The Effects of Age on Mate Choice Across Primate Species and its Correlation to Mating Systems

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ABSTRACT

Age can be an important factor in mate choice as it affects experience, access to resources and reproductive value. The hypothesis of this thesis is that in species with long-term mating bonds, males will prefer to mate with younger females whereas in species that mate promiscuously, male will prefer to mate older females. Tackling this question of effect age has on mate choice will help contribute to knowledge on mating behavior and mate choice in primates. The methods for this thesis included gathering evidence from the scientific literature on mate patterns and mate choice in humans (*Homo sapiens*), chimpanzees (*Pan troglodytes*), hamadryas baboons (*Papio hamadryas),* and savannah baboons. Due to the large variation in human behavior across the globe, a cross-cultural analysis is used to draw conclusions regarding how men tend to perceive attractiveness in terms of age and how they choose potential reproductive partners. Similarities and difference in mating patterns and perception of attractiveness in primate are examined. Cross-cultural analysis concluded men generally find youthfulness attractive. Preferences for younger female mates is observed in species that exhibit long-term reproductive pair bonds (humans and hamadryas baboons), whereas preference for older females is observed in species that mate promiscuously (chimpanzees and savannah baboons). Females across all species prefer to mate in way that increase the survival of their offspring. For species with long term pair bonds, this means a preferences for males of high social status, independent of what age. In species that don't experience long-term pair bonds, this means mating with many males in order to confuse paternity and reduce the risk of infanticide. However, in most primate species (those other than humans), it can be challenging to determine female mate preferences are because of the suppression of female choice through sexual coercion and male-male competition.

GLOSSARY

Cross-Cultural Analysis Theory: anthropological theory involving comparisons across different cultures that can be used to discover traits shared between cultures and uncover human universals (Parker, 2009, p.1-2)

Fecundity: likelihood a mating event will result in conception and birth offspring (Biologydictionary., 2017)

Fitness: the probability an individual's genes get passed down to future generations; increases in value with more offspring (Maynard Smith, 1989)

Mate value: the fecundity, expected amount of parental care and genetic contribution an individual will provide to the potential offspring (Jones, 1996a). Mate value of individual (x) to another individual (y) is calculated as the expected fitness of mating with (x) divided by the expect fitness from mating at random (Jones, 1996b).

Monogamous: a mating system in which both females and males have a focus on only one reproductive partner during their lifetime or only one reproductive partner at a single time (Merriam-Webster, n.d.)

Multiparous: a female who has given birth more than one time (Merriam-Webster, n.d.)

Nulliparous: a female who has never given birth (Kinsley et al., 2008)

Polygynandrous: mating system in which both females and males mate with multiple partners for reproduction (Davies et al., 2012)

Polygynous: a mating system in which males have multiple reproductive partners at a time while females only mate with a single male (Merriam-Webster, n.d.)

Primigravida: a female who is pregnant for the first time or has been pregnant one time (Merriam-Webster, n.d.)

Reproductive lifespan: time interval between menarche and menopause; amount of time a individual is able to produce offspring; for women, it is the time interval between menarche and menopause (Shadyab et al., 2017).

Reproductive value: an individual's expected future contribution to the future population and is age-specific (Engen et al., 2009); reproductive value declines with age is due to the increased likelihood of death of older individuals and their shortened reproductive lifespan (Medawar, 1957). Therefore, the fertility of young is relatively more evolutionarily important than the survival of the old (Fisher, 1930). Can also be defined as the relative probability that a gene chosen at random from a future generation can be traced back to a particular individual (Gardner, 2019)

INTRODUCTION

Humans and chimpanzees share many similarities (Wildman, 2002). For humans, youthfulness has traditionally been a large indicator of attractiveness (Buunk et al., 2001; Phua et al., 2018; Sohn, 2017). However, studies have found that male chimpanzees prefer to mate with older females. (M. N. Muller et al., 2006). Many attributes that affect the perception of attractiveness in different species, however it is surprising to find that one of our closest relatives seems to display a complete opposite preference of age when selecting a mate. Things such as reciprocity, social status, the choices of others, coloration, quality of calls and odors are just a few characteristics that have been studied in humans and other primate species. However, an evolutionary explanation of why chimpanzees and humans might differ in their perception of attraction to a potential mate based on age, by comparing them to other primate species, has yet to be thoroughly completed. In this paper, I will attempt to answer the question of how and why humans and chimpanzees differ in their age preference of a potential by comparing them to species of baboons. Additionally, I will address how different reproductive patterns, specifically the presence or absence of long-term pair bonds, of species determine the age at which an individual finds a potential mate attractive.

So, in primates, is age an attribute of consideration when selecting a mate? If so, how does age impact the decision making? And why might it have this impact? In order to further explore and answer these questions, I will provide an overview of the scientific literature on mating patterns on and behavior, both in humans and in other animals. I will provide evidence to demonstrate that age does play a significant role in the mate value of an individual and the value is determined by the mating systems of species. I aim to determine if age has an effect on attractiveness and if so what role it play on human's biological attractiveness to one another. I

intend to make my conclusions by conducting a cross-cultural analysis of human societies to determine the most common and possible biological predisposition for how humans perceive attraction based on age and most human's mating system. I then validated these findings by comparing humans to other primates. With research and evidence in primates, I compiled detailed information on the similarities and differences in age preference of different species as well as information on each species' social and mating behavior. Any conclusions drawn from the findings of this study can be used for better understanding of mate choice and mating behavior in animal species. It can provide evidence to demonstrate that age is not "just a number" but has an important evolutionary role in selecting a mate. Additionally, understanding the effect of evolutionary adaptions in mating patterns on human perceptions of attractiveness can help us to better understand human's adaptions and our biological predisposition for certain mating behaviors. It can also help in understanding dating, mating and marriage patterns around the world, and uncover the intersection between social and culture pressures with our biological underpinnings. It is important to note that using primates as a model for studying humans is commonly used as primates share a large amount of genetic information with humans and since we are in the same taxonomic order. And "biological anthropology encompasses a long history of the use of nonhuman primates to help understand the evolution of hominin biology and behavior" (Swedell & Plummer, 2019).

In this paper, I looked at the effects of age has on attraction in *Homo sapiens*, *Pan troglodytes* and two species of baboons (*Papio hamadryas* and *Papio cynocephalus*). I chose these two species of baboons as one mates in long-term pair bonds similar to humans (*Papio hamadryas*) while the other tends to mate promiscuously (*Papio cynocephalus*), similar to chimpanzees. I will examine humans' (*Homo sapiens*) preference for age as information on our

own species. I chose to examine chimpanzee's preferences for age as they are one of our closest living relatives. However, they participate in much different mating patterns than humans as they mate promiscuously. In order to determine whether the differences and similarities in humans and chimpanzees are due to their different mating patterns, I will examine the age preferences of potential mates in other primate species with differing mating patterns. I examined are the hamadryas baboons (*Papio hamadryas*), who tend to form long-term pair bonds, and savannah baboons, which include the yellow baboon (*Papio cynocephalus*), olive baboon (*Papio anubis*) and chacma baboon (*Papio ursinus*), who all mate promiscuously. Using baboon species can be considered somewhat of an experimental "control" as they are relatively similar despite their different matting patterns can be used to compared to humans and chimpanzees.

HYPOTHESIS AND RATIONALE

With this information, the specific hypothesis I have for this thesis is that **in species with long-term mating bonds, males will prefer to mate with younger females.**

The rationale behind this hypothesis is based on the reproductive value and limitations of the different sexes. Males tend to have more stable reproductive value, because they are able to contribute to producing offspring over a longer period of time (Jones, 1996a). In contrast, females have a limited reproductive lifespan and therefor their reproductive value is highly related to age (Jones, 1996a). Additionally, males' fitness (ability to produce offspring) is limited by their access to females whereas females' reproductive value is limited by their access to resources (Bateman, 1948; Bergman, 2006). Since males need access to females in order to reproduce, long-term reproductive value is important in species who form long-term reproductive pair bonds. On the flip side, I assume that species that do not form long-term reproductive bonds will put less of an emphasis on the reproductive value of a potential female, but rather attempt to mate with females who have proven themselves to be offspring bearer (old/multiparous). Since the reproductive value of males is much more consistent across their lifetime than females , and since females are limited by their access to resources (Bateman, 1948; Bergman, 2006), age of males will play a small role in the decision making of females, but rather status of males will be more important.

There are other hypothesis in regard to age's effects on attraction as well (more in "OTHER OPINIONS AND HYPOTHESIS" p. 14). One hypothesis is that age has no effect on attraction in humans (Muhlbauer & Chrisler, 2007). Another is that what effect age does have on attraction in humans is based on cultural influences and environmental reasons than being biologically influenced (Alarie, 2019; Muhlbauer & Chrisler, 2007)

AN ASSUMPTION ABOUT PRIMATE ATTRACTION

A central assumption for my argument is that there is a connection between attraction and mate choice. I will be making the assumption that if an individual (x) chooses to mate with another (y) then individual x finds individual y attractive. If an individual (x) chooses to mate with an individual (z) over another individual (y) then individual x must find individual z more attractive than individual y. This assumption was drawn directly from Muller's paper on male chimpanzee's preference to mate with older females, (M. N. Muller et al., 2006) which was one of the central readings that inspired my thesis. In this paper, Muller and colleagues make a direct connection between sexual attractiveness and mate choice in both chimpanzees and humans. This direct connection between sexual attractiveness and mate choice is not unique to Muller's paper but rather is a widely accepted conclusion in the field as it appears in other research (H. E. Fisher et al., 2006; Wincenciak et al., 2015). The majority of research in the field draws a direct connection between physical attraction to an individual with a desire for them to be a mate (Fugère et al., 2017; Kocsor et al., 2011; Margana et al., 2019). Therefore, attraction of an individual is even measured by other's desires to mate with that individual.

So, why consider age? Age affects the value of a mate as a potential reproductive partner. First, (1) age provides experience. In species where male parental care is limited, the value of age is only provided by females to males. Older females are more likely to have had raised offspring. Being a multiparous female (i.e. having given birth at least once) provides that individual with knowledge of having and raising an infant, and therefore making it more likely that any additional offspring of that individual will make it to adulthood (Glander, 1980; Silk, 1989). Second, (2) age tends to also correlate to greater access to resources in humans. This correlation is especially present in human as one of our biggest resources is money and older

individuals tend to have more of it (Huggett, 1996; J. Creedy & P. E. Hart, 1979). And finally, (3) age affects the reproductive value and mate value of an individual. Reproductive value is the expected future contribution an individual will have to a future population and is age-specific (Engen et al., 2009). Reproductive value declines with age due to the increased likelihood of death of older individuals and their shortened reproductive lifespan (Medawar, 1957). The mate value of an individual (x) to another individual (y) is the expected fitness of mating with (x) divided by the expect fitness from mating at random (Jones, 1996b). If an individual is mating at random, the expected fitness of their mate would be the average of all potential mates. So, for example, it would be the average age of the potential mates. Reproductive value is tied to age because younger individuals have the potential to produce more offspring over the rest of their lives than older individuals. Therefore, with all other elements being equal, younger individuals who are still sexual mature would have a higher expected fitness than mating at random. Mate value is heavily influenced by fecundity (i.e., likelihood a mating event will result in conception and birth offspring), the expected amount of parental care they will provide and the genetic contribution they will give to the potential offspring (Jones, 1996a). Since mate value is influenced by the likelihood an individual to produce offspring, it is correlated to the reproductive value of that individual and therefore, the age of an individual. When species form monogamous relationships, the long-term mate-value is important in determining how many offspring a pair can conceive. This is especially prevalent in human females as fertility peaks in late 20s and begins to decline through the 30s due to menopause (Herndon et al., 2012). Therefore, younger females have higher mate value as they have more potential years to bear children (Jones, 1996a). Males also experience a decline in fertility, however this happens later

in life and consequently, age has less of an effect on their reproductive value as a mate (Jones, 1996a).

ALTERNATIVE OPINIONS AND HYPOTHESIS

Besides age, there are other factors that affect attraction in humans and other primates. For example, in humans, having similarity views and attitudes (Swami, 2016, p. 202-243), being at similarity of level of attractiveness (Yela & Sangrador, 2001) reciprocity (Swami, 2016, p.156-163) social status (Ha et al., 2010), the choices of others (Waynforth, 2007) and even certain colors (Elliot & Niesta, 2008) have been demonstrated to affect attractiveness. In primates, quality of calls (Oliveira & Ades, 2004), odors (Roberts et al., 2010) and coloration (Setchell, 2005) are just a few of the many attributes which have been observed to affect attraction. However, the two main reasons why I was most drawn to age as a factor affecting attractiveness are the following; (1) age is relatively easy to measure (while other factors like intelligence or personality are much more challenging to quantify), and (2) the dissimilarity between chimpanzees and humans on the effects of age on attraction (M. N. Muller et al., 2006), despite common evolutionary history and genetics (Wildman, 2002).

Some people argue that "age is just a number" (Muhlbauer & Chrisler, 2007) and has no effect on attraction. However, as I will demonstrate in my cross-cultural analysis, age has been observed as an important element of attractiveness across many human populations. Additionally, some argue that age's effect on attractiveness is culturally determined (Alarie, 2019; Muhlbauer & Chrisler, 2007). Put differently, attractiveness for younger, older or the same age individuals is entirely based on the environments we grow up in (Alarie, 2019; Muhlbauer & Chrisler, 2007). Through a cross-cultural analysis, I will demonstrate that this is not accurate. Although individuals vary (Alarie & Carmichael, 2015), there is simply not as much variation in age preference as we see in other characteristics that affect attractiveness and are clearly culturally determined (Cunningham et al., 1995; Gates, 2008; Pazhoohi &

Hosseinchari, 2014; Swami et al., 2010).   Additionally, I will demonstrate that the age of a potential mate does have an effect on their mate value (Bovet et al., 2018; Jones, 1996a; Li et al., 2013; Singh & Luis, 1995; Symons, 1979) and therefore age preferences are in part biological selected through the evolutionary process.

It can be argued that attractiveness is not connected to reproductive value or mate choice, or that an individual might find another one "attractive" but not consider them to have high reproductive value or appropriate reproductive partner. Research in non-human species, such as in guppy (*Poecilia reticulata*) have shown that in some species sexual attractiveness does not have a significant influence on mating choice (Godin & Hair, 2009). Some researchers have suggested that factors other than attractiveness have a greater effect on mate choice and are more important than attractiveness in mating decisions. Some of these factors include spatial proximity (Meuche et al., 2013), altruism (Farrelly et al., 2016), individual's self-perceived mate value (Back et al., 2011) and parental control (Apostolou, 2017). In the section on humans of this thesis, I examine arguments for the opposite view, i.e. age does have a significant impact on perception of attractiveness as it directly affects the mate value of an individual and therefore, animals (including humans) are biologically predisposed to find certain ages more attractive than others based on the mating system of a species.

A FOCUS ON HETEROSEXUAL BEHAVIOR

In this thesis, I examine attraction between different-sex pairs (i.e. males' attraction to females and females' attraction to males). I will specifically be focusing on heterosexual attraction in humans and other primates as it is (i) more common than homosexual behavior and (ii) is directly related to reproductive success (Bailey et al., 2016; Sommer & Vasey, 2006). In recent years, societies have demonstrated an increased openness to expressions of homosexuality and have become more committed to protecting the rights of non-heterosexual individuals. However it is not nearly as common as heterosexual behavior in non-human species and does not lead to reproductive success as commonly. Although same-sex sexual interactions have been reported in hundreds of animal species (Bagemihl, 1999), they are consistently observed in very few (Sommer & Vasey, 2006). From an evolutionary perspective, in species with two separate sexes and that engage in sexual reproduction, the production of offspring has resulted from only from heterosexual behavior and interactions. Additionally, I will focus more strongly on males' attraction to females, as this seems to be more extensively studied than females' attraction to males, in both humans and primates (Miller, 2001; van Noordwijk & van Schaik, 2009).

PERSONAL BIASES

Before I dive too far into my thesis, I think it is important to acknowledge my personal biases. First and foremost, I am a female. This might cause me to have a more feminist point of view on the topic and possibly focus more on female choice and/or how females are attractive than males. Second, my anthropological background is mainly biological. In college, my studies have been focused on evolution and behavioral studies. This may bias my viewpoints and theories on the topics presented. Finally, I was born, raised and currently live in a Western society where monogamy is the norm. This may lead me to jump to conclusions about behavior in human cultures which may not be universally true.

METHODS

My methods for this thesis included gathering evidence from peer-reviewed papers, scholarly books and other scientific sources on mating patterns and mating choice in humans, chimpanzees, hamadryas baboons and savannah baboons. With respect to age effect on humans' perception of attractiveness, I conducted a cross-cultural analysis of age effect on attractiveness in different cultures around the globe. Cross-cultural comparisons can inform what is generally true for most if not all human cultures (Parker, 2009). By doing this, I will be able to discover underlying similarities and patterns in human behavior. This will strengthen my conclusions on human's perception of attractiveness to be more accurate than what would be possible by just looking at one population of people. I will also use cross-cultural comparisons to examine human mating patterns and draw conclusions on how the majority of people interact with reproductive partners. My methods are slightly different as I examine the other primate species. When examining chimpanzees and baboons, I examined studies that have reported on the mating patterns, mate choice and interactions between potential reproductive partners in these species. From this review, I will drew conclusions on what ages and characteristics the primates find attractive in a potential mate, and compare any correlation between the mating patterns of primate species and perceived attractiveness.

HUMANS

Anthropologist and scientist have studied human attraction extensively over the past few decades. When it comes to short-term mating, both sexes are similar in their preferences for mates. They both prioritize physical attractiveness when choosing a short-term mate (Li et al., 2002; Li & Kenrick, 2006). However, studies have indicated that there are differences between the characteristics each sex looks for when searching for a long-term reproductive partner. Males are more concerned with youth and physical attractiveness whereas women pay more attention to personality, social status and resources of a potential mate (Buunk et al., 2002; Fletcher et al., 2004; Schwarz & Hassebrauck, 2012; Shackelford et al., 2005).

Additionally, there have been debates over what the biological default mating system is for humans. Humans display sexual dimorphism which would suggest patterns of polygyny (Michael Lawrence Wilson et al., 2017). However, the majority of humans currently engage in monogamous relationship, even when societal laws may allow for polygynous relationships (Marlowe, 2000). Yet again, there are plenty arguments for and plenty of individuals who choose to partake in polygynous (one male and multiple females) (Koos & Neupert-Wentz, 2020; Puts, 2010), polygamous (multiple males and multiple females) (Garrison, 2011) and polyandrous relationships (one female and multiple males) (Geher & Jewell, 2017).

MALE HUMANS PREFER YOUNG FEMALES

From the male perspective, age has historically been a prominent predictor of perceived attractiveness in women (Danylova, 2020; Jones, 1996a). Human males consistently prefer to mate and have relationships with younger women over old women (Buunk et al., 2001; Phua et al., 2018; Sohn, 2017), specifically women who are early in their reproductive lifespan (late

teens to mid-twenties). This may be older females for adolescent males but is typically younger females for the majority of the male population. Youth is seen as the "gold standard" for beauty in today's society (Danylova, 2020). Cues of youth, such as smooth, soft skin, few winkles, a straight back, vibrant colored hair and strong bodies, are all attractive features. Striving for youth is common in human cultures; for example, the myth and stories surrounding the fountain of youth, a water source promising to provide youth and regeneration to those who drink or bathe in it (Olschki, 1941).

Research has indicated that a woman's sexual attractiveness peaks before motherhood and declines with age (Jones, 1996a). Visible, physical traits that provide cues about woman's age during the fertile period of around 15 to 35 years of age, include a low waist to hip ratio (typically between the values of 0.7 and 0.8) (Singh & Luis, 1995), facial neoteny (i.e. retaining juvenile features with large eyes, small noses and full lips (Cunningham, 1986; Cunningham et al., 1995; Johnston & Franklin, 1993; Perrett et al., 1994) and light skin color (relative to the local population) (Rambausek & Thompson, 1990; van den Berghe & Frost, 1986). Surprisingly enough, despite global variation in some characteristics of physical attraction (Cunningham et al., 1995) and arguments that perception of physical attraction varies (Meckler & Meckler, 1990; Wolf, 1992), there is evidence to support that physical characteristics of attractiveness are relatively consistent across geographic regions and time.

Characteristics such as a low waist-to-hip ratio (Singh & Luis, 1995) and light skin (Rambausek & Thompson, 1990) have been found to be similar amongst different groups of people in different parts of the world and from different time periods. This indicates that the cues of youthfulness are consistently attractive for all humans and that these characteristics are not unique to a specific culture. Even today, attempts to achieve these characteristics can be

observed through the use of waist trainers and corsets (Ray A. Smith, 2018) and with the rise of

cosmetic facial plastic surgery (Mendelson & Wong, 2012; Panfilov, 2007), lip injections and

makeup. Many women undergo plastic surgery. I posit that these characteristics aren't

necessarily attractive on their own, but rather it is what they indicate about the individual is what

make them desirable. Much of what women do to be considered "attractive" has to do with the

modification of cues of age so that they appear to be younger. Since youthfulness is attractive to

male humans, indicators of youth must therefore also be attractive.

So why youth? There are two important, biological reasons, intertwined with each other,

that may be able to answer this question; that men prefer younger females because of human's

long-term and in many cases, life-long pair bonds, because of the importance of future

reproductive potential (Symons, 1979), as well as the onset of menopause limiting a women's

future fertility (Bovet et al., 2018; Buss, n.d.; Jones, 1996b).

Long-term pair bonds: There is still debate as to whether humans are adapted for

monogamy, polygyny, polyandry or promiscuous mating relationships (Wilson et al., 2017).

However, one thing is common across cultures and time – that is humans form long-term pair

bonds. Around eight million years ago, our hominin ancestors shared a common ancestor with

chimpanzees (whose mate preferences we will cover later on in this paper) (Knight & Taylor,

1998). Although we do not know that mating partners of our last common ancestor with

chimpanzees, we are aware that since then, the lineages leading to humans and chimpanzees

diverged, one evolved to engage in more promiscuous mating patterns (chimpanzees) and the

other evolved to engage in more monogamous mating patterns (humans) (Kauth, 2021). Many

hypotheses have been proposed for the purpose of this adaptations. These include the benefits of

increased parental investment on infant survival, benefits of male provisioning and the costs of

male competition (Quinlan & Quinlan, 2008). No matter the reasoning, it is clear that long-term affiliation of two individuals with a sexual relationship is common across the world and provides important economic, reproductive and social benefits (Kauth, 2021; Quinlan & Quinlan, 2008). Because many human cultures form long-lasting pair bonds, choosing a younger mate allows males to have a longer period of reproductive potential with his mate. Obviously, relative age becomes a factor in the decision making, so younger people show strong preferences for youthful partners than older people (Jones, 1996a). However, the importance of choosing a female with many years of reproductive potential ahead is important in order to ensure a male with the ability to produce children for his own and pass on his own genes.

Menopause: One reason males may preferer to have a young mate is to avoid mating with older, infertile females. Eventually, a female's reproductive potential will decline to nothing, typically around 40 to 50 years of age, with the onset of menopause (Herndon et al., 2012). Menopause is the period of life at which females experience a reduction of and eventual cessation of ovulation and child-bearing potential (McDonald Pavelka & Fedigan, 1991). Surprisingly, true menopause is uncommon in other species, including primates and is considered to be relatively distinct to humans (Kasuya & Marsh, 1984). However, this could be simply due to the fact humans have evolved to have long life histories and in today's world, are able to live long past what they would physically be able to sustain in the wild.

Since a women's fertility is tied to her age, it makes sense that males in long-term term pair bonded species would prefer reproductive partners who are youthful as they are more likely to be capable to bear more offspring over the rest of their lifetime (Li et al., 2013).

However, there are also alternative hypotheses that argue that male humans are not attracted to female youth or that female youth does not play a role in human attraction. We see evidence for this in "cougars," females who are past their prime reproductive age but still engage in sexual activity with men over 5 years younger than themselves (Alarie, 2019; Muhlbauer & Chrisler, 2007). Some famous age gap couples with an older woman include Demi Moore and her younger husband, Aston Kutcher, with an age difference of 16 years, and the French President Emmanuel Macron and his older wife Brigitte Macron who is 24 years his senior. Some men indicate they prefer dating older women because they find them to be more self-assured, self-confident, good with conversation and emotionally stable (Alarie & Carmichael, 2015). There are also plenty of people who believe that age is a socio-cultural construct and that is has no biological relevance in inherent attraction (Alarie, 2019; Muhlbauer & Chrisler, 2007) The belief in the loss of attraction after a certain age is entirely fabricated by the media and is only a cultural discourse (Alarie, 2019; Muhlbauer & Chrisler, 2007).

One might also argue that youthfulness being attractive is cultural rather than biological; that humans do not innately find youthfulness to be attractive but rather they are affected by their surrounding environments. If this is the case, we should see variation in age preferences across cultures. In contrast, if my hypothesis is correct, and attraction to youth is universal and evolutionarily selected for, we should see consistency in the preference of female youth across cultures. This brings up the argument of nature versus nurture, an age-old discussion on the role of genetics versus the environmental on human behavior (Lafuze, 2017).

Although an argument can be made that age doesn't or shouldn't even matter when deciding on a potential mate, one cannot deny the overwhelming evidence that there is

consistency across different cultures in preferences for younger women. If the age effect on attraction is cultural rather than biological, we should see more variation on age preferences for mating partners. For example, cross-culturally studies have shown that the ideal body weight is largely affected by the culture and the environment in which a population resides and experiences (Swami et al., 2010). Subsequently, ideal body weight and perception of the favorability of different body weights vary drastically across cultures and regions (Swami et al., 2010). It would be wrong to say that there isn't variation in age preference of a potential mate. There clearly is, as we have seen in presence of some men's desire for "cougar" women. However, there is not nearly as much variation in age preferences across human cultures as there is for culturally influenced attributes, such as body weight (Swami et al., 2010), clothing (Pazhoohi & Hosseinchari, 2014) or foot binding (Gates, 2008).

FEMALE HUMANS PREFER SAME AGE OR OLDER MALES

Women's age preferences for a potential mate are not nearly as clear as those of men. Studies have shown that women are attracted to men of either a similar age (Buunk et al., 2001) or older than them (Walter et al., 2020). However, they do not have as distinct of an age preference for their mate as most men (Jones, 1996a). This is surprising since women tend to be the choosier sex when it comes to deciding on a mate (Ruti, 2015). There are few explanations for the presence of a less strong mate age preference in women.

First, (i) the reason for female's lack of a strong age preference in potential mate, maybe be due to the exact reason females, overall tend to be choosier. It might be simply due to the fact that female's reproductive potential is most heavily limited by access to resources (H. S. Fisher & Rosenthal, 2006; Reik & Walter, 2001). Therefore, if a female is able to gain access to

resources through a mate, independent to what age the mate is, she will likely benefit. A study where females indicate a preference for older mates hypothesize that this is likely due to the pattern that older mates likely have greater access to resource and financial prospects, especially compared to males younger than the respective female (Walter et al., 2020).

Another possible explanation is that (ii) males have a more consistent reproductive value. Mate value is determined by a potential mate's fecundity (i.e. the likelihood that a mating with them will result in the production of offspring) the expected amount of parental care they will provide and the value of genetic contribution they will make (Jones, 1996a). Research has shown that "age-related variance in fecundity is almost time greater in adult females than adult males. Consequently, there will be much stronger selection on males than females to choose partners on the basis of age" (Jones, 1996a). In order words, because females experience menopause and infertility earlier in life than males, they can afford to be less choose on the basis of age and focus their preferences on other characteristics of the potential mate such as resources of genetic quality. Since male can produce offspring over a longer period of their lives, age of a potential male is a less important attribute to consider for female choice of a potential mate.

CHIMPANZEES

Chimpanzees (*Pan troglodytes*) are one of the most, if not the most, studied primates besides our own species, humans (M. N. . Muller et al., 2017). One reason for the amount of information on chimpanzees is due to the extensive research by renowned Jane Goodall and many other researchers. Goodall, specifically, has been researching chimpanzees since 1960, and more specifically the Kasekela chimpanzee community in what is now Gombe National Park. She foraged a more personal way of primate research and observations as she gave her chimp subjects names rather than numbers (Greene, 2005). Her legacy of discovering chimpanzees' tool use (Greene, 2005) will always stand as a turning point in how we view primate behavior. An additional reason for the extensive research on chimpanzees is that humans and chimpanzees share a remarkable amount of genetic similarity (98.77) (Wildman, 2002), making them great research candidates for understanding our species. In terms of their mating system, chimpanzees are promiscuous. They live in multi-male, multi-female groups where individuals mate promiscuously with others (Goodall, 1986; Povinelli & Povinelli, 2001; R. M. Stumpf & C. Boesch, 2005; Tutin, 1979)

MALE CHIMPANZEES PREFER OLDER FEMALES

Male chimpanzees have been found to prefer mating with older females (Anderson, 1986; M. N. Muller et al., 2006; Tutin, 1979). An initial hypothesis for this pattern was that male chimpanzees are simply avoiding younger, nulliparous (never given birth) females rather than actively having a preference for older females. This would be because nulliparous females may be predicted to be lower quality mates as they experience prolonged periods of adolescent subfecundity before their first birth (Young & Yerkes, 1943), they experience higher rates of

miscarriages/fetus mortality (Young & Yerkes, 1943) and they have not yet proven they are capable of successfully bearing and/or raising offspring (Anderson & Bielert, 1994). In a study performed by Muller and colleagues, they used male copulatory approaches, the party size of males around near/around a female, rate of copulation and male-male aggression in mating competition to measure how males were attracted to females. The data used in the study included over 13 years of information on the Kanyawara chimpanzee community at Kibale National Park in Uganda. Muller discovered that chimpanzees did not simply avoiding nulliparous, young females but rather exhibiting a preference for females who were above the median age of survival (M. N. Muller et al., 2006). This was done by excluding nulliparous females for part of the analysis.

Many hypotheses have been proposed as to why male chimpanzees may prefer mating with older females. (i) First, the older females tend to be the higher ranking females in a community (Anne Pusey et al., 1997; Foerster et al., 2016). Female chimpanzees have a queuing system to determine rank in a community and age is the main indicator of a female's place in the hierarchy (Foerster et al., 2016). Having a higher status means great access to resources such as food and shelter (Pusey et al., 1997; Sapolsky, 2005). This can in turn not only increase the fitness of the individual females but all the offspring she raises (Pusey et al., 1997).

Another reason as to why chimpanzees may prefer older females is because (ii) they have years of mothing experience. Older females are more likely to have born an offspring and would therefore, hopefully, have experience in raising this offspring. This experience leads to increased infant survival (Weladji et al., 2006).

Additionally, (iii.) female chimpanzees who reach later states of life display an honest indicator of their fitness. Being able to survive for decades, acquiring enough resources and avoiding death, would have higher genetic quality than others (Weladji et al., 2006).

FEMALE CHIMPANZEES PREFERENCE IS UNCLEAR

Not much research has been done on age preferences of female chimpanzees when choosing male mates. In fact, little research has been done on female primate choice, specifically because it can be difficult to measure in natural settings (van Noordwijk & van Schaik, 2009). As Miller puts, we "know less about female choice in non-human primates than we do about female choice in the Tungara frog, the guppy fish, or the African widowbird" (Miller, 2001). There is also debate as to whether or not female chimpanzees (and other primates) are able to exhibit their choice. Researchers such as Pieta and Stumpf have made the argument and have evidence to support that female chimpanzees are able to exercise their mate choice (Pieta, 2008; R. M. Stumpf & C. Boesch, 2005). Stumpf argues that female choice is a major driving force in primate evolution (Smuts, 1987). However, other researchers such as Muller have provided evidence that sexual coercion by male chimpanzees suppress female choice (Martin N. Muller et al., 2011). Researchers Keddy-Hector and Small have argued that evidence for female mate choice in most primate species is slim and nothing conclusive (Keddy-hector, 1992; Small, 1989). So the debate on whether female primates, and chimpanzees specifically, exhibit mate choice continues (Paul, 2002).

However it is obvious that female chimpanzees tend to mate rather promiscuously (R. M. Stumpf & C. Boesch, 2005). Research shows that females copulate more than 500 times per conception and may mate with nearly every adult male in their community (Wrangham, 2002). A

well supported hypothesis for this is effort to reduce the risk of infanticide by confusing paternity (Hrdy, 1979; Paul, 2002; van Noordwijk & van Schaik, 2009; van Schaik et al., 2009). By mating with the majority, if not all of the males in her community, many male chimpanzees have the possibility of being the father and will therefore, most likely not engage in harming or killing of the offspring, a cautionary action by females of pernicious mating communities in order to avoid infanticide. Infanticide is a form of sexual competition where an infant is killed, providing the infanticidal individual increased fitness. This gain in fitness comes from (1) the use of the infant as a resource (such as food), (2) the elimination of competition for other resources and (if a male) (3) quicker access to fertile females as the infanticidal act terminates lactational amenorrhea which shortens the interbirth interval of the infant-deprived females (Bartlett et al., 1993). However, some professionals in the field, such as Bartlett and Sussman (Bartlett et al., 1993) disagree with this hypothesis. They argue that infanticide events are too rare and random to be selected for any natural selection. Most recent research on this topic supports the anti-infanticide hypothesis (van Schaik et al., 2009)

However, there is also evidence that female chimpanzees do not mate completely promiscuously, as some researchers have found that proceptivity rates are lower when conception is likely (e.g. peri-ovulatory period) (Martin N. Muller et al., 2011; R. M. Stumpf & C. Boesch, 2005) and this may be an indication of female choice. There is evidence that the proportion of female copulations with high-ranking males is significantly higher during the peri-ovulatory period than during other times in their cycle (Matsumoto-Oda, 1999). Matsumoto-Oda, who reported this result inferred that this meant females prefer mating with high-ranking males when they are most likely to conceive and therefore show a preference toward high-ranking males (Matsumoto-Oda, 1999). Alternatively, this could also be when higher ranking

males invest more effort in monopolizing females. Younger males have also been shown to have more success with fathering infants than older males (Wroblewski et al., 2009). However, this is likely due to younger males being of higher physical condition and therefore, outcompeting older males for position of high rank (Goodall, 1986; Hasegawa & Kutsukake, 2014). It may be concluded that although female chimpanzees have more offspring with younger chimps, they are actively choosing to mate with them not because of their age, but rather because of their status.

A high-ranking father can provide two things to a mother chimpanzee. First, they likely possess some of the best quality genes in the community since male chimpanzees compete for rank (Foerster et al., 2016). The male's ability to beat out and continuously hold his status against others is an indicator of his physical ability. These strong genes, which allow the male to reach his rank may then be passed down to his offspring. If the offspring express these advantageous genes, they will be more likely to survive and mate themselves, therefore passing on the female's own genetics in the process. Another benefit of females mating with high-ranking males is that their offspring are less likely to be killed, as there is also evidence that male chimpanzees do display some kin recognition (Lehmann et al., 2006; Murray et al., 2016). Consequently, male may be able to distinguish their own kin and not show aggression or kill them, as infanticide is common with chimpanzee infants (Arcadi & Wrangham, 1999b; Nishida & Kawanaka, 1985; Michael L Wilson et al., 2002).

It can be argued that the reasons (genes and resources) for female chimpanzees' mate preference mirror that of humans. Rank in chimpanzee communities determines access to resources when intragroup competition (Koenig, 2002), such as rich foraging areas and food (Murray, Mane, et al., 2007), and grooming frequency (Newton-Fisher & Kaburu, 2017). All of these advantages can be directly compared to resources and finances observed in humans.

Additionally, the ability to gain access to resources and money in human societies can be attributed to intelligence. Since intelligence is genetic and heritable (Davies et al., 2011), being smart enough to have lots of resources may also be an indicator of genetic quality. Surprisingly enough, intelligence in chimpanzees has also been found to be heritable (Hopkins et al., 2014).

It is important to note that even though preferences for high rank are present, they are not extreme. The risk of infanticide is extremely high in chimpanzees (Arcadi & Wrangham, 1999a; Murray, Wroblewski, et al., 2007; Nishida & Kawanaka, 1985) and ensuring survival is more important than getting them advantageous genes or slightly better access to resources. This appears to be why female chimpanzees still choose to mate promiscuously and strive to confuse paternity (Hrdy, 1979; Pieta, 2008).

MOVING FORWARD

In order to determine if the discrepancy in age preference between genetically similar species (*Homo sapiens* and *Pan troglodytes*) is due to the different mating patterns (Pair bonds and Promiscuity), it would be helpful to examine the mating patterns and preferences of age in other primates. If species with pair bonds and long-term reproductive relationships are attracted to younger females as well, while species with polygamous reproductive patterns are attracted to older females, one can conclude that the mating patterns of species determine how they perceive attractiveness of a mate on the basis of age. If it is not the case, one can conclude that long-term pair bonding and menopause are not reasons for men preferring younger females over older females as mates.

BABOONS

The use of baboons as an analogue for human evolution derives from their broad ecological similarities with hominins, including their contemporaneous adaptation to open and variable terrestrial habitats during the Plio-Pleistocene. Their behavioral and ecological flexibility, and their lack of ecological specialization (Washburn & DeVore, 1961). These are attributes for which hominins are thought to share more ecologically and evolutionarily relevant adaptations with baboons than they do with chimpanzees and bonobos (Swedell & Plummer, 2019). Additionally, baboons provide a good model for early human adaptations as they are also ground-living primates that evolved on the African savanna. For this analysis, I will specifically be looking at hamadryas baboons *(Papio hamadryas)* who form long-term reproductive pair bonds. And savannah baboons, which include the species of yellow baboon (*Papio cynocephalus*), olive baboon (*Papio anubis*) and chacma baboon (*Papio ursinus*), who mate promiscuously.

MALE HAMADRYAS BABOONS PREFER YOUNG FEMALES

Hamadryas baboons *(Papio hamadryas)* are an excellent model for examining pair-bonded primates. They live in groups of several hundred individuals (Fischer et al., 2019). Yet, they are unique compared to other baboons with their presence of strong social and kin-based bonds among males and their stable/semi-permanent heterosexual bonds outside of reproductive periods (Bergman, 2006; Swedell & Plummer, 2019). In fact, it has been discovered that hamadryads baboons experience stronger cross-sex bonds than same sex bonds (Kummer & Biederman-Thorson, 2017). This male-female bond, although not identical to the life-long pair bond experienced by many humans, is a strong comparison for wild primates. It is also

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important to note that a male hamadryas Baboons may have more than one female he is bonded with. When a male hamadryas Baboons is at his peak physical condition, he can have anywhere from two to five females in his group/unit (S. A. Altmann, 1968), leaving many bachelor males, without a female bond and without a mate.

Since male hamadryas baboons attempt to monopolize females, not every male gets the opportunity to mate. Instead, males must compete for females and male takeovers of females are common (Amann et al., 2017). Amann and colleagues found, in their study, that male hamadryas baboons took over nulliparous females about 250% times more often than what would be expected by chance (Amann et al., 2017). Additionally, males took over multiparous females 20% less than what would be expected by chance (Amann et al., 2017). These results indicate that male hamadryas Baboons have a preference to mate with younger females who have not had offspring and have not demonstrated their ability to successfully reproduce. This conclusion supports the hypothesis that the enhanced attractiveness of younger females over older females is due to the presence of pair-bonds. As taking over and gaining access to a younger female provides the focus male a potential longer period of time where he has access to said female's lifetime fertility, so long as he is able to defend the female from other take overs.

Another important finding among hamadryas baboons, is that males demonstrate strong and consistent interest in females regardless of where they are in at in their reproductive cycle and estrus condition (Bergman, 2006).   Additionally, the long-term bonds between males and female hamadryas baboons remain intense even when females are not in fertile (Bachmann & Kummer, 1980). Both of these findings can be considered support that male hamadryas baboons are not simply looking for experienced and multiparous females but instead are attracted to younger females with larger long-term reproductive value.

Savannah baboons clearly have a different mating structure than their cousins, the hamadryas baboons. They include yellow olive and chacma baboons. Savannah baboons mate promiscuously, similar to the mating patterns of the chimpanzees (Jeanne Altmann, 1980; Fischer et al., 2019). They live multi-male, multi-female groups ranging anywhere from a dozen to one hundred individuals (Fischer et al., 2019). All of which share similar mating patterns and mate choice preferences (Strier, 2016).

Male olive baboons, for example, show interest in females only around the ovulation cycle (Bergman, 2006; Tutin, 1979). Ovulation of a female can be determined by her sexual swellings, which is when the genital area enlarges and the perineum skin changes to a bright red color (Domb & Pagel, 2001; Huchard et al., 2009).   Additionally, the size of the sexual swellings affects the mating efforts of male baboons as they will spend more time grooming and more aggressively consort females with larger and more red swellings (Domb & Pagel, 2001). The size of a female's sexual swelling is also corelated to other characteristics of the female's fitness. Females with larger swelling begin to reproduce at an earlier age, have more offspring per year with a greater offspring survival rate (Domb & Pagel, 2001).

Since the coloration and size of female sexual swellings obviously has a large impact on male preference for a mate in savannah baboons, it can be argued that it is more important than the effect of age when choosing a mate. However, in regards to age, there is evidence that male savannah baboons lack interest in nulliparous and adolescent females (COLLINS, 1981; NoË & Sluijter, 1990). In fact, they have been observed to selectively avoid nulliparous females over ones that are more likely to sire an offspring (NoË & Sluijter, 1990).

FEMALE BABOONS APEAR TO PREFER HIGH RANKING MALES INDEPENDENT OF AGE

Both the hamadryas and savannah female baboons have been observed to have a preference for high-ranking males (COLLINS, 1981; Seyfarth & Seyfarth, 1978). However, female choice is arguably over-powered by the male-male competition, herding behavior and sexual coercion (COLLINS, 1981), similar to how it is unclear if female chimpanzees exhibit mating choice. Additionally, high ranking males tend to have greater mating success (Fischer et al., 2019; Rasmussen, 1986), so it can be difficult to determine if their increased fertility is due to physical ability or preference of the female. However, it is clear that male rank is important in mating success (Alberts et al., 2003).

Hamadryas have been observed to prefer to mate with their current sexual partner (Amann et al., 2017). They typically avoid having to switch mates, specifically because it can be reproductively costly for a female to be taken over by another male, due to lengthen interbirth interval, loss of pregnancy, stress and infanticide (Polo et al., 2014). However, what is important in female hamadryas baboon's heterosexual relationships is protection, by a male partner, both to herself and her offspring (Lemasson et al., 2008). So if a female's current sexual partner appears to be unable to protect her and her offspring, she might be more receptive to a takeover by another male (Amann et al., 2017). There are mixed opinions regarding whether age affects ranking in hamadryas baboon colonies. Some researchers suggest younger males are more likely than older males to be the individuals to conduct takeovers of fertile females as they have to acquire mating partners and because they are likely more physically fit than older males (Romero et al., 2010). However, others have found lack of evidence to support the correlation between age

and dominance rank (Romero et al., 2010). Due to these conflicting results, it is unclear what age female Hamadryas Baboons would find attractive.

Since female savannah baboons find males of higher rank more attractive (COLLINS, 1981; Seyfarth & Seyfarth, 1978), this would amply that younger males are more attractive to female savannah baboons as well. Since studies have reported male dominance rank being strongly associated with age as male reach the higher rank positions when they are youthful and their prime but then fall in rank as they age (Alberts et al., 2003; J Altmann et al., 1988; Hamilton & Bulger, 1990; NoË & Sluijter, 1990) Dominance rank of male yellow Baboons being determined by age is due to the fighting ability of the individuals, as younger males tend to be more healthy and physically capable but lose strength with age (Hamilton & Bulger, 1990). The benefits of mating with a high ranking male is similar to that of hamadryas baboons as they also for heterosexual friendships (Seyfarth, 2008). A male with a high ranking displays signals of being of high genetic quality as he was able to physically fight and achieve his rank (COLLINS, 1981). Even though yellow baboons mate promiscuously and paternal certainty is low, if a male thinks an offspring is his, he is likely to show interest in it and possibly protect it (Collins, 1986; NoË & Sluijter, 1990).

TABLE OF AGE PREFERENCES OF DIFFERENT PRIMATES

Species	Mating System	Sex	Prefer to mate with
Humans *(Homo sapiens)*	Typically monogamous; with long-term pair bonds within multi-male multi-female societies (Kauth, 2021; Knight & Taylor, 1998; Marlowe, 2000)	Male	Younger Females; within a fertile range of around 15 years of age to 35 (Bovet et al., 2018; Buss, n.d.; Buunk et al., 2001; Jones, 1996b; Phua et al., 2018; Sohn, 2017; Symons, 1979)
		Female	Same Age or Older Males with resources (Buunk et al., 2001; Jones, 1996a; Walter et al., 2020)
Chimpanzees *(Pan troglodytes)*	Polygynandrous; promiscuously multi-male, multi-female mating within multi-male multi-females groups (Goodall, 1986; 2001; R. M. Stumpf & C. Boesch, 2005; Tutin, 1979)	Male	Older Females (Anderson, 1986; M. N. Muller et al., 2006; Tutin, 1979; Young & Yerkes, 1943)
		Female	Younger Males with high rank (Matsumoto-Oda, 1999; Wroblewski et al., 2009)
Hamadryas Baboons *(Papio hamadryas)*	Monogamous or Polygynous; Pair bonds between male and females (Bergman, 2006; Kummer & Biederman-Thorson, 2017; Swedell & Plummer, 2019)	Males	Younger/Nulliparous Females (Amann et al., 2017; Bachmann & Kummer, 1980; Bergman, 2006)
		Female	Current sexual partners or high-ranking/dominant male; typically younger males (Amann et al., 2017; Romero et al., 2010; Seyfarth & Seyfarth, 1978)
Savannah Baboons *(Papio cynocephalus, Papio anubis* and *Papio ursinus)*	Polygynandrous; promiscuously multi-male, multi-female mating within multi-male multi-females groups (Jeanne Altmann, 1980; Fischer et al., 2019)	Males	Older/ Multiparous Females (Bergman, 2006; COLLINS, 1981; NoË & Sluijter, 1990; Tutin, 1979)
		Females	High ranking males; typically younger males (Alberts et al., 2003; J Altmann et al., 1988; COLLINS, 1981; Hamilton & Bulger, 1990; NoË & Sluijter, 1990; Seyfarth & Seyfarth, 1978)

Figure 1. Table organizing the age preferences of different primates (*Homo sapiens*, *Pan troglodytes*, *Papio hamadryas* and *Papio cynocephalus*) based on species, mating system and sex of observer.

CONCULSIONS

There is variation in how attraction is perceived across cultures in humans, and across species in primates. In terms of age effect on mate choice, there are several examples of male humans choosing to mate and form pair bonds with females older than themselves. However, the overwhelming majority of cultures and populations put a distinct focus on youthfulness, and specifically female youthfulness, and strive for youthfulness through cultural practices such as waist trainers and plastic surgery. In chimpanzees, a species with promiscuous mating and where males do not engage in parental care, males tend to prefer mating with older females. They don't simply avoid nulliparous females but rather have a preference for females who are older and have had offspring. In hamadryas baboons, who form long-term mating bonds, males tend to takeover groups with nulliparous females at a much higher rate than would be expected by chance, indicating a mating preference towards younger females. In contrast, savannah baboons mate promiscuously, males show no interest in nulliparous females and actively choose older females over those who had not had offspring.

Lack of variation in preference for youthfulness across cultures and the consistency of males preferring younger females as mates in other species with similar sexual pair bonds (e.g., hamadryas baboons) support the theory that youthfulness is a biologically attractive trait in species that form long-term pair bonds with their reproductive partners, independent of whether these partnerships are monogamous or not. This is likely because of the reproductive value a young mate in long-term reproductive relationships. Being of a younger age and much earlier means there is a longer reproductive lifespan of the individual.

In contrast, we see consistency in species who engage in promiscuous mating behavior (e.g. chimpanzees and savannah baboons) with males having a preference towards mating with

older females. This is likely because males mate with multiple females and do not form long-term bonds, and therefore, the age of the female doesn't particularly matter as long as she is sexually mature. The most important aspect is the likelihood a female to successfully raise an offspring.

Across primate species, we see consistency in female's preferences for mates with a high status and resources. Age is correlated with access to resources and status in different species. For example, with humans, older individuals tend to have more resources, whereas in savannah baboons, younger males tend to have the highest rank.   It is clear that for females, age is not nearly as important in mate choice, as for males. The perception of attraction at different ages is the result of access to resources and status patterns in specific primate species.

FUTURE DIRECTIONS

Based on the findings summarized in this thesis, there are several future research directions which may be interesting to explore: homogenous attraction and effects of coloration.

Homosexual attraction is one area that would be intriguing to explore. Although homosexual sexual activity does not typically result in the production of offspring, there is clearly attraction between same-sex partners (Bailey et al., 2016). How does age play a role in same-sex male and homogenous female attraction? Do their perceptions align with heterogenous individuals or are they different? It may also be interesting to look at how people who identify as bisexual interpret attractiveness regarding age. Do they perceive attractiveness with respect to age differently in males and females, or the same?

Another idea for a future direction is the effects of coloration on attractiveness. It has been suggested that men tend to be more attracted to women who wear the color red (Elliot & Niesta, 2008). Additionally, women seem to be more likely to wear the colors red or pink around the time of peak fertility (Alec T. Beall & Jessica L. Tracy, n.d.). As we found with savannah baboons, sexual swellings are considered to be honest indicators of female reproductive quality (Domb & Pagel, 2001; Nunn, 1999). Furthermore, male savannah baboons are more sexually attracted to females with large and very red sexual swellings (Domb & Pagel, 2001). Can this evolutionary feature play a role in men's attraction to women rearing red? Is it a subconscious behavior performed by women to display their fertility?

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