

# Pupillometry

## A sexual selection approach

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### Abstract

We attempted to clarify prior reported discrepancies between males judging females and females judging males in the attraction value of pupil size. Our hypothesis was that attraction values of pupil size will be described by an interaction effect, such that males will be most attracted by large pupils in females and females by medium size pupils in males. The rationale for the hypothesis was that the reproductive strategies of males are best served by unequivocal female sexual interest and arousal, whereas the strategies of females will predispose them to favor more moderate sexual attentions. As expected, the relationship of attraction to pupil size was positive and linear for males viewing females. Females, however, rather than showing the predicted inverted U function, showed consistent preferences for either medium or large pupils in males. Further investigation revealed that females attracted by large pupils also reported preferences for proverbial bad boys as dating partners. Analogous findings in the literature on female romantic partner preferences are discussed.

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### 1. Study 1: Pupil size preference and sexual selection

In a classic study of pupil size and attraction, Hess (1965) showed that men found drawings of women's faces to be more attractive when the pupils were rendered larger, a finding that has been replicated using various methods (Bull & Shead, 1979; Hess, 1975;

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Stass & Willis, 1967; Tomlinson et al., 1978). Studies that additionally or independently assessed the corresponding responses of women to pupil sizes of men, however, have shown inconsistent results (Bull & Shead, 1979; Stass & Willis, 1967; Tomlinson et al., 1978).

The present study sought to resolve this discrepancy within the concept of sexual selection. Sexual selection seemed an apt framework for several reasons. For one, pupillary dilation has been shown to be foremost an expression and signal of sexual arousal (Aboyoun & Dabbs, 1998; Bernick, Kling, & Borowitz, 1971; Hamel, 1974). For another, effects of pupil size on attraction begin at about puberty, which suggests that it has a role in reproductive strategies (Bull & Shead, 1979; Flade & Lindner, 1979; Hess, 1975; Tarrahan & Hicks, 1979). Foremost, however, the sexual selection concept provided a precise hypothesis about the total pattern of sex differences.

The hypothesis was based on a fundamental divergence in reproductive strategies between sexes, which has been well established in humans and other species displaying at least some degree of polygyny (Daly & Wilson, 1983, pp. 113–136). In such species, male reproductive success is mainly limited by access to willing, fertile females; thus, it may be assumed that males have been programmed by selection to respond without much equivocation to female sexual arousal and attention. Females, on the other hand, do not require intense male interest to obtain mating privileges. Furthermore, the female reproductive strategy is based on selective mating, and her interests are probably better served by moderate levels of male arousal. Overzealous sexual attention on the part of the male may presage forced copulation, overpossessiveness, excessive sexual jealousy and/or promiscuity, all of which can operate to the detriment of the female's fitness. Thus, it is plausible to assume that females have been programmed by selection to prefer moderation in the sexual attentions and arousal of prospective suitors.

This phenomenon is not unique to humans. Trivers (1985, p. 349), for example, gives an engaging account of the courtship strategy of the male black grouse, noting that subtlety and restraint are critical to success. In fact, the successful male will often turn his back to the female and begin to walk away during courtship, leaving her to take the initiative.

The hypothesis of the present study, then, was that the relationship between pupil size and attraction for men viewing women will be positive and linear, whereas the relationship for women viewing men will be a negative quadratic (inverted U) function. The latter aspect of this prediction may explain inconsistencies in prior studies, in that most used two, rather than three, pupil sizes, and females' preferences may have depended on whether the smaller or larger pupil more closely approached the moderate range. In fact, one study that employed three pupil sizes (Tomlinson et al., 1978) did find the inverted U-shaped function predicted here, though the authors interpreted this as an artefact, occurring with relatively unattractive male models.

### 1.1. Method

High school graduation photographs were obtained from three men and three women whom both authors considered to be at least moderately attractive. A professional portrait artist constructed three photos from each, with small, medium, and large pupils, using the

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