



# The Contribution of Sex to Quality of Life in Modern Societies

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## Abstract

Sexual behavior is a core activity not only for our genes, but also for individual happiness. It is therefore important to assess how this aspect of life functions in industrialized nations. Adopting the idea that society should aim at maximizing happiness, the question is whether the present situation is optimal, or if we should strive toward cultural changes that may improve the impact of sex. Sex is associated with some of the strongest rewards the brain has to offer, and consequently should serve to improve quality of life. There are, however, numerous pitfalls in that sex easily elicits negative emotions. Certain aspects of sexuality may reflect what is referred to as a ‘disease of modernity’; that is, the present environment is causing an increase in the prevalence of sex-related misery. The text use both an evolutionary and a bioecological perspective to understand human behavior. Biological (nature) and ecological (environment or nurture) factors are considered in order to assess how to improve the impact of sex on quality of life.

**Keywords** Sexual behavior · Mental health · Emotions · Environment of evolutionary adaptation · Happiness · Bioecological systems theory

## Introduction

The human brain is adaptive. As pointed out in *bioecological systems theory*, development is a question of how an individual are molded over time in the interaction with various environmental factors or systems (Bronfenbrenner 1989, 2005). Included in this approach, is the biological features of the individual, whether specific for that particular person or universal human qualities. The theory use the concept of layers to define the ecological setting that impact on mental development. Two layers are of

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particular relevance for the present discussion: The innermost layer, the *microsystem*, is the direct interactions with other individuals; the outermost layer, the *macrosystem*, is the attitudes and ideologies of the larger culture.

Although the biological features differ between individuals, the genetic homogeneity of the human species (Lewis 2016) suggests that we start life with shared innate predispositions. The adult is a product of a chronological series of interactions between this biological starting point and the various layers of environment. If the environment differs from what the genes are tuned to, the result may be suboptimal. The importance of sex for the genes is obvious, consequently there are strong innate tendencies aimed at relevant behavior. These tendencies, however, were designed for a life different from what people typically experience in industrialized societies.

The ‘diseases of modernity’ (‘diseases of civilization’) are caused by disparities between the present way of life and the *environment of evolutionary adaptation* (EEA) (Grinde 2009a; Crawford and Krebs 2008; Bennett 2018). They have been considered the greatest threat to public health in the developed world (Yach et al. 2006), the question is whether sexual behavior should be included.

The EEA presumably reflects what can be perceived as a ‘Stone Age,’ hunter-gatherer, tribal lifestyle. Ecological factors that differ from the EEA are referred to as *mismatches*. As most mismatches are beneficial, it is important to identify the changes in lifestyle that actually contribute to morbidity.

For sexual behavior to qualify as a disease of modernity, the impact of the present environment has to be undesirable. As to what is desirable, the text is based on the recent interest in promoting happiness or well-being (Helliwell et al. 2020). The term ‘happiness’ as used here covers the mental part of quality of life. The term includes contentment and subjective well-being, as well as both hedonic and eudemonic aspects of pleasure.

The characteristic diseases of modernity are somatic – such as obesity, type 2 diabetes, and nearsightedness – but it seems reasonable to include certain mental disorders, particularly depression and anxiety (Grinde 2009a; Hidaka 2012; Nesse 1999). Most health problems presumably occurred in the EEA as well, thus whether a condition ought to be included is primarily a question of prevalence.

I shall start this review with three introductory sections that present required background for the later discussion: (1) a biological model of happiness as it relates to sex; (2) an outline of the sort of feelings that sex is likely to instigate; and (3) a brief look at relevant gender differences. The main part of the text considers the question of whether sexual life is distorted in the present environment and the role of various mismatches. Finally, I discuss applied perspectives; that is, how to improve present conditions.

## Sex and Happiness

### An Evolution Based Model

The process of evolution has equipped the brain with a range of functions that may be referred to as *modules* (Grinde 2016; Barrett and Kurzban 2006). Sexual behavior can be considered as one of these modules (or one set of modules), where the obvious,

primary function is to secure propagation of the genes. If the conditions of life differ from that of the EEA, the sex module may be skewed in the direction of aberrant desires and behavior; which again may cause more negative feelings.

The term *feelings* as used here comprise *sensations*, which reflect pleasant or unpleasant experiences due to signals from external or internal sensing systems; and *emotions*, which encompass all other forms of feelings, but typically concern interpersonal relations. Feelings include an element that can be either positive or negative; that is, rewards or punishment in the form of respectively pleasure or pain (where ‘pain’ implies any unpleasant experience). The *mood modules* are responsible for the positive or negative element. The evolutionary function of pleasure and pain is to help an individual evaluate behavioral options (Cabanac 1999; Grinde 2018). Positive feelings are there to lead us toward what is good for the genes, such as food or a partner; while negative feelings drive us away from anything that might harm the genes, such as predators or injury.

There are three different mood modules (Berridge and Kringelbach 2015; Grinde 2012; Leknes and Tracey 2008): Negative feelings rely on a single *pain module*; that is, whether it is a question of social punishment, such as guilt, or a physical injury, the same neurological circuits deliver the unpleasant component of the experience. The reward system, on the other hand, is divided into a *seeking* (or *wanting/motivating*) module, which is meant to stimulate the individual to seek opportunities and motivate for action; and a *liking* (or *consuming*) module, which make sure the opportunities are utilized once present. The two modules are exemplified by respectively a man spotting a nude woman and the pleasure of the orgasm. The above classification reflects both evolutionary theory and present knowledge as to the neurobiology responsible.

A variety of modules in the brain can activate the mood modules, and thus cause experiences to be considered either pleasant or unpleasant. It is important to note that many modules can activate both rewards and punishment. Fear, for example, is typically associated with negative feelings, but for a climber the adrenalin kick turns it into something pleasant. Which mood module that is activated, can shift rapidly; if the climber suddenly slips, the pleasure gives way to unpleasant panic.

The sex module is primarily set up to activate the two reward modules; however, sex can indirectly activate negative feelings in several ways, which I shall return to in the next section. Again, whether a particular situation is conceived as pleasurable or not, depends on a range of factors and can shift on short notice.

The system of positive and negative feelings explains why we have the capacity for happiness. A reasonable definition is simply that happiness is a question of the net activity of the mood modules: the pleasure minus the pain (Grinde 2012). This definition requires some comments:

1. In this model of the mind, any type of positive feeling reflects activity in the reward modules. The list includes not only overt pleasures, such as those associated with sex, but also friendship, comfort, and a sense of having a ‘meaningful life.’ In other words, the definition includes what is referred to as eudemonic happiness. This makes sense in that the same neurological circuits apparently create the positive or negative content regardless of the type of situation or stimuli (Lieberman and Eisenberger 2009; Leknes and Tracey 2008; Blood and Zatorre 2001).

2. The pursuit of happiness should take into account both the present and the future. Some endeavors, such as adulterous sex, may offer short-term benefits, but decrease the overall lifetime measure of happiness.
3. The mammalian brain is presumably designed with a positive feeling as the normal state of mind (Grinde 2012). If everything is fine, activity in the reward modules dominates, implying that the default state is one of contentment. Consequently, for the sake of lifetime happiness, avoiding long-term negative emotions is arguably more important than seeking short-term delights. The contention seems reasonable also in the case of sex. It is a limit as to how many hours a day one may harvest sensory pleasures associated with sex; thus the emotional impact is, perhaps, more important.

### Positive and Negative Feelings Associated with Sex

Both the core sensations stemming from the erogenous zones and the core emotions associated with sex (such as love and devotion) are positive. This is an obvious evolutionary choice for behavior required for propagation. On the other hand, the indirect consequences of sex include a range of negative emotions such as jealousy, shame, and guilt.

Over the last 5–10 million years, humans evolved to be both a highly social species and a couple-forming species (Fowers 2015). Evolution concomitantly introduced a range of emotional modules designed to enhance relations. It may be argued that both the most important pleasures and the most important pains are associated with interpersonal relations (Grinde 2009b). Not surprisingly, the nature of our social network, and how we handle interactions, typically offers the strongest correlates to scores on subjective well-being (Gallagher and Vella-Brodrick 2008; Grinde et al. 2017; Layard 2005). In line with the concept of a ‘default state of contentment,’ a reasonable strategy for the pursuit of happiness is to avoid negative emotions by focusing on how to improve relations.

Sexual behavior is considered a community concern, thus there are rules of conduct that easily induce negative emotions if violated. That is, in the course of infant development we are socialized to accept moral guidelines. Doing something regarded as wrong in the macrosystem, may cause punishing emotions.

Sex with other individuals than the partner may elicit jealousy, and lead to a breakup of the bond with concomitant punishing emotions. Another problem is that of regret, or feeling misused, after being involved in sexual activity. Other relevant emotions include disgust and outrage, typically elicited by acts or ideas performed by others, but it is possible to feel disgust over personal actions as well. Resentment, envy, and spite should also be mentioned. Some people develop a sense of inadequacy, in terms of either appearance or sexual performance. The problem is associated with a feeling of inferiority, for example, if others are perceived as prettier, sexier, more virile, or simply more popular.

All the negative emotions mentioned above reflect modules installed by evolution, thus they were engaged in the EEA as well. The question is whether the frequency of activation, or average impact on the mind, is higher today. One problem when trying to answer this question is that the same emotions are engaged in a variety of situations,

thus it is difficult to discern the role of sex. For example, a person get jealous if the partner has sex with someone else, but perhaps also if the partner spends too much time with a dog; and sexual desires can cause shame, but so can a range of other factors.

## Gender Differences

Women tend to invest more in offspring than men; an observation that corresponds with the key differences in mating strategy (Ford and Beach 1951; Kruglanski and Stroebe 2012): Females are on average more fastidious and selective as to whom they mate with. Males are more promiscuous; they desire a variety of partners and have a lower threshold for engaging in sex.

The differences have distinct ramifications when it comes to sexual pleasures. Men are by far the larger consumer of porn sites offering explicit sex or nudity, while women take more interest in sites offering stories that cater to the their ideals as to partner (Carvalho et al. 2013; Hald 2006; Salmon and Fisher 2018; Tyson et al. 2015). Apparently, women have greater erotic plasticity; that is, sexual behavior varies more with time, and they are more responsive to the cultural context (Baumeister 2000).

The pertinent question for the present discussion is how to make the most of both the female and the male versions of the sex module. As to happiness, the relevant brain rewards are not necessarily that different; both genders take pleasure in the sexual act, and both can appreciate the intimacy, the skin contact, and the bonding associated with sex. There are probably more differences when it comes to negative emotions, brought on by the contrasting mating strategies. For example, women are more prone to feel abused, or ending up with regret, after engaging in sex (Galperin et al. 2013). Men seem more prone to be frustrated by situations where they suspect a person fooled them into anticipating sex. Furthermore, whereas the male brain is designed to become jealous over physical infidelity, the female brain is more inclined to react to emotional infidelity (Ogas and Gaddam 2011).

## Is Sex Distorted in Modern Societies?

### Sexual Behavior

A key question for the present analysis is whether the present ecological setting for human development cause sexual behavior to be skewed in a negative direction. Is the emotional burden associated with sex higher today than what one would expect was the case in the EEA? The question will initially be probed in two ways: I shall consider possible changes in sexual preferences; and look at sexual dysfunctions. As to putative changes, both cross-cultural comparison of traditional societies and observations of animal behavior are relevant. The subsequent discussion on possible contributing mismatches adds pertinent information.

It should be kept in mind that what is considered troublesome in the present analyses, is not whether the behavior has changed, is odd (in a statistical sense), or off (in the sense of not contributing to procreation). The issue is whether the present situation is suboptimal as to quality of life. Aberrant behavior is, however, likely to impede happiness. Most societies have ideas as to what is considered proper sexual

conduct. When individuals transgress these lines, they tend to be antagonized; a situation that easily leads to negative emotions. In other words, abnormal sexual behavior often has a negative impact on happiness, but the problem may be ameliorated by changing the attitudes in that society.

As the primary function of sex is propagation, sexual desires should be directed at coitus. According to anthropological literature (Ford and Beach 1951), coitus is indeed by far the most common practice; yet, in most cultures there appear to be a reasonable amount of sexual activity that is not aimed at fertilization. In a species using sex to enhance bonding, sex without pregnancies serves a genetic purpose; thus the use of contraceptives, or interrupted ejaculation, should be considered normal. Moreover, as sex is strongly reward-driven, one should also expect that self-stimulation occurs. This is indeed the case, based on the anthropological descriptions of tribal people as well as observations of other species of mammals (Ford and Beach 1951). Most traditional cultures are well aware of the possibility for self-stimulation; the practice is typically not banned, but discouraged as being less desirable.

### **Aberrant Practices and Desires**

Certain sexual behaviors and desires may reflect a distorted sex module. The more common examples are discussed below.

**Masturbation** Self-stimulation probably occurs in all cultures, but in industrialized countries it stands for a considerable proportion of sexual activity (Prause 2019; Regnerus et al. 2017). It seems likely that the present situation represents an increase compared to tribal societies. The increase is presumably at least partly driven by the opportunities offered by pornography, particularly in the form of Internet-based sexual stimuli, but perhaps also by a lack of sexual partners or frustrations associated with intimate relations. Stone Agers would most likely take an interest in porn; in fact, even male macaques willingly ‘pay’ for viewing pictures of female macaques in heat (Deaner et al. 2005).

The question is whether the use of pornography, and the concomitant high prevalence of masturbation, affect current sexual behavior in ways that are undesirable. Although masturbation does offer sexual pleasures, and therefore contributes to happiness, the practice may have negative effects on emotional life. For one, the focus on self-stimulation may imply less focus on sex with a partner, which could reduce the strength of a relationship; and two, depending on the kind of stimuli sought, it could cause the sex module to develop in adverse directions. For example, if a person focuses on violence or on underage females, the desires may move further in this direction; that is, masturbatory fantasies about a stimulus can reinforce and broaden that form of arousal (Nolen-Hoeksema 2013).

**Types of Stimuli – Paraphilics** Another pertinent question as to aberrant sexuality is what sort of stimuli trigger sexual arousal. There is a wide range of interests, most, if not all, are catered to on Internet (although legal issues cause some to be less readily available). The more common search words concern what may be considered normal sexual interests (Ogas and Gaddam 2011; Salmon and Fisher 2018; Tyson et al. 2015): Men search for young and willing females with sexual appeal. As pointed out above, a

virgin look is preferred, but there is also a desire for older women, often aimed at those already with a partner. Married females make sense as a strategy for men; if the woman gets pregnant, his genes will be passed on with a minimum of investment.

Although the majority of attention is in line with what one would expect reflects innate tendencies, there is also considerable interest in porn (and real-life experience) for sexual content that is less likely to reflect biology. Examples include fetishes for dead bodies, feet, animals, or female clothing items. Obscure preferences are referred to as paraphilia. Although a range of ‘odd’ sexual behavior has been observed in animals, including attempts to have sex with dead bodies, at least for animals living in the wild this seems to reflect a spillover of sexual urges rather than a prime interest. Moreover, paraphilia seem to be rare in the anthropological literature on tribal societies, thus the present prevalence is likely a consequence of the modern environment.

**Homosexuality** Some homosexual activity (not counting mock-mounting as used to confirm social rank) is apparently the norm in mammals, and particularly so in species lacking the pheromone associated TRPC2 gene; that is Old World monkeys, apes and man (Pfau et al. 2019). Yet, heterosexual behavior dominates – with the possible exception of bonobos (de Waal 2007). Exclusively homosexual individuals seem to be extremely rare in mammals, at least in the wild, thus the observed homosexual behavior is typically a question of bisexuality. Humans have a relatively high rate of bisexuals (5–20% depending on gender and how the issue is probed), but more peculiar is the observation that approximately 1% claims to be solely interested in one’s own gender (Savin-Williams et al. 2012; Tyson et al. 2015). The question of whether the prevalence is higher today than in the EEA is difficult to resolve due to the impact of cultural norms.

Two factors may explain why homosexual activity is relatively common in our species. One is the fact that we probably have a particularly strong sex drive, due to the dual purpose of sex; and a strong drive seems more likely to include aberrant behavior. The other is that humans, as in the case of bonobos, have extensive collaborations with individuals of the same gender. One would expect homosexuality to serve a role in bonding, a phenomenon that may appear in other species as well (Douglas 2009; Packer and Pusey 1987). The relatively high prevalence of exclusive homosexuals may reflect aspects of the present environment; for example, condemning the behavior may create a need to ‘choose side’.

Trannies, or shemales, are men with penises, but female appearance and often breasts due to surgery or hormone treatment. Contrary to popular belief, trannies cater primarily to heterosexual (or bisexual) men, and is one of the more popular categories of porn on the Internet (Ogas and Gaddam 2011). In fact, many men take an interest in penises; ‘big cock’ rates among the most popular search terms, and the popularity cannot be explained solely by searches made by females or gay men (Salmon and Fisher 2018). The popularity possibly reflects that bisexuality is a common feature, perhaps one that is more oppressed than expanded in industrialized societies.

**Pedophilia** Taking and interest in adolescent females, as long as they have anatomical features suggestive of maturation, is biologically normal. An interest in infants is not. Related behavior have been observed in other mammals such as the Hawaiian monk seal (Hiruki et al. 1993), but it appears to be rare with the exception of bonobos (de Waal and Lanting 1997). Both heterosexual and gay human males take an interest in

juveniles. In an Internet-based, anonymous questionnaire, 4.1% responded that they had sexual fantasies about children, and 3.2% admitted to having abused infants (Dombert et al. 2016). Based on the interest in search words such as Lolita and preteen, this may be an underestimate of the true appeal of children as sexual objects (Hald and Štulhofer 2016).

In many tribal societies, it is common for parents to fondle the genitals of their infants (Ford and Beach 1951). In the present perspective, this practice should not be considered pedophilic, as it typically does not imply sexual arousal for the adult. There are rare examples of traditional cultures that not only allow, but encourage sex between adults and infants (Ford and Beach 1951; Kelly and Lusk 2013). The considerable interest in modern societies, in spite of the ostracism, suggests that the practice resonates with some innate urges – perhaps a trait shared with bonobos. Yet, the prevalence may have increased due to mismatches in the present environment. As the practice is unlikely to gain acceptance, pedophilic desires are expected to decrease quality of life.

**‘Rough’ Sex** Rape-like behavior occurs in many species (Smuts and Smuts 1993). Whether the species form parental couples or not, it makes evolutionary sense for the male to force himself upon the female. Humans may be the expert rapist in that we have hands to hold the victim and language to form oral threats. Not surprisingly, rape is common both in the tribal setting and in modern societies (Ford and Beach 1951). Although the use of force can be construed as normal male sexual behavior, it constitutes a minor part of all sexual encounters.

As to the question of happiness, the use of force on a non-conforming partner is likely to imply a heavy load of negative feelings for the victim, and should thus be discouraged. The interesting observation is that both genders willingly participate in activities involving violence or coercion, as exemplified by the popularity of concepts such as bondage, spanking, dominance, rough sex, slave, sadism, and masochism (Ogas and Gaddam 2011). There is limited evidence for similar interests in tribal societies, except that inflicting pain (typically in the form of scratching and biting the partner) is considered to enhance sexual pleasure in certain cultures (Ford and Beach 1951). The more overt forms of violent, voluntary sex seem to be novel, which suggests that the practice, or at least the prevalence, is a consequence of the present environment.

Presumably, the participants derive pleasure from rough sex that goes beyond what they would obtain from normal sex. As previously pointed out, many brain modules can activate either pleasure or pain. Even the sensory signals stemming from pain receptors can be converted to yield pleasure, as observed when people take delight in self-harming (Edmondson et al. 2016). Thus, pain may enhance the sexual experience. Similar arguments can be made for submission and dominance in that these situations too can activate rewards rather than their expected (emotional) pain. Moreover, it has been suggested that women may appreciate (mock) rape for the experience it offers of being attractive (Hazen 1983).

## Sexual Dysfunctions

The main category of sexual disorders is sexual dysfunctions. The more common forms concern problems like premature ejaculation, lack of erection, and lack of libido. Based



on reports from Western countries, the conditions affect some 30% of adult men and 40% of adult women (Lewis et al. 2004; Shifren et al. 2008; Laumann et al. 1999). Although there is not much in terms of comparable anthropological data, the above figures suggest that the present environment is responsible for an increase. It seems unlikely that evolution would design a sex module that malfunctions in such a large proportion of the population.

Hypersexuality, or sex addiction, is recognized as a problem, but not included in diagnostic manuals. The existence of sex addiction is in line with general assumptions as to addiction. Any stimuli that engage the reward modules of the brain are likely to cause some form of addictive behavior when amply available, sex-related stimuli on the Internet should be no exception. Sex addiction has a negative impact on happiness if the behavior is excessive in a way that is unfavorable for other aspects of life. Some people do consider their own craving for sex to be troublesome in that it may, for example, damage career or personal relations (Griffiths 2012). It seems unlikely that sexual addiction was conceived as a problem in the EEA.

### Conclusion as to Sexual Distortion

Based on the above discussion, it seems likely that the modern environment does increase the prevalence of abnormal sexual desires and behavior. As pointed out above, the question is not whether a behavior is aberrant, but how it serves the overall happiness of the population. As long as sexual practices involve consenting adults, they have the potential to enhance happiness. Yet, one would expect that it is easier to achieve sexual satisfaction for the average person if he or she has a sex module that functions according to cultural norms.

Animals in captivity often display abnormal sexual behavior; for example, dogs are known to mate with human legs, zoo animals to chase away potential partners and refuse to mate. We live in a ‘human zoo,’ in the sense that the environment includes likely negative mismatches; their presence is expected to impair mood and cause unpredictable behavior (Grinde 2009a; Hidaka 2012; Nesse 1999). That is, the ‘zoo’-situation implies an ecological setting that promotes aberrant sexual desires, a lack of interest in sex, and an increase in hostility – in both animals and humans.

Negative emotions evolved for a purpose, the problem is when the relevant modules are active without serving that purpose. Anxiety, for example, can be construed as unwarranted activity of the *fear module*; while depression reflects similar hyperactivity of a *low mood module* (Grinde 2012). Clinical anxiety and depression are each diagnosed in some 10–20% of the people in Western countries (Moffitt et al. 2010; Wittchen et al. 2011); moreover, the diagnosable disorders are likely only the tip of the iceberg as to reduced quality of life, perhaps most people suffer from unnecessary worries and ruminations. It seems unlikely that these mental problems were equally common in the EEA as one would expect evolution to select against excessive negative emotions (Grinde 2005). People who associate sex with negative emotions appear to have reduced sexual desire (Woo et al. 2011); a situation that certainly is not in the interest of the genes.

Based on the discussion so far, I infer that the happiness of the population should improve if we can identify, and restore, relevant mismatches. It is a question of examining the ecological systems that shape the human mind (Bronfenbrenner 1989).

## Possible Mismatches

### Moral

Social structure has changed drastically since the EEA. Humans moved from a tribal setting to large-scale societies. Today we regularly interact with a considerable number of strangers, and many people lack a close-knit social network. The situation is likely to include negative mismatches and concomitant stress (Grinde 2009b). Moreover, the loss of tribal social bonds may explain the success of religions with strong moralizing gods (Grinde 2011). Sexual moral is still a significant factor of the macrosystem in most Western societies, exemplified by the restriction on nudity and sex in films. Compared to the more lenient censor regarding violence, which is behavior one ought to avoid, the censor on sex, which is behavior with a lot of positive potential, may seem strange. One possible explanation is that the sexual urges are more in need of being subdued in a large-scale society; that is, sex is a more permeating feature of the mind.

In the EEA, up until the last 50–100 thousand years, people were probably mostly naked (Kittler et al. 2003). Although various rules regarding touch and sexual relations apply in tribal societies as well, these cultures tend to be more relaxed than industrialized nations as to both dress codes and sexual behavior (Ford and Beach 1951). It seems likely that the default setting for humans is an open and permissive attitude to nudity and sex, as it is in animals.

Relationships – whether it is with a sexual partner, relatives, or friends – are important for the genes. Consequently, the relevant emotional modules offer strong rewards, but also considerable punishment. The punishment is primarily meant to induce people to cater to their relations. That is, negative emotions are there to warn you against something that, in the EEA, could be very destructive for the genes, such as being banished from the tribe or losing a partner. A strict sexual moral will tend to elicit more of these emotions and can therefore have a considerable negative impact on happiness.

### Restrictions on Infant Sexuality

When looking for relevant mismatches affecting the mind, it makes sense to focus on the environment of infants, as the brain develops proportionally more in the first years of life (Bronfenbrenner 2005). One facet of the microsystems affecting children in modern societies may be particularly destructive; that is, the restrictions on children's experience with nudity and sex. Parents typically hide their sexual activity, and their nude bodies, not just for other adults, but also for their children. In other primates, sex is generally not concealed, and the anthropological literature suggests that the same was the case in the EEA (Ford and Beach 1951; Frayser 2003; Josephs 2015).

As reviewed elsewhere (Josephs 2015), infants take extensive interest in their genitals, as well as those of others, and they obtain pleasure from genital stimulation from a very early age. Moreover, those with frequent exposure of this sort, even if the exposure comes in the form of abuse, tend to be more sexually active later in life (Browning and Laumann 1997). The lack of sexual stimulation and experimenting in present society may contribute to a situation where sex does not fulfil its potential for

enhancing happiness. Besides restricting sexual rewards, the situation is likely to increase the level of negative emotions such as guilt, shame, and regret.

It appears to be normal for children to enact sex play with peers from as early as 3 or 4 years of age (Kinsey et al. 1998; Martinson 1976). In fact, boys at this age may experience a sort of ‘orgasm.’ The Human Relations Area Files include several cultures where children learn sex through observations and play (Ember and Fischer 2017), much as they learn about other aspects of adult behavior. Infants explore the genitals of their parents, and mothers stimulate the genitals of their children, either for pleasure or for soothing and comfort. Juvenile sexuality also seems to be the norm among other primates, although males may engage in this sort of behavior more often than females (Dixon 2012). Juvenile male chimpanzees mock mate with any female that allows them, including their own mothers (de Waal 2007). This opportunity to learn about sex, and develop a suitable attitude, is generally absent in modern humans. On the contrary, children typically learn that nudity and sex is taboo.

The observation that the genitals can offer pleasures even in infants, rather than having this trait develop at puberty, is an important aspect of human biology, and thus an integrated part of the infant ecosystem. The observation substantiates the idea that children are meant to engage in sexual play. In contrast, the female nipples do not seem to become particularly erogenous until the development of breasts (Robinson and Short 1977).

Mental functions, including the sex module, are meant to develop in interaction with the ecological setting. In mammals such as goats and sheep, and possibly in humans, males are imprinted as to sexual interest during adolescence (Ogas and Gaddam 2011). In fact, there appear to be a critical period for males to develop sexual desires (Ford and Beach 1951). Chimpanzees that are refused sexual play during infancy, later struggle to perform sexually (Yerkes and Elder 1936). When the environment differs substantially from the EEA, the desires and the emotional reactions are likely to become distorted.

## Sexual Stimuli

As suggested above, another consequence of large-scale societies was the introduction of dress codes so that men would be less inclined to desire, and consequently abuse, women. Internet has made sure that there is abundant alternative stimuli available. Both the lack of natural nudity and the profusion of stimuli are mismatches with a potential for negative effects.

The impact of Internet porn is discussed above. One additional problem is that the high standard of the models presented, whether catering to males or females, make it more difficult to enjoy normal sexual stimuli – that is, less perfect bodies and less ideal male characters. The consequences may include unwarranted negative feelings when women assess their own bodies, and lack of sexual fulfilment for both if a person does not find the spouse sufficiently attractive.

It seems reasonably well documented that the use of Internet porn can contribute to sexual dysfunction (Park et al. 2016). What typically happens is that the user, more often a male, masturbates to porn that, (1) offers unlimited access to ‘novel and ideal sex objects’; and (2) caters to peculiar preferences. The combination implies a form of superstimuli not found in real life, and consequently the person may experience erectile dysfunction, lack of libido, or low sexual satisfaction when with a partner. One may

argue that the potential for sexual pleasures is catered for by masturbation, but the bonding part and the skin-to-skin contact is missing.

## Conclusions

### Present State of Affairs

The level of sexual activity correlates strongly with happiness (Blanchflower and Oswald 2004; Cheng and Smyth 2015), but so does the quality of close relationships. It is not obvious whether better relations imply more sex, or more sex help build better relations. It seems likely, however, that having a positive attitude to sex, improves both how one relates to loved ones, and the amount of pleasure obtained from intimate behavior. The previous discussion suggests that sexual behavior is not functioning optimally in industrialized societies. The two most troublesome aspects are probably: (1) an elevated level of negative emotions such as guilt and shame, and (2) a malfunctioning sex life that restricts the harvesting of positive feelings.

The negative emotions typically imply the activation of modules related to fear and low mood. Neuronal circuitry generally expand and strengthen upon repeated activation (Maguire et al. 2000), the situation is consequently likely to contribute to the high prevalence of anxiety and depression. Whether or not present sexual behavior qualifies as a ‘disease of modernity,’ there seems to be room for improvements, particularly in the form of altering the bioecological systems that drive infant development.

As to paraphilia, it may be easier to have positive experiences with sex for individuals with non-aberrant sexual desires, but it is difficult to change the desire of adult males. Attempting to do so, may not improve the happiness of that person. The best strategy may therefore be to increase acceptance. In the long run, dealing with the proposed mismatches of industrialized societies may normalize desires.

Modern societies have many advantages compared to the EEA-based life, but also detrimental aspects in the form of negative mismatches. While it is difficult to orchestrate biological evolution, we do have the means to influence cultural evolution. That is, we should aim to create a social-ecological setting that leads in the direction of an average quality of life surpassing any previous or present human society. Making the most of sexual behavior is an important element in this endeavor. Below are some points one may consider. The list can also be taken as suggested topics for future research in the form of intervention studies.

### Applied Perspectives

**Moral** As to the net effect on the population, punishing emotions induced by a strict moral should be weighed against the upside of having people behave nicely. If the rules are unnecessarily stern, or out of tune with innate behavioral tendencies, the balance is likely to be negative. I believe that a more open and permissive sexual moral would benefit the population.

The present rules affecting sexual behavior, particularly in countries shaped by monotheistic religions, are a legacy from a time when strict ethical guidelines were more important. Some of the negative aspects of sex, such as infectious diseases and

unwanted pregnancies, can be avoided today; and we are, arguably, better at curbing violence. The emotional burden of sensing that even normal desires are considered amoral, may actually promote sexual abuse. The point is substantiated by the observation that a leniency to porn correlates with lower levels of violence toward women (Diamond 2010; Salmon and Diamond 2012). Perhaps society ought to implement greater acceptance of any sexual desires as long as they are restricted to solitary activities or involve consenting adults. Vulnerable groups, such as children, need protection, but that may be cared for by a strict intolerance for illegal behavior rather than a condemnation of pedophilic desires. The problem is somewhat similar to aggression; it makes sense to accept that people sometimes get angry, but not to tolerate that the anger results in violence.

**Attitude to Porn and Sex Workers** Rather than considering prostitution, or pornography, to be sinful, it seems better to accept it. As sex tends to evoke strong emotions, sex workers should know the potential burden of what they engage in. On the other hand, the negative emotions are largely a consequence of stigmatization due to cultural norms. In some societies, prostitutes can have a high status, as exemplified by the historical role of Devadasis in India and oiran courtesans in Japan; and some prostitutes find their work meaningful and agreeable even where it is illegal (Lucas 2005). The main objective should be to make sure sex work is entered voluntarily – in terms of both overt coercion and economic necessity.

Although it may be preferable to direct sex toward real life partners, Internet offers a substitute with a potential for enhancing happiness. An attempt to abolish porn seems like a dubious strategy. It has been argued that the Internet, by depicting a fair amount of violent sex where the female part is the sufferer, can induce violence in real life. The contention is valid, but it seems fair to point out that mainstream TV depict more violence against women than seen in porn (Salmon and Diamond 2012). Perhaps Internet stimuli open arenas for undesirable sexual behavior, but they also offer a chance to relieve sexual cravings in a safe way (Fortin et al. 2018; Nolen-Hoeksema 2013). We lack sufficient data to determine how these two arguments balance.

The problem of sexual addiction is another valid concern. The issue reflects a common dilemma in present society: Any stimulus that triggers reward modules in the brain has been refined by commercial interests and made readily available. The effect on quality of life is typically two-edged; sweet food, for example, offers rewards, but can lead to health problems later in life. We do not want to live without tasty food, the more viable solution is to teach people moderation.

The availability of porn is necessarily a mismatch. As such, it illustrates what may be the biggest problem when trying to improve society: A mismatch may serve some individuals in a positive way, while being negative for others; the outcome depends on personal and cultural differences. In order to optimize the prospect of happiness, one needs to cater not only to what is genetically inherited, but also to individual variation and to the ecological systems that have shaped present adults. What is a reasonable initiative for change in one country may not be desirable elsewhere.

**Infant Sexuality** Children should be allowed, perhaps encouraged, to play with their own genitals and to explore sexual play with peers. Moreover, they should preferably be exposed to nudity and sexual behavior. A more contentious question is whether

parents (particularly mothers) should engage in ‘sex play’ with their infants. A more open attitude toward sex in the formative years seems likely both to reduce later desires for aberrant sex and to improve the potential for harvesting sexual pleasures. This should again translate into more sex with the partner, more stable relations, and less sexual violence. In short, society ought to reconsider the ecological systems that cater to human development.

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## Declarations

**Conflict of Interest** No competing interests.

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