

# COPULATION, MASTURBATION, AND INFIDELITY

## State-of-the-Art

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### ABSTRACT

When a woman copulates with two or more different men within five days, the sperm from those men compete for the 'prize' of fertilising any egg she may produce. This 'sperm competition' is probably both a lottery and a race, but more than anything it could also be a war, with sperm of different morphologies playing different roles. The risk of sperm competition has been argued to shape the evolution of almost every aspect of human sexuality: from testis size to penis shape; from the 'wet sheet' phenomenon to masturbation and the female orgasm. Most male behaviour can be seen as an attempt either to prevent sperm competition or to win any competition that occurs if he fails. Most female behaviour can be seen - as she 'shops around' for resources and genes - as a continual attempt to optimise any advantageous opportunities for promoting sperm competition. Here, I summarise and test some hypotheses as to how the risk of sperm competition has shaped male and female sexuality. In particular, I evaluate suggestions that men with larger testes, men of greater bilateral symmetry, and bisexual men are morphs adapted to greater involvement in sperm competition. The timing of copulations which could lead to sperm competition varies with the risk of conception in different ways in different phases of a woman's reproductive ontogeny. So too does the woman's retention of sperm as determined by her orgasm pattern. Direct evidence is presented that men with larger testes and more symmetrical men are more likely to become involved in sperm competition. Both also inseminate women with more sperm during copulation and shed more sperm during masturbation. Bisexual men, however, ejaculate fewer sperm. Heterosexual men inseminate established partners with more sperm when the risk of sperm competition is high but inseminate extra-pair women with fewer sperm. Low sperm numbers during extra-pair copulations and in the ejaculates of bisexual men are achieved via masturbation and may

be strategies for success in sperm competition. If ejaculate competitiveness is a trade-off between sperm numbers and sperm age, smaller but younger ejaculates may be a better compromise when the male has only a limited opportunity to inseminate a particular woman, whereas larger, albeit older, ejaculates may be a better compromise when a male has more frequent opportunity to inseminate.

## 1. INTRODUCTION

When a woman copulates with two or more different men within a few days, the sperm from those men compete for the 'prize' of fertilising any egg she may produce. This 'sperm competition' (Parker 1970) is both a lottery (Parker 1982) and a race (Gomendio and Roldan 1991), but more than anything it could also be a war (Baker and Bellis 1988, 1995; Baker 1996), with sperm of different morphologies playing different roles. Fewer than 1% of sperm are programmed to seek and fertilise an egg (at any one time) (Lee 1988), and it has been hypothesised that the remainder are programmed for a variety of offensive and defensive activities (Baker and Bellis 1988, 1989a, 1995).

Following Smith (1984) I have argued that the risk of sperm warfare has helped to shape the evolution of just about every aspect of human sexuality - from testis size to penis shape, and from the 'wet sheet' phenomenon to masturbation and the female orgasm (Baker and Bellis 1995; Baker 1996).

Smith (1984) suggested that sperm competition would occur whenever a woman had sex with two different men within 7–9 days, this being the maximum active life of human sperm once inside the cervix. He was probably correct (Baker and Bellis 1995), but to be conservative, I have in the past used a 5-day criterion, using the fertile rather than the active life of sperm (Baker and Bellis 1995). Other authors (e.g. Gomendio and Roldan 1993) would prefer to be even more conservative and use a criterion of only 2–3 days but, as shown previously (Baker and Bellis 1995), even this actually makes very little difference to estimates of the level of sperm competition. If a woman is going to have sex with two different men within the space of 7 days, she almost always does so within 2–3 days, perhaps precisely so as to promote the most active sperm competition (Bellis and Baker 1990). Estimates for the UK suggest that about 4% of children are the result of sperm competition, each being conceived while their mother contains sperm in her reproductive tract from two or more different men (Baker and Bellis 1995).

Over the past few years, research at Manchester has led to a relatively detailed hypothesis of the way that sperm competition may have shaped the sexual strategies of both men and women (Baker and Bellis 1995; Baker 1996). The various suggestions are outlined at different points in this paper, alongside results from new experimental investigations.

The main theme of this rather multi-faceted paper is that the importance of sperm competition to human sexuality varies not only from person to person but also from one stage of sexual ontogeny to another.

## 2. SOURCES OF DATA

### 2.1. The Manchester Study of Whole Ejaculates and Flowbacks

The main materials and methods used in the Manchester studies of whole ejaculates and flowbacks have been described in detail elsewhere (Baker and Bellis 1993a,b, 1995).