necessary changes to wording in cases where there was ambiguity. We also asked for feedback on any wording that might suggest a 'bias' either in favour of, or against, NTC, and we modified items accordingly. Items included statements such as, "Most medical associations around the world that have issued statements on routine new-born male circumcision recommend the procedure" (False); "After birth, a boy who has *not* been circumcised should have his foreskin 'retracted' or pulled back as soon as possible to facilitate cleaning" (False); and "According to the American Academy of Pediatrics, there is good evidence that being circumcised is associated with a lower incidence of urinary tract infections (UTIs) in boys under the age of 2" (True). Participants were asked to mark 'True' or 'False' in response to each item; incorrect answers were summed to produce a False Belief Score. The complete list of final items may be found in the Appendix.

Circumcision satisfaction

Participants were asked three questions[6] to assess their degree of satisfaction with their circumcision status: "How satisfied/dissatisfied are you with your circumcision status?" (1 = very dissatisfied, 2 = dissatisfied, 3 = neither satisfied nor dissatisfied, 4 = satisfied, 5 = very satisfied); "How much is your circumcision status a positive/negative issue for you in your everyday life?" (1 = a very negative issue, 2 = a negative issue, 3 = neither a negative nor a positive issue, 4 = a positive issue, 5 = a very positive issue); "How positively/negatively does your circumcision status affect your sexual experience (if you are sexually active)?" (1 = very negatively, 2 = negatively, 3 = neither negatively nor positively, 4 = positively, 5 = very positively). These three items showed good internal consistency (Cronbach's α = .79) and were moderately positively intercorrelated (*r*s = .50-.66; *p*s < .001). They were therefore averaged to form a Circumcision Satisfaction Score.

Procedure

Study procedures were approved by the IRB where funding was granted (Quinnipiac University). The study was conducted with workers from Amazon's Mechanical Turk (MTurk) marketplace, who were paid $1.00 for their time. For purposes of recruitment, the study was described as a "Men's Sexual and Reproductive Behavior and Knowledge Questionnaire," so that prospective participants would not know in advance that they would be asked questions about circumcision specifically. This was in order to avoid any possible selection biases, for example, overrepresentation of men with especially strong feelings about circumcision. After providing informed consent, participants were given a "Men's Sexual and Reproductive Health Knowledge Quiz," consisting of various filler questions designed to make the cover story more credible. These questions purported to assess their knowledge of general men's sexual health and reproductive issues unrelated to circumcision, such as the prevalence of prostate cancer, what a vasectomy entails, and so on. They were then told, "In the next part of the survey, we are going to focus on additional male reproductive and sexual health issues. In this section, the questions will relate to the topic of male circumcision, a common men's health issue." This wording was chosen to imply that questions relating to circumcision were just a part of the overarching survey, and not the specific focus of the study.

Next, participants were administered the *Circumcision Status* and *Circumcision Satisfaction* items described above, followed by the *False Beliefs* measure. Then, demographic information was collected, and participants were fully debriefed (online).

Results

A linear regression was conducted with Circumcision Status and False Belief Score predicting Circumcision Satisfaction. Consistent with Aiken and West (1991), to ensure that the interaction term was orthogonal to its constituent variables, Circumcision status was coded (0 = not circumcised, 1 = circumcised) and False Belief Scores were centred (with an overall mean of 0). The interaction term for each participant was then created by multiplying Circumcision Status by the centred False Belief Score. A statistically significant Circumcision Status by False Belief Score interaction was observed: *B* = .160, *SE* = .039, *p* < .001 (β = .326). Simple slopes analyses demonstrated that, as hypothesised, for circumcised men, as the proportion of false beliefs increased, so did their degree of satisfaction with their circumcised state (*B* = .102, *SE* = .016, *p*

< .001; β = .230). For non-circumcised men, although not statistically significant, the opposite pattern was observed: as the proportion of false beliefs increased, their degree of satisfaction tended to decrease (*B* = -.058, *SE* = .036, *p* = .106; β = -.124); see Figure 4. Post hoc power analyses revealed that roughly 3 times as many non-circumcised participants would have been needed for this latter effect to be statistically significant. For additional results and related exploratory analyses, see the Appendix.

Discussion

This study found that, in a large sample of US American men, greater endorsement of false beliefs concerning circumcision and the foreskin predicted greater satisfaction with circumcision status among circumcised participants; while, among non-circumcised participants, the opposite pattern was seen (albeit not statistically significant). These data are consistent with, and build on, research conducted by Goldman (1997). In his informal study with a small, non-representative sample, Goldman (1997) provided preliminary evidence that circumcised men with positive attitudes about their circumcision status may know less about the anatomy and functions of the foreskin compared to such men who have negative attitudes about their circumcision status. Goldman speculated that the more awareness a man had of basic issues regarding the inherent (as opposed to contested or probabilistic) effects of circumcision—namely, that it involves the removal of a substantial amount of functional tissue—the more he would be dissatisfied with being circumcised. The present study, involving a much larger, more demographically diverse sample and employing robust measures of circumcision-related beliefs and satisfaction, provides additional, albeit still tentative, support for the hypothesis advanced by Goldman (1997).

Why might many circumcised men, like their female counterparts in societies where female 'circumcision' is the norm, fail to regard the loss of sensitive genital tissue in infancy or early childhood as a harm? The answer explored here is that they may lack sufficient or accurate information regarding the anatomy and functions of the intact penis (or vulva), and about the consequences, both positive and negative, that have been reliably associated with their genital surgeries. Consistent with this perspective, in the present study, 49% of circumcised men (*n* = 359) reported that they are not confident that they would be able to identify if there were complications from their circumcision, while only 26% (*n* = 193) reported that they knew the reason why they were circumcised. Such men may also harbour false beliefs, as seen in the current sample, that reflect and reinforce wider cultural stigmatisation of surgically unmodified genitalia (see Waldeck 2003, for a theoretical analysis).

Cultural expectations, in the form of scripts or norms for example, undoubtedly play a large role in shaping individuals' attitudes toward their own (and their children's) genital status, whether modified or unmodified. To illustrate just how strong such cultural forces may be, consider that many 'circumcised' women do not want to "burden (their) daughter with excess clitoral and labial tissue that is unhygienic, unsightly, and interferes with sexual penetration" (Ahmadu and Shweder 2009, 17); these women report having the same desire for "healthy and aesthetically pleasing genitalia" in their daughters as they would want for their sons – an attitude that many Western mothers would presumably find shocking.

This is not to say that 'cultural' beliefs are necessarily false. Culturally influenced aesthetic preferences, in particular, come down to a matter of opinion, and reasonable people can disagree about what should be considered beautiful or normal. But it is precisely the

subjectivity of such beliefs that introduces uncertainty into the system: when attitudes and expectations are not rooted in cross-cultural universals, but are rather variant or unstable across time and space, they may be susceptible to being questioned as individuals learn new information or begin to see things in a different light (see Earp and Darby 2017).

For example, after hearing about societies that do not routinely modify children's genitalia, engaging in a sexual encounter with someone who has not undergone such a modification, or learning about the properties or functions of the excised genital tissue (i.e., properties that one might reasonably regard as having value), some adults of all genders experience a 'perspective shift.' They begin to reconsider their feelings about their own genital status or about the practice of genital modification generally, sometimes resulting in very negative attitudes and emotions (Earp and Steinfeld 2017; Johansen 2017; Johnsdotter and Essén 2016; for further discussion, see Earp and Darby in press). Thus, while the majority of circumcised men and women in societies where nontherapeutic childhood genital cutting (NGC) is culturally entrenched appear to regard their modified genitalia as 'normal,' a minority of both sexes,[7] upon reflection, come to express anger and resentment at not having been able to provide their own informed consent for the procedure when they were old enough to understand what was at stake (Bossio and Pukall 2017; Earp and Darby 2017; Earp and Steinfeld 2017; Hammond and Carmack 2017).

In this study, we have provided preliminary evidence that male circumcision satisfaction may be positively associated with holding false beliefs about circumcision and the foreskin, with inaccurate judgments tending to be biased in a way that (1) supports the prevailing cultural norm and (2) reinforces stigmatisation of surgically unaltered male genitalia. A strength of the study is that the statistical analyses were confirmatory, based upon a single, *a priori* hypothesis, rather than exploratory in nature or based on HARKing (hypothesising after the results are known; see Kerr 1998). In addition, apart from a small pilot study to gather feedback on the wording of items, there is no 'file drawer' to potentially skew the findings (see Earp and Trafimow 2015; Rosenthal 1979). A further notable characteristic, especially compared to the earlier research by Goldman (1997), is the relatively large and demographically diverse sample—although we do not claim that our findings can be extrapolated beyond this group. Weaknesses include the correlational rather than experimental design of the study, and the use of non-validated measures as the primary outcome variables.

Future studies should explore the role of demographic factors in influencing the extent to which men are exposed to, process, believe, and recall positive and negative information regarding the foreskin and circumcision, and the effects of these factors on satisfaction. Do race, religion, or sexual orientation[8] affect satisfaction, the endorsement of false beliefs, or interactions among these variables? The theory of motivated reasoning (Kunda 1990) predicts that circumcised men will seek out information that supports circumcision and discount or ignore information that weighs against it. Future research should explore this hypothesis directly. Finally, similar research questions apply to nontherapeutic female genital cutting (FGC), and a replication of the present study in an FGC-practising society with female participants would be most welcome. We hope to address these and other questions in forthcoming work.

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Disclosure statement

The first author has published articles in the bioethics literature that raise normative concerns about nontherapeutic surgeries performed on minors, including surgeries for hypospadias (Carmack, Notini and Earp 2016) and routine male and female circumcision (Earp 2015c). To protect against any possible bias, outside experts were recruited to review study materials in advance of data collection (as described above), and all data analysis was conducted by the third author, who has no prior engagement with this subject matter. The data were then subsequently provided to the journal and the peer reviewers, one of whom conducted an independent analysis to reproduce the findings. No financial or other conflict of interest is reported by any of the authors.

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Figure 1. **A brief overview of the penile prepuce (foreskin)**

According to Cold and Taylor (1999) the prepuce "is an integral, normal part of the external [male] genitalia that forms the anatomical covering of the glans penis" (34). In this respect, it is similar to the clitoral prepuce in females, which similarly covers and protects the glans clitoris. One of its functions is to internalise the head of the penis including the urethral meatus, "thus decreasing external irritation or contamination" (*Ibid.*) This feature may help to explain why meatal stenosis and other urethral stricture diseases, thought to be caused by abrasion of the exposed meatus, are far less common in genitally intact boys compared to circumcised boys (Frisch and Simonson 2016). Similar to the eyelids, lips, anus, and female genital labia, the penile prepuce is a "specialized, junctional mucocutaneous tissue which marks the boundary between mucosa and skin … The unique innervation of the prepuce establishes its function as an erogenous tissue" (Cold and Taylor 1999, 34).

In the adult organ, the foreskin has an average surface area of approximately 30-50 square centimeters (Kigozi et al. 2009; Werker, Terng, and Kon 1998), constituting roughly half of the moveable skin system of the penis (Taylor, Lockwood, and Taylor 1996). Recent research using objective measures suggests that the foreskin is the most sensitive part of the penis to light touch, while also being significantly more sensitive than the head of the penis to sensations of warmth (Bossio, Pukall and Steele 2016; Earp 2016c). As it is an elastic, retractable sleeve of tissue, the foreskin can be manipulated during sex and foreplay, whether manually or orally, thus providing specific subjective sensations that some men regard as being highly pleasurable (Ball 2006). Although "the amount of genital tissue removed is variable … the penile prepuce is removed in nearly all male circumcisions" (Cold and Taylor 1999, 34), thereby precluding such particular sensations.

Figure 2. **Genital cutting before vs. after sexual debut: implications for sexual experience**

It is important to emphasise that FGC takes place at many different ages depending on the community, including sometimes after the girl or woman has been sexually active and thus would have a basis for comparing 'before' versus 'after.' There is evidence that, while many women regard their sexual experience as diminished after some types of cutting, others regard it as either 'no different' or even improved (Ahmadu 2000; Obermeyer 2005). Similar mixed findings apply to males who have been circumcised after sexual debut. For example, in one study of 255 circumcised men of whom 138 had been sexually active before circumcision, "masturbatory pleasure decreased after circumcision in 48% of the respondents, while 8% reported increased pleasure. Masturbatory difficulty increased after circumcision in 63% of the respondents but was easier in 37%. About 6% answered that their sex lives improved, while 20% reported a worse sex life after circumcision" (Kim and Pang 2007, 619). What these inconsistent findings show is that genital cutting affects different individuals differently: depending on one's mindset and prior experiences going into the cutting, one's preferences regarding modified versus unmodified genitalia, and other factors, the implications of the cutting for subjective sexual satisfaction may vary considerably (Earp 2016b, 2016c; Johnsdotter 2013). It is important to note, however, that adults who regard their sexual experience as improved after cutting are not randomly sampled from the population: insofar as they elected the cutting for themselves, they will have done so precisely because they were unsatisfied in some way with their genitals in an unmodified form; and insofar as the genital cutting offered relief from this dissatisfaction (whatever its source), one should expect subjective feelings of improvement along certain dimensions. Thus, the attitudes and experiences of adults who elected genital cutting cannot and should not be extrapolated to individuals whose genitals were cut in infancy or early childhood (Frisch and Earp 2016b).

Figure 3. **Epistemic asymmetries and cognitive dissonance: male and female genital cutting**

Like American men who were circumcised in infancy, women who have undergone childhood FGC in societies where male and female genital cutting are culturally normative do not typically feel harmed by their genital modifications, although a vocal minority in each group does (Silverman 2004). Rather, these women tend to feel 'normal' or even enhanced (Public Policy Advisory Network on Female Genital Surgeries in Africa 2012; Shweder 2016). To explain this phenomenon, it is sometimes argued that the women must not 'know what they are missing' or otherwise lack relevant information that might alter their assessment (see main text; see also Dickerson 2007). Against this view, however, it has been noted that a similar epistemic asymmetry exists in the opposite direction that must also be taken into account (e.g., Nnaemeka 2001). Specifically, Western women with 'uncut' genitalia cannot know, subjectively, what it is like to have vulvae that were surgically modified in childhood. They may therefore make certain assumptions about the subjective experience of women who have undergone such modification that do not consistently reflect the full reality (see, e.g., Ahmadu 2007). For example, among other myths and misperceptions (see, e.g., James and Robertson 2002; Obiora 1996), these Westerners may erroneously believe that excision of the external clitoral glans or other sensitive tissues necessarily eliminates the capacity for orgasm, failing to realise that most of the clitoris is underneath the skin and that orgasm and other forms of sexual pleasure are in fact common in 'circumcised' women (e.g., Abdulcadir et al. 2016; Catania et al. 2007; Obermeyer 2005; Shweder 2013).

That pleasure and orgasm are possible despite FGC does not, of course, entail that a woman's sexual experience would be no different had her genitals been left intact (Earp 2016b). The same is true for men who have undergone infant circumcision. In both cases, at minimum, any sensation that would have been experienced 'in' the excised tissue itself is necessarily eliminated; and the *risk* of adverse sexual consequences due to the cutting is bound to increase by some amount (Earp 2016b). Moreover, there is an important asymmetry between 'cut' and 'uncut' individuals in terms of the likely need to engage in motivated reasoning to (re)construe their genital status as superior to the alternative (e.g., through the adoption of inaccurate beliefs that stigmatise 'uncircumcised' individuals or exaggerate the benefits of genital modification). Specifically, a person who has not had his/her genitalia altered, but would like them to be, can undertake such a change at an age of maturity, leaving an option 'open' to rectify an undesired situation. By contrast, one whose genitalia were altered in childhood but who might resent this cannot typically 'reverse' the alteration (Earp and Darby 2017; Earp and Shaw 2017). This lack of an option for (physical) rectification in the latter case predicts a greater likelihood of experiencing cognitive dissonance if confronted with the possibility that one's current genital status may be undesirable; this dissonance would then need to be resolved in some way (see generally, Harmon-Jones and Harmon-Jones 2007). One plausible way to resolve it would be through a process of motivated reasoning of the sort just described, i.e., by adopting a 'sour grapes' attitude toward the excised tissue (Earp and Shaw 2017). However, careful empirical research is needed to test this hypothesis directly; such research is currently lacking.

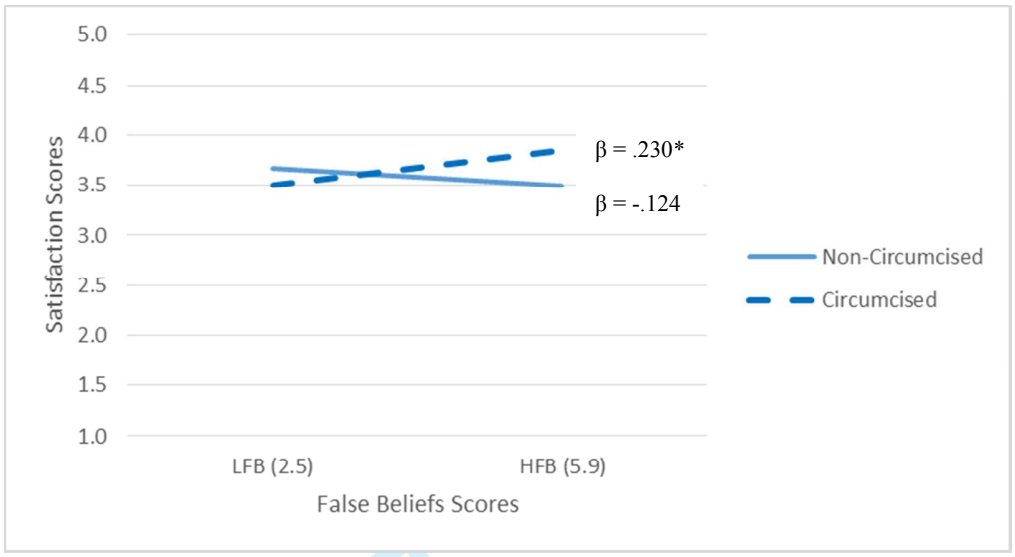

Figure 4. Linear regression analyses predicting Circumcision Satisfaction from Circumcision Status and False Belief Score. As False Belief Scores move from Lower (LFB = -1 SD) to Higher (HFB = +1 SD), circumcised men show greater satisfaction, while non-circumcised men show lesser satisfaction.
* $p < .001$

Notes

[1] Reliable figures are hard to come by, but a recent YouGov poll concluded that 10% of circumcised U.S. American men wish that they had not been circumcised (Moore 2015); in the present sample, this figure was 13.6% (see Earp and Darby 2017 for further discussion).

[2] There is a growing body of scholarship disputing the Western near-consensus that the risk of sexual and health-related harms associated with FGC is as great as is commonly portrayed in that discourse (see, e.g., Ahmadu and Shweder 2009; Catania et al. 2007; Johnsdotter 2013; Obermeyer 1999, 2003, 2005). Scholars in this camp note that FGC falls on a spectrum, with some forms being comparatively minor (such as a 'prick' to the clitoral hood that does not remove tissue); that it can be carried out in more or less hygienic conditions, and is, in fact, increasingly being carried out by trained medical professionals in sterile settings; and that even the most invasive forms of FGC remove only a small portion of the (external) clitoris since most of the structure is subcutaneous (Abdulcadir et al. 2016), thus leaving sufficient tissue for sexual pleasure and orgasm in many if not most cases (Catania et al. 2007). For a critical discussion of some of these points, see Earp (2016b), especially the Appendix.

[3] According to Hauser and Schwarz (2016), MTurk workers have been found to be more attentive to instructions than collegiate samples. Moreover, according to Silberman et al. (2015), MTurk workers lean heavily toward being U.S.-based, which was the population of interest for this study. For more information on the demographic characteristics of our sample, please see the Appendix to this article, which can be found in the supplementary materials.

[4] For a post hoc power analysis and related discussion, see the Appendix.

[5] Previous research has shown that many men do not know whether they are circumcised, or incorrectly identify their circumcision status (Risser et al. 2004). To address this issue, an additional measure of circumcision status was administered: see Appendix. Re-running analyses using the second measure resulted in similar findings to those reported in the main text.

[6] A fourth question was initially included in the survey, namely, "How happy or unhappy are you with being circumcised?" However, due to a programming error, some participants did not see this question. Therefore, we were not able to include it in the final scale. Dropping versus including this question does not substantially affect the main findings in the study.

[7] We note that many intersex individuals come to express similar negative feelings upon learning of the medically unnecessary genital surgeries to which they were exposed in early childhood in an effort to conform their ambiguous genitals to a perceived gender binary. See the references collected in Earp and Steinfeld (2017).

[8] Among gay men and other men who have sex with men, one question worth exploring is whether the extent and quality of one's experience with sexual partners of the same/different circumcision status affect one's satisfaction with one's own status. Moreover, investigation of the attitudes and experiences of the sexual partners of circumcised and non-circumcised men (in terms of their sexual satisfaction and its relationship to their endorsement of false beliefs) should also be undertaken. We thank an anonymous reviewer for suggesting these ideas as possible avenues of further investigation.

APPENDIX (supplementary material)

A. Demographic characteristics of the sample

Appendix A. Demographic Information by Group

Demographic Variable	Non-Circumcised (*n* = 170)	Circumcised (*n* = 732)
Age	*M* = 31.9 (*SD* = 9.5)	*M* = 34.4 (*SD* = 10.0)
Race/Ethnicity		
White/Caucasian/European American	85 *(50.0%)*	587 *(80.2%)*
People of Colour	73 *(42.9%)*	103 *(14.1%)*
Multi-Racial	12 *(7.1%)*	42 *(5.7%)*
Prefer not to Answer	0 *(0%)*	3 *(0%)*
Religious Affiliation		
Christian	59 *(34.6%)*	296 *(40.4%)*
Jewish	3 *(1.8%)*	14 *(1.8%)*
Muslim	1 *(0.6%)*	4 *(0.5%)*
Other Religions	16 *(9.5%)*	60 *(8.3%)*
Agnostic/Atheist	86 *(50.6%)*	344 *(47.0%)*
Prefer not to Answer	5 *(2.9%)*	14 *(1.9%)*
Education Level		
High School or Less	22 *(12.9%)*	92 *(12.6%)*
Bachelor's Degree or Some College	130 *(76.4%)*	547 *(74.7%)*
Graduate Degree or Some Graduate Schooling	18 *(10.7%)*	92 *(12.6%)*
Prefer not to Answer	0 *(0%)*	1 *(0.1%)*
Relationship Status		
Single	68 *(40.0%)*	269 *(36.7%)*
In a Relationship	52 *(30.6%)*	157 *(21.4%)*
Engaged/Married	48 *(28.2%)*	268 *(36.6%)*
Separated/Divorced	2 *(1.2%)*	38 *(5.2%)*
Sexual Orientation		
Heterosexual or Straight	154 *(90.6%)*	659 *(90.0%)*
Non-heterosexual (Gay, Bisexual, Pansexual)	14 *(8.2%)*	73 *(10.0%)*
Asexual	2 *(1.2%)*	0 *(0%)*

A note on representativeness. For reference, 65.1% of our total sample (*N* = 902) consisted of White participants who are circumcised, compared to 65.3% of White participants included in the Nationwide Inpatient Sample (NIS) between 1988 and 2000 as analysed by Nelson, Dunn, Wan, and Wei (2005). Similarly, 74.5% of our total sample reported being White, while 25.5% reported being a person of colour or multi-racial; this compares to 62.3% White and 34.6% Black, Hispanic, Asian/Pacific Islander, and Native

American (combined) in the NIS per Nelson et al. (2005). Thus, Whites seem to be overrepresented in our sample; however, among Whites, the percentage circumcised is almost exactly the same as in the NIS. Note that the percentage circumcised for people of colour and multi-racial participants is harder to compare between the two samples because we did not use the same racial/ethnic categorisation scheme for non-White status.

Reference: Nelson, Caleb P., Rodney Dunn, Julian Wan, and John T. Wei. 2005. "The Increasing Incidence of Newborn Circumcision: Data from the Nationwide Inpatient Sample." *The Journal of Urology* 173(3): 978-981.

B. 10-Item False Belief Scale ("Penile Anatomy and Circumcision Quiz")*

1. According to the American Academy of Pediatrics, there is good evidence that being circumcised is associated with a lower incidence of urinary tract infections (UTIs) in boys under the age of 2. [TRUE]
2. If a baby boy is not circumcised shortly after birth, he will most likely require a circumcision anyway to correct medical problems before he turns 18. [FALSE]
3. The percentage of men who are circumcised in the United States is significantly greater than the percentage of men who are circumcised in most other English-speaking countries. [TRUE]
4. The foreskin is typically the least sensitive part of the penis to light touch. [FALSE]
5. After birth, a boy who has not been circumcised should have his foreskin "retracted" or pulled back as soon as possible to facilitate cleaning. [FALSE]
6. Some forms of non-therapeutic (ritual) female genital cutting that are described by the World Health Organization (WHO) as "mutilation" are less physically invasive than male circumcision as it is typically performed in the United States. [TRUE]
7. Most medical associations around the world that have issued statements on routine newborn male circumcision have concluded that the foreskin does not have any functions. [FALSE]
8. In the United States, during the late 19th and early 20th centuries, circumcision was advocated by mainstream doctors as a preventative measure against—or a "cure" for—masturbation. [TRUE]
9. According to most authoritative sources, approximately 100 circumcisions would be needed to prevent 1 urinary tract infection (UTI) among boys with normally developing anatomy. [TRUE]
10. Most medical associations around the world that have issued statements on routine newborn male circumcision recommend the procedure. [FALSE]

* *n.b.* Participants were originally administered an 11-item False Belief Scale, with the 11th item reading: "The World Health Organization recommends that male circumcision be carried out in countries and regions with high heterosexually transmitted HIV prevalence and low percentages of circumcised males." After data collection, we realised that the statement was worded in such a way that participants would have to agree that both propositions in the sentence were true in order to choose the correct answer (which is True), so we elected to drop this "double-barreled" item from the final scale. To confirm that doing so would not

substantially alter the findings from the study, we re-ran the linear regression described in the main text with the full 11 items (i.e., attempting to predict Circumcision Satisfaction from Circumcision Status and False Belief Score). Similar results were obtained: a significant regression equation was found: $F(3,901) = 13.66$, $p < .001$, with an $R^2 = .04$. An interaction between Circumcision Status and False Belief Score was also observed: $B = .145$, $SE = .039$, $p < .001$ ($\beta = .300$). Simple slopes analyses demonstrated that, as expected, for circumcised men, as the proportion of false beliefs increased, so did their degree of satisfaction with their circumcised state ($B = .094$, $SE = .016$, $p < .001$; $\beta = .217$). For non-circumcised men, although not statistically significant, the opposite pattern was observed: as the proportion of false beliefs increased, their degree of satisfaction tended to decrease ($B = -.050$, $SE = .035$, $p = .157$; $\beta = -.109$).

C. Post hoc power analysis

A post hoc power analysis was conducted using the software package G* Power (Faul et al. 2007; Faul et al. 2009), with the final sample size of 902 and alpha level set at $p < .05$. The analysis showed that the statistical power for the overall interaction, as well as for the circumcised sub-set ($n = 732$), was very high, exceeding .99. In fact, only 143 circumcised men would have been needed to achieve a statistically significant result. Among non-circumcised participants ($n = 170$), by contrast, a total of 518 participants would have been needed to achieve statistical significance: for this (smaller) effect size, then, our power was low (.359). That said, we caution readers against equating statistical significance with substantive significance. This is the first large-sample study of its kind, so the findings should be considered preliminary: replications are needed along with further theoretical work to establish effect size ranges that are theoretically and practically meaningful along different dimensions and with respect to different research questions. Our aim in the present study was only to establish that there was a relationship between the studied variables in the expected directions (i.e., our hypothesis concerned the existence and direction of the effect, rather than its magnitude).

D. Exploratory analyses

Our hypothesis was that the relationship between false beliefs and satisfaction would be different for circumcised compared to genitally intact men, and this is what we found. However, some readers may be interested in the absolute (mean) scores for false beliefs and circumcision satisfaction for these groups. Since we did not have a specific hypothesis about what these scores should be in advance of data collection, we have decided to report them here in the Appendix as opposed to the main text. The circumcised men in our sample reported numerically, but not significantly, greater endorsement of false beliefs ($M = 4.3$, $SD = 1.7$) compared to non-circumcised men ($M = 4.0$, $SD = 1.6$, $p = .10$), as well as numerically, but not significantly, greater satisfaction scores ($M = 3.7$, $SD = 0.8$), compared to non-circumcised men ($M = 3.6$, $SD = 0.7$, $p = .09$). Although we did not have an *a priori* hypothesis concerning these scores, the similar observed means for each group, especially with respect to satisfaction, are consistent with our theoretical framework: it is precisely the lack of felt dissatisfaction among the majority of circumcised men (despite the non-consensual loss of functional tissue that is *prima*

facie valuable) that we are seeking to explain in this line of research. Finally, we note that given the cross-over interaction or 'opposite' effect for non-circumcised men, statistically, one would expect that the mean scores should not differ.

E. Secondary circumcision status measure

Previous research has shown that many men do not know whether they are circumcised, or incorrectly identify their circumcision status (Risser et al. 2004). To address this issue, an additional measure of circumcision status was administered. Specifically, drawings of what appear to be circumcised penises (drawings 1, 2, and 3) and non-circumcised penises (drawings 4, 5, and 6) in both flaccid and erect states were shown, and participants were asked to select the drawing from each category that most resembled their own penis (adapted with permission from Bossio 2015). The flaccid and erect drawing choices were highly internally consistent (Cronbach's α = .87), so these items were averaged into a single circumcision-status-by-drawing-choice measure. Scores on this new measure ranging from 1 through 3.5 were recoded as 1 for 'circumcised' while scores ranging from 4 through 6 were recoded as 2 for 'non-circumcised' to correspond with codings from the self-report measure, "To your knowledge …" (there were no scores between 3.5 and 4). The two ways of measuring circumcision status were highly significantly correlated: r = .75, $p < .001$. Re-running analyses using this second measure resulted in similar findings to those reported in the main text of this manuscript; this measure will therefore not be discussed further.