

# Monogamy

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**Monogamy** (/ˈməˈnɒɡəmi/ *mə-**NOG**-ə-mee*) is a form of relationship in which an individual has only one partner during his or her lifetime or at any one time (serial monogamy), as compared to polygyny, polyandry, or polyamory.<sup>[1]</sup> The term is also applied to the social behavior of some animals, referring to the state of having only one mate at any one time.

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## Overview

It is important to have a clear understanding of the nomenclature of monogamy because scientists use the term monogamy for different relationships. Biologists, biological anthropologists, and behavioral ecologists often use the term monogamy in the sense of sexual, if not genetic, monogamy.<sup>[2]</sup> Modern biological researchers, using the theory of evolution, approach human monogamy as the same in human and non-human animal species. They postulate the following four aspects of monogamy:

- Marital monogamy refers to marriages of only two people.
- Social monogamy refers to two partners living together, having sex with each other, and cooperating in acquiring basic resources such as shelter, food and money.
- Sexual monogamy refers to two partners remaining sexually exclusive with each other and having no outside sex partners.<sup>[3]</sup>
- Genetic monogamy refers to sexually monogamous relationships with genetic evidence of paternity.<sup>[3]</sup>

When cultural or social anthropologists and other social scientists use the term monogamy, the meaning is social or marital monogamy.

<sup>[2]</sup><sup>[3]</sup> Marital monogamy may be further distinguished between:

1. marriage once in a lifetime;
2. marriage with only one person at a time (**serial monogamy**), in contrast to bigamy or polygamy,<sup>[1]</sup>

Human monogamy's legal aspects are taught at faculties of law. There are also philosophical aspects in the field of interest of e.g. philosophical anthropology and philosophy of religion, as well as theological ones.

## Etymology

The word *monogamy* comes from the Greek μόνος, *monos* which means alone, and γάμος, *gamos* which means marriage.<sup>[1]</sup>

## Frequency of monogamy in humans

### Distribution of social monogamy

According to the Ethnographic Atlas, of 1,231 societies from around the world noted, 186 were monogamous; 453 had occasional polygyny; 588 had more frequent polygyny; and 4 had polyandry.<sup>[6]</sup> However, this does not take into account the relative population of each of the societies studied, and the actual practice of polygamy in a tolerant society may actually be low, with the majority of aspirant polygamists practicing monogamous marriage.<sup>[7]</sup>

Many societies that we consider monogamous in fact allow easy divorce. In many western countries divorce rates approach 50%. Those who remarry do so on average 3 times. Divorce and remarriage can thus result in "serial monogamy", i.e. multiple marriages but only one legal spouse at a time. This can be interpreted as a form of plural mating, as are those societies dominated by female-headed families in the Caribbean, Mauritius and Brazil where there is frequent rotation of unmarried partners. In all, these account for 16 to 24% of the "monogamous" category.<sup>[8]</sup>

### Prevalence of sexual monogamy

The prevalence of sexual monogamy can be roughly estimated as the percentage of married people who do not engage in extramarital sex. The Standard Cross-

Cultural Sample describes the amount of extramarital sex by men and women in over 50 pre-industrial cultures.<sup>[9]</sup><sup>[10]</sup> The amount of extramarital sex by men is described as "universal" in 6 cultures, "moderate" in 29 cultures, "occasional" in 6 cultures, and "uncommon" in 10 cultures. The amount of extramarital sex by women is described as "universal" in 6 cultures, "moderate" in 23 cultures, "occasional" in 9 cultures, and "uncommon" in 15 cultures. These findings support the claim that the reported amount of extramarital sex differs across cultures and across genders.

Recent surveys conducted in non-Western nations have also found cultural and gender differences in extramarital sex. A study of sexual behavior in Thailand, Tanzania and Côte d'Ivoire suggests about 16–34% of men engage in extramarital sex while a much smaller (unreported) percentage of women engage in extramarital sex.<sup>[11]</sup> Studies in Nigeria have found around 47–53% of men and to 18–36% of women engage in extramarital sex.<sup>[12]</sup><sup>[13]</sup> A 1999 survey of married and cohabiting couples in Zimbabwe reports that 38% of men and 13% of women engaged in extra-couple sexual relationships within the last 12 months.<sup>[14]</sup>

The issue of extramarital sex has been examined frequently in the United States. Many surveys asking about extramarital sex in the United States have relied on convenience samples. A convenience sample means surveys are given to whoever happens to be easily available (e.g., volunteer college students or volunteer magazine readers). Convenience samples do not accurately reflect the population of the United States as a whole, which can cause serious biases in survey results. It should not be surprising, therefore, that surveys of extramarital sex in the United States have produced widely differing results. These studies report that about 12–26% of married women and 15–43% of married men engage in extramarital sex.<sup>[15]</sup><sup>[16]</sup><sup>[17]</sup> The only way to get scientifically reliable estimates of extramarital sex is to use nationally representative samples. Three studies have used nationally representative samples. These studies have found that about 10–15% of women and 20–25% of men engage in extramarital sex.<sup>[18]</sup><sup>[19]</sup><sup>[20]</sup>



Bronze sculpture of an elderly Kashubian married couple located in Kaszubski square, Gdynia, Poland. Their relationship went through a test of his temporary work emigration to the USA.<sup>[4]</sup> The percentage of people who confide only in family increased in the USA from 57% to 80%, and the number who depend totally on a spouse is up from 5% to 9%.<sup>[5]</sup>

Research by Colleen Hoffon of 566 homosexual male couples from the San Francisco Bay Area found that 45% had monogamous relationships. That study was funded by the National Institute of Mental Health.<sup>[21]</sup> However, the Human Rights Campaign has stated, based on a Rockway Institute report, that "GLBT young people... want to spend their adult life in a long-term relationship raising children." Specifically, over 80% of the homosexuals surveyed expected to be in a monogamous relationship after age 30.<sup>[22]</sup>

A majority of married people remain sexually monogamous during their marriages. The number of married partners who engage in extramarital sex never exceeds 50% in studies using large or nationally representative samples. Yet, the incidence of sexual monogamy varies across cultures. People in some cultures are more sexually monogamous than people in other cultures.

### Prevalence of genetic monogamy

The incidence of genetic monogamy may be estimated from rates of extrapair paternity. Extrapair paternity is when offspring raised by a monogamous pair come from the female mating with another male. Rates of extrapair paternity have not been extensively studied in people. Many reports of extrapair paternity are little more than quotes based on hearsay, anecdotes, and unpublished findings.<sup>[23]</sup> Simmons, Firman, Rhodes, and Peters reviewed 11 published studies of extra-pair paternity from various locations in the United States, France, Switzerland, the United Kingdom, Mexico, and among the Yanomamo Indians of South America.<sup>[24]</sup> The rates of extrapair paternity ranged from 0.03% to 11.8% although most of the locations had low percentages of extrapair paternity. The median rate of extrapair paternity was 1.8%. A separate review of 17 studies by Bellis, Hughes, Hughes, and Ashton found slightly higher rates of extrapair paternity.<sup>[25]</sup> The rates varied from 0.8% to 30% in these studies, with a median rate of 3.7% extrapair paternity. A range of 1.8% to 3.7% extrapair paternity implies a range of 96% to 98% genetic monogamy. Although the incidence of genetic monogamy may vary from 70% to 99% in different cultures or social environments, a large percentage of couples remain genetically monogamous during their relationships. A review paper surveying 67 other studies of nonpaternity reporting rates of nonpaternity in different societies ranging from 0.4% to over 50% was recently published by Kermyt G. Anderson.<sup>[26]</sup>

Pedigree errors are a well-known source of error in medical studies. When attempts are made to try to study medical afflictions and their genetic components, it becomes very important to understand nonpaternity rates and pedigree errors. There are numerous software packages and procedures that exist for correcting research data for pedigree errors.<sup>[27][28][29]</sup>

## Evolutionary and historical development of monogamy in humans

### Biological arguments

Monogamy, or at least social monogamy, does exist in many societies around the world,<sup>[30]</sup> and it is important to understand how these marriage systems might have evolved. In any species, there are three main aspects that combine to promote a monogamous mating system: paternal care, resource access, and mate-choice;<sup>[3]</sup> however, in humans, the main theoretical sources of monogamy are paternal care and extreme ecological stresses.<sup>[2]</sup> Paternal care should be particularly important in humans due to the extra nutritional requirement of having larger brains and the lengthier developmental period.<sup>[31][32][33]</sup> Therefore, the evolution of monogamy could be a reflection of this increased need for bi-parental care.<sup>[31][32][33]</sup> Similarly, monogamy should evolve in areas of ecological stress because male reproductive success should be higher if their resources are focused on ensuring offspring survival rather than searching for other mates.<sup>[2]</sup>

However, the evidence does not support these claims.<sup>[2]</sup> Due to the extreme sociality and increased intelligence of humans, *H. sapiens* have solved many problems that generally lead to monogamy, such as those mentioned above.<sup>[2]</sup> For example, monogamy is certainly correlated with paternal care, as shown by Marlowe,<sup>[32]</sup> but not caused by it because humans diminish the need for bi-parental care through the aid of siblings and other family members in rearing the offspring.<sup>[2]</sup> Furthermore, human intelligence and material culture allows for better adaptation to different and rougher ecological areas, thus reducing the causation and even correlation of monogamous marriage and extreme climates.<sup>[2]</sup>

Paleoanthropology and genetic studies offer two perspectives on when monogamy evolved in the human species: paleoanthropologists offer tentative evidence that monogamy may have evolved very early in human history<sup>[34]</sup> whereas genetic studies show that monogamy evolved much more recently, less than 10,000 to 20,000 years ago.<sup>[35][36]</sup>



A pair of New Zealand kaka parrots at Auckland Zoo.



Orangutan males are not monogamous and compete for access to females.

Paleoanthropological estimates of the time frame for the evolution of monogamy are primarily based on the level of sexual dimorphism seen in the fossil record because, in general, the reduced male-male competition seen in monogamous mating results in reduced sexual dimorphism.<sup>[37]</sup> According to Reno et al., the sexual dimorphism of *Australopithecus afarensis*, a human ancestor from approximately 3.9–3.0 million years ago,<sup>[38]</sup> was within the modern human range, based on dental and postcranial morphology.<sup>[34]</sup> Although careful not to say that this indicates monogamous mating in early hominids, the authors do say that reduced levels of sexual dimorphism in *A. afarensis* “do not imply that monogamy is any less probable than polygyny”.<sup>[34]</sup> However, Gordon, Green and Richmond claim that in examining postcranial remains, *A. afarensis* is more sexually dimorphic than modern humans and chimps with levels closer to those of orangutans and gorillas.<sup>[35]</sup> Furthermore, *Homo habilis*, living approximately 2.3 mya,<sup>[38]</sup> is the most sexually dimorphic early hominid.<sup>[39]</sup> Plavcan and van Schaik conclude their examination of this controversy by stating that, overall, sexual dimorphism in australopithecines is not indicative of any behavioral implications or mating systems.<sup>[40]</sup>

The genetic evidence for the evolution of monogamy in humans is more complex but much easier to interpret. While female effective population size (the number of individuals successfully producing offspring thus contributing to the gene pool), as indicated by mitochondrial-DNA evidence, increased around the time of human (not hominid) expansion out of Africa about 80,000–100,000 years ago, male effective population size, as indicated by Y-chromosome evidence, did not increase until the advent of agriculture 18,000 years ago. This means that before 18,000 years ago, many females would be reproducing with the same few males.<sup>[36]</sup>

## Cultural arguments

Despite the human ability to avoid sexual and genetic monogamy, social monogamy still forms under many different conditions, but most of those conditions are consequences of cultural processes.<sup>[2]</sup> These cultural processes may have nothing to do with relative reproductive success. For example, anthropologist Jack Goody's comparative study utilizing the Ethnographic Atlas demonstrated that monogamy is part of a cultural complex found in the broad swath of Eurasian societies from Japan to Ireland that practice social monogamy, sexual monogamy and dowry (i.e. "diverging devolution", that allow property to be inherited by children of both sexes).<sup>[41]</sup> Goody demonstrates a statistical correlation between this cultural complex and the development of intensive plough agriculture in those areas.<sup>[42]</sup> Drawing on the work of Ester Boserup, Goody notes that the sexual division of labour varies in intensive plough agriculture and extensive shifting horticulture. In plough agriculture farming is largely men's work and is associated with private property; marriage tends to be monogamous to keep the property within the nuclear family. Close family (endogamy) are the preferred marriage partners to keep property within the group.<sup>[43]</sup> A molecular genetic study of global human genetic diversity argued that sexual polygyny was typical of human reproductive patterns until the shift to sedentary farming communities approximately 10,000 to 5,000 years ago in Europe and Asia, and more recently in Africa and the Americas.<sup>[44]</sup> A further study drawing on the Ethnographic Atlas showed a statistical correlation between increasing size of the society, the belief in "high gods" to support human morality, and monogamy.<sup>[45]</sup> A survey of other cross-cultural samples has confirmed that the absence of the plough was the only predictor of polygamy, although other factors such as high male mortality in warfare (in non-state societies) and pathogen stress (in state societies) had some impact.<sup>[46]</sup>

Betzig postulated that culture/society can also be a source of social monogamy by enforcing it through rules and laws set by third-party actors, usually in order to protect the wealth or power of the elite.<sup>[2][47][48]</sup> For example, Augustus Caesar encouraged marriage and reproduction to force the aristocracy to divide their wealth and power among multiple heirs, but the aristocrats kept their socially monogamous, legitimate children to a minimum to ensure their legacy while having many extra-pair copulations.<sup>[47]</sup> Similarly—according to Betzig—the Christian Church enforced monogamy because wealth passed to the closest living, legitimate male relative, often resulting in the wealthy oldest brother being without a male heir.<sup>[48]</sup> Thus, the wealth and power of the family would pass to the “celibate” younger brother of the church.<sup>[48]</sup> In both of these instances, the rule-making elite used cultural processes to ensure greater reproductive fitness for themselves and their offspring, leading to a larger genetic influence in future generations.<sup>[47][48]</sup> Furthermore, the laws of the Christian Church, in particular, were important in the evolution of social monogamy in humans.<sup>[48]</sup> They allowed, even encouraged, poor men to marry and produce offspring which reduced the gap in



Plough agriculture. The castle in the background is Lusignan. Detail from the calendar *Les très riches heures* from the 15th century. This is a detail from the painting for March.



Woman farming, using a digging stick in the Nuba Mountains, South Sudan.

reproductive success between the rich and poor, thus resulting in the quick spread of monogamous marriage systems in the western world.<sup>[48]</sup> According to B. S. Low, culture would appear to have a much larger impact on monogamy in humans than the biological forces that are important for non-human animals.<sup>[2]</sup>

Other theorists use cultural factors influencing reproductive success to explain monogamy. During times of major economic / demographic transitions, investing more in a fewer offspring (social monogamy not polygyny) increases reproductive success by ensuring the offspring themselves have enough initial wealth to be successful.<sup>[2]</sup> This is seen in both England and Sweden during the industrial revolution<sup>[2]</sup> and is currently being seen in the modernization of rural Ethiopia.<sup>[49]</sup> Similarly, in modern industrialized societies, fewer yet better-invested offspring, i.e. social monogamy, can provide a reproductive advantage over social polygyny, but this still allows for serial monogamy and extra-pair copulations.<sup>[2]</sup>

### Arguments from outside the scientific community

Karol Wojtyła (later, Pope John Paul II) in his book *Love and Responsibility* postulated that monogamy, as an institutional union of two people being in love with one another, was an embodiment of an ethical *personalistic norm*, and thus the only means of making true human love possible.<sup>[50]</sup>

### Ancient societies

The historical record offers contradictory evidence on the development and extent of monogamy as a social practice. Laura Betzig argues that in the six large, highly stratified early states, commoners were generally monogamous but that elites practiced de facto polygyny. Those states included Mesopotamia, Egypt, Aztec Mexico, Inca Peru, India and China.<sup>[51]</sup>

#### Ancient Mesopotamia and Assyria

Both the Babylonian and Assyrian families were monogamous in principle but not entirely so in practice since polygyny was frequently practiced by the rulers.

In the patriarchal society of Mesopotamia the nuclear family was called a "house". In order "to build a house" a man was supposed to marry one woman and if she did not provide him with offspring, he could take a second wife. The Code of Hammurabi states that he loses his right to do so if the wife herself gives him a slave as concubine.<sup>[52]</sup> According to Old Assyrian texts, he could be obliged to wait for two or three years before he was allowed to take another wife. The position of the second wife was that of a "slave girl" in respect to the first wife, as many marriage contracts explicitly state.<sup>[53]</sup>

#### Ancient Egypt

Although an Egyptian man was free to marry several women at a time, and some wealthy men from Old and Middle Kingdoms did have more than one wife, monogamy was the norm.<sup>[54]</sup> There may have been some exceptions, e.g. a Nineteenth Dynasty official stated as proof of his love to his deceased wife that he had stayed married to her since their youth, even after he had become very successful (P. Leiden I 371). This may suggest that some men abandoned first wives of a low social status and married women of higher status in order to further their careers although even then they lived with only one wife. Egyptian women had right to ask for a divorce if her husband took a second wife. Many tomb reliefs testify to monogamous character of Egyptian marriages, officials are usually accompanied by a supportive wife. "His wife X, his beloved" is the standard phrase identifying wives in tomb inscriptions. The instruction texts belonging to wisdom literature, e.g. Instruction of Ptahhotep or Instruction of Any, support fidelity to monogamous marriage life, calling the wife a *Lady of the house*. The Instruction of Ankhsheshonq suggests that it is wrong to abandon a wife because of her barrenness.<sup>[55]</sup>

#### Ancient Israel

As against Betzig's contention that monogamy evolved as a result of Christian socio-economic influence in the West, monogamy appeared widespread in the ancient Middle East much earlier. In Israel's pre-Christian era, an essentially monogamous ethos underlay the Jewish creation story (Gn 2) and the last chapter of Proverbs.<sup>[56][57]</sup> During the Second Temple period (530 BCE to 70 CE), apart from an economic situation which supported monogamy even more than in earlier period, the concept of "mutual fidelity" between husband and wife was a quite common reason for strictly monogamous marriages. Some marriage documents explicitly expressed a desire for the marriage to remain monogamous. Examples of these documents were found in Elephantine. They resemble those found in neighbouring Assyria and Babylonia.<sup>[56]</sup> Study shows that ancient Middle East societies, though not strictly monogamous, were practically (at least on commoners' level) monogamous.<sup>[53][54]</sup> Halakha of the Dead Sea Sect saw prohibition of polygamy as coming

from the Pentateuch (Damascus Document 4:20–5:5, one of the Dead Sea Scrolls). Christianity adopted a similar attitude (cf. 1 Tm 3:2,12; Tt 1:6), which conformed with Jesus' approach.<sup>[56]</sup> Michael Coogan, in contrast, states that "Polygyny continued to be practised well into the biblical period, and it is attested among Jews as late as the second century CE."<sup>[58]</sup>

Under Judges and the monarchy, old restrictions went into disuse, especially among royalty, though the Books of Samuel and Kings, which cover entire period of monarchy, do not record a single case of bigamy among commoners — except for Samuel's father. The wisdom books e.g. Book of Wisdom, which provides a picture of the society, Sirach, Proverbs, Qohelet portray a woman in a strictly monogamous family (cf. Pr 5:15-19; Qo 9:9; Si 26:1-4 and eulogy of perfect wife, Proverbs 31:10-31). The Book of Tobias speaks solely of monogamous marriages. Also prophets have in front of their eyes monogamous marriage as an image of the relationship of God and Israel. (Cf. Ho 2:4f; Jer 2:2; Is 50:1; 54:6-7; 62:4-5; Ez 16). Roland de Vaux states that "it is clear that the most common form of marriage in Israel was monogamy".<sup>[57][59]</sup>

The Mishnah and the *baraitot* clearly reflect a monogamist viewpoint within Judaism (Yevamot 2:10 etc.). Some sages condemned marriage to two wives even for the purpose of procreation (Ketubot 62b). R. Ammi, an *amora* states:

Whoever takes a second wife in addition to his first one shall divorce the first and pay her *kettubah* (Yevamot 65a)

Roman customs, which prohibited polygamy, may have enhanced such an attitude - especially after 212 AD, when all the Jews became Roman citizens.<sup>[56]</sup> However, some Jews continued to practice bigamy (e.g. up to medieval times in Egypt and Europe). Fourth-century Roman law forbade Jews to contract plural marriages.<sup>[60]</sup>

A synod convened by Gershom ben Judah around 1000 CE banned polygamy among Ashkenazi and Sephardic Jews.<sup>[61]</sup>

### Ancient Greece and ancient Rome

The ancient Greeks and Romans were monogamous in the sense that men were not allowed to have more than one wife or to cohabit with concubines during marriage.<sup>[61][62]</sup>

### Early Christianity

Jesus Christ contended that core problem was faithfulness to the Torah. According to him, monogamy was a primordial will of the Creator described in Genesis, darkened by the *hardness of hearts* of the Israelites. As John Paul II interpreted the dialogue between Jesus and the Pharisees (Gospel of Matthew 19:3–8), Christ emphasized the primordial beauty of monogamic spousal love described in the Book of Genesis 1:26–31, 2:4–25, whereby a man and woman by their nature are each ready to be a beautifying, total and personal gift to one another:

Jesus avoids entangling himself in juridical or casuistic controversies; instead, he appeals twice to the "beginning". By doing so, he clearly refers to the relevant words of Genesis, which his interlocutors also know by heart. (...) it clearly leads the interlocutors to reflect about the way in which, in the mystery of creation, man was formed precisely as "male and female," in order to understand correctly the normative meaning of the words of Genesis.<sup>[63]</sup>

## Contemporary societies

### International

Western European societies established monogamy as their marital norm.<sup>[64]</sup> Monogamous marriage is normative and is legally enforced in most of the world's highly developed countries.<sup>[65]</sup> Laws prohibiting polygyny were adopted in 1880 in Japan, 1953 in China, 1955 in India and 1963 in Nepal.<sup>[65]</sup>

The women's rights movements in these nations want to make monogamy the only legal form of marriage. The United Nations joined these efforts in 1979 when the General Assembly adopted the Convention on the Elimination of All Forms of Discrimination Against Women (<http://www.un.org/womenwatch/daw/cedaw/cedaw.htm>), an international bill of rights for women that over 180 nations have agreed to implement. Article 16 of the Convention requires nations to give women and men equal rights in marriage. Polygamy is interpreted as inconsistent with Article 16 when it extends the right of multiple spouses to men but not to women. The United Nations

has established the Committee on the Elimination of Discrimination against Women (CEDAW)<sup>[66]</sup> to monitor the progress of nations implementing the Convention. The United Nations is thus working through the Convention and CEDAW to promote women's equality by making monogamy the only legal form of marriage worldwide.

### People's Republic of China

The founders of Communism believed monogamy oppressed women and had no place in communist society. However, the Communist revolution in China changed these ideas as the communist revolutionaries in China viewed monogamy as a means of giving women and men equal rights in marriage. The newly formed Communist government established monogamy as the only legal form of marriage.

"The 1950 Marriage Law called for sweeping changes in many areas of family life. It forbade any 'arbitrary and compulsory' form of marriage that would be based on the superiority of men and would ignore women's interests. The new democratic marriage system was based on the free choice of couples, monogamy, equal rights for both sexes, and the protection of the lawful interests of women. It abolished the begetting of male offspring as the principal purpose of marriage and weakened kinship ties which reduced the pressure on women to bear many children, especially sons. With arranged marriages prohibited, young women could choose their own marriage partners, share the financial cost of setting up a new household, and have equal status in household and family decision-making. The Government then initiated an extensive campaign of marriage-law education, working jointly with the Communist Party, women's federations, trade unions, the armed forces, schools and other organizations."<sup>[67]</sup>

### Africa

The African Union has adopted the *Protocol on the Rights of Women in Africa* (the Maputo Protocol). While the protocol does not suggest making polygamous marriage illegal, article 6 of the protocol states that "monogamy is encouraged as the preferred form of marriage and that the rights of women in marriage and family, including in polygamous marital relationships are promoted and protected."<sup>[68][69]</sup> The protocol entered into force November 25, 2005.

## Varieties of monogamy in biology

Recent discoveries have led biologists to talk about the three varieties of monogamy: social monogamy, sexual monogamy, and genetic monogamy. The distinction between these three are important to the modern understanding of monogamy.

Monogamous pairs of animals are not always sexually exclusive. Many animals that form pairs to mate and raise offspring regularly engage in sexual activities with partners other than their primary mate. This is called extra-pair copulation.

<sup>[70][71][72][73][74][75][76][77][78][79][80][81][82][83][84]</sup> Sometimes these extra-pair sexual activities lead to offspring. Genetic tests frequently show that some of the offspring raised by a monogamous pair come from the female mating with an extra-pair male partner.<sup>[83][84][85][86]</sup> These discoveries have led biologists to adopt new ways of talking about monogamy:

"Social monogamy refers to a male and female's social living arrangement (e.g., shared use of a territory, behaviour indicative of a social pair, and/or proximity between a male and female) without inferring any sexual interactions or reproductive patterns. In humans, social monogamy equals monogamous marriage. Sexual monogamy is defined as an exclusive sexual relationship between a female and a male based on observations of sexual interactions. Finally, the term genetic monogamy is used when DNA analyses can confirm that a female-male pair reproduce exclusively with each other. A combination of terms indicates examples where levels of relationships coincide, e.g., sociosexual and sociogenetic monogamy describe corresponding social and sexual, and social and genetic monogamous relationships, respectively." (Reichard, 2003, page 4)<sup>[87]</sup>

Whatever makes a pair of animals socially monogamous does not necessarily make them sexually or genetically monogamous. Social monogamy, sexual monogamy, and genetic monogamy can occur in different combinations.

Social monogamy does not always involve marriage in humans. A married couple is almost always a socially monogamous couple. But couples who choose to cohabit without getting married can also be socially monogamous. The popular science author Matt Ridley in his book *The Red Queen: Sex and the Evolution of Human Nature*, described the human mating system as "monogamy plagued by adultery".

## Serial monogamy

Serial monogamy is a mating practice in which individuals may engage in sequential monogamous pairings,<sup>[88]</sup> or in terms of humans, when men or women can marry another partner but only after ceasing to be married to the previous partner.<sup>[89]</sup>

One theory is that this pattern pacifies the elite men and equalizes reproductive success. This is called the Male Compromise Theory.<sup>[90]</sup> Such serial monogamy may effectively resemble polygyny in its reproductive consequences because some men are able to utilize more than one woman's reproductive lifespan through repeated marriages.<sup>[91]</sup>

Serial monogamy may also refer to sequential sexual relationships, irrespective of marital status. A pair of humans may remain sexually exclusive, or monogamous, until the relationship has ended and then each may go on to form a new exclusive pairing with a different partner. This pattern of serial monogamy is common among people in Western cultures.<sup>[92][93]</sup>

## Reproductive success

Evolutionary theory predicts that males would be apt to seek more mating partners than females because they obtain higher reproductive benefits from such a strategy.<sup>[91]</sup> Accordingly, males developed many behavior strategies that allow them to acquire more reproductively capable sexual partners.<sup>[91]</sup> Therefore, in order to monopolize periods of more than one female's reproductive life span without being considered polygamous and thus breaking social norms of a monogamous society, males try to remarry women younger than themselves. A study done in 1994 found a significant difference between ages of remarried men and women because the men have a longer reproductive window.<sup>[94][95]</sup>

## Breakup

Serial monogamy has always been closely linked to divorce practices. Whenever procedures for obtaining divorce have been simple and easy, serial monogamy has been found.<sup>[96]</sup> As divorce has continued to become more accessible, more individuals have availed themselves of it, and many go on to remarry.<sup>[97]</sup> Barry Schwartz, author of *The Paradox of Choice: Why less is more*, further suggests that Western culture's inundation of choice has devalued relationships based on lifetime commitments and singularity of choice. It has been suggested, however, that high mortality rates in centuries past accomplished much the same result as divorce, enabling remarriage (of one spouse) and thus serial monogamy.<sup>[98][99][100]</sup>

## Mating system

Monogamy is one of several mating systems observed in animals. However, a pair of animals may be socially monogamous but that does not necessarily make them sexually or genetically monogamous. Social monogamy, sexual monogamy, and genetic monogamy can occur in different combinations.<sup>[87]</sup>

Social monogamy refers to the overtly observed living arrangement whereby a male and female share territory and engage in behaviour indicative of a social pair, but does not imply any particular sexual fidelity or reproductive pattern.<sup>[87]</sup> The extent to which social monogamy is observed in animals varies across taxa, with over 90 percent of avian species being socially monogamous, compared to only 3 percent of mammalian species and up to 15 percent of primate species.<sup>[79][101]</sup> Social monogamy has also been observed in reptiles, fish, and insects.

Sexual monogamy is defined as an exclusive sexual relationship between a female and a male based on observations of sexual interactions.<sup>[87]</sup> However, scientific analyses can test for paternity, for example by DNA paternity testing or by fluorescent pigment powder tracing of females to track physical contact. This type of analysis can uncover reproductively successful sexual pairings or physical contact. Genetic monogamy refers to DNA analyses confirming that a female-male pair reproduce exclusively with each other.<sup>[87]</sup>

The incidence of sexual monogamy appears quite rare in other parts of the animal kingdom. It is becoming clear that even animals that are overtly socially monogamous engage in extra-pair copulations. For example, while over 90% of birds are socially monogamous, "on average, 30 percent or more of the baby birds in any nest [are] sired by someone other than the resident male."<sup>[102]</sup> Patricia Adair Gowaty has estimated that, out of 180 different species of socially monogamous songbirds, only 10% are sexually monogamous.<sup>[103]</sup> Offspring are far more successful when both the male and the female members of the social pair contribute food resources.



An example of this was seen when scientists studied red winged blackbirds. These birds are known for remaining in monogamous relationships during the course of mating season. During the course of the study, the researchers gave a few select males vasectomies just before mating season. The male birds behaved like they do every season, establishing territory, finding a mate, and attempting to make baby birds. Despite apparent social monogamy, the female birds whose partners were surgically altered still became pregnant, indicating that overt social monogamy did not predict for sexual fidelity.<sup>[103]</sup> These babies were cared for by their sterile adoptive fathers.<sup>[104]</sup>

The highest known frequency of reproductively successful extra-pair copulations are found among fairywrens *Malurus splendens* and *Malurus cyaneus* where more than 65 percent of chicks are fathered by males outside the supposed breeding pair.<sup>[101]</sup> This discordantly low level of genetic monogamy has been a surprise to biologists and zoologists, as social monogamy can no longer be assumed to determine how genes are distributed in a species.

*Elacatinus*, also widely known as neon gobies, also exhibit social monogamy. Heterosexual pairs of fish belonging to the genus *Elacatinus* remain closely associated during both reproductive and non-reproductive periods, and often reside in same cleaning station to serve client fish.<sup>[105]</sup>

## Evolution in animals

Socially monogamous species are scattered throughout the animal kingdom: A few insects, a few fish, about nine-tenths of birds, and a few mammals are socially monogamous. There is even a parasitic worm, *Schistosoma mansoni*, that in its female-male pairings in the human body is monogamous.<sup>[106]</sup> The diversity of species with social monogamy suggests that it is not inherited from a common ancestor but instead evolved independently in many different species.

The low occurrence of social monogamy in placental mammals has been claimed to be related to the presence or absence of estrus—or oestrus—the duration of sexual receptivity of a female. This, however, doesn't explain *why* estrus females generally mate with any proximate male nor any correlation between sexual and social monogamy. Birds, which are notable for a high incidence of social monogamy, do not have estrus.

Researchers have observed a mixed mating system of monogamy and polygyny in the European pied flycatcher.<sup>[107]</sup>

## Psychology of monogamy

Psychological studies of social monogamy have relied heavily on observations of married couples. These studies focus on relationship satisfaction, duration and attachment.

## Neuroendocrine bases of monogamy

The North American microtine rodent's (vole) complex social structure and social behavior has provided unique opportunities to study the underlying neural bases for monogamy and social attachment. Data from studies using the *Microtis ochrogaster* or prairie vole indicate that the neuroendocrine hormones, oxytocin (in female prairie voles) and vasopressin (in male prairie voles) play a central role in the development of affiliative connections during mating. The effects of intracerebroventricular administration of oxytocin and vasopressin have been shown to promote affiliative behavior in the prairie vole but not in similar, but non-monogamous montane voles. This difference in neuropeptide effect is attributed to the location, density, and distribution of OT and AVP receptors. Only in the prairie voles are OT and AVP receptors located along the mesolimbic dopamine reward pathway, presumably conditioning the voles to their mates odor while consolidating the social memory of the mating episode. This finding highlights the role of genetic evolution in altering the neuroanatomical distribution of receptors, resulting in certain neural circuits becoming sensitive to changes in neuropeptides.

## See also

- Affair
- Cohabitation
- Divorce
- Human bonding
- Hypergamy – 'marrying up'
- Jealousy
- Marriage
- Mating system
- Monogamy in Christianity
- Pair bonding
- Paternal care
- Psychology of sexual monogamy
- Sexual intercourse
- The seven-year itch

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
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## Further reading

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## External links

- The Myth of Monogamy (<http://www.libchrist.com/sexed/mythmonogamy.html>)
- UK website on childsupport and paternity with many links to studies of paternity, nonpaternity and pedigree error rates

 Look up ***serial monogamy*** in Wiktionary, the free dictionary.

 Wikiquote has quotations related to: ***monogamy***

([http://www.childsupportanalysis.co.uk/analysis\\_and\\_opinion/choices\\_and\\_behaviours/misattributed\\_paternity.htm#philipp1973](http://www.childsupportanalysis.co.uk/analysis_and_opinion/choices_and_behaviours/misattributed_paternity.htm#philipp1973))

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