

Overview of the influence of relative parental investment and variance in mate quality on female competition and selectivity

Sexual selection occurs as the result of two processes; competition for mates and mate choice. Two factors have been invoked repeatedly as major influences on competition and choice; relative parental investment and variance in mate quality. With respect to females, the value of intrasexual competition will increase as the ratio of male parental investment to female parental investment increases from 1/1 (Fig. 1).

All selectivity is based on variance in mate quality. Given that variance in male quality is constant across species or populations, the value of selectivity will decrease for females as the relative parental investment of males goes up in a comparison across species or populations (Fig. 2). In the extreme case (hypothetical) any female could potentially increase the number of offspring she produced by mating with all males and there would be no need for a female to be selective (i.e. a female lek).

As the variance in quality between males increases, the value of intrasexual competition will increase for females. Increasing variance in male quality will also increase the value of selectivity to females (Fig. 3). Hence, female competitiveness and selectivity should be positively correlated as a function of variance in male quality and negatively correlated as a function of increasing male parental investment.

Even when there is no variance in quality between males there may be potential variance in quality within males, and this may select for female-female competition over a mate. For example, if the quality of the parental care provided by a male decreases as the number of offspring he cares for increases, then females should compete to keep other females from mating with their mates (Fig. 4). Potential variance within males should also increase the value of selectivity for females.

The effects of variance in quality within and between males should interact for two reasons:

- 1) If there is variance in quality between, but not within males (the quality of the males contribution does not decline no matter how many offspring he contributes to) then there is no reason for female-female competition, only female selectivity.
- 2) If there is variance in quality within but not between males then females should spread themselves evenly over males and females should not compete (unless there is a female biased sex ratio or polyandry).

Both types of variance in quality interact with the amount of parental investment provided by males. If males provide no parental investment then any male will be able to mate with all females and competition over a male would be superfluous (this means that females should only compete because of variance between males in genetic quality when males provide enough parental investment that they are limited to some extent in the number of females they can profitably mate with). Any potential variance in quality within males will derive from males having a limited amount of parental investment to distribute to offspring. Finally, variance in male quality is likely to increase as the amount of parental investment males contribute increases. This effect could potentially confound the effect of increasing relative male parental investment on female selectivity, but not on female-female competition. Hence, we might expect females in some species where males invest much more than females (are there any?) to be highly selective anyway.

*f compete to be 1st to mate w/ ♂  
to use least time*

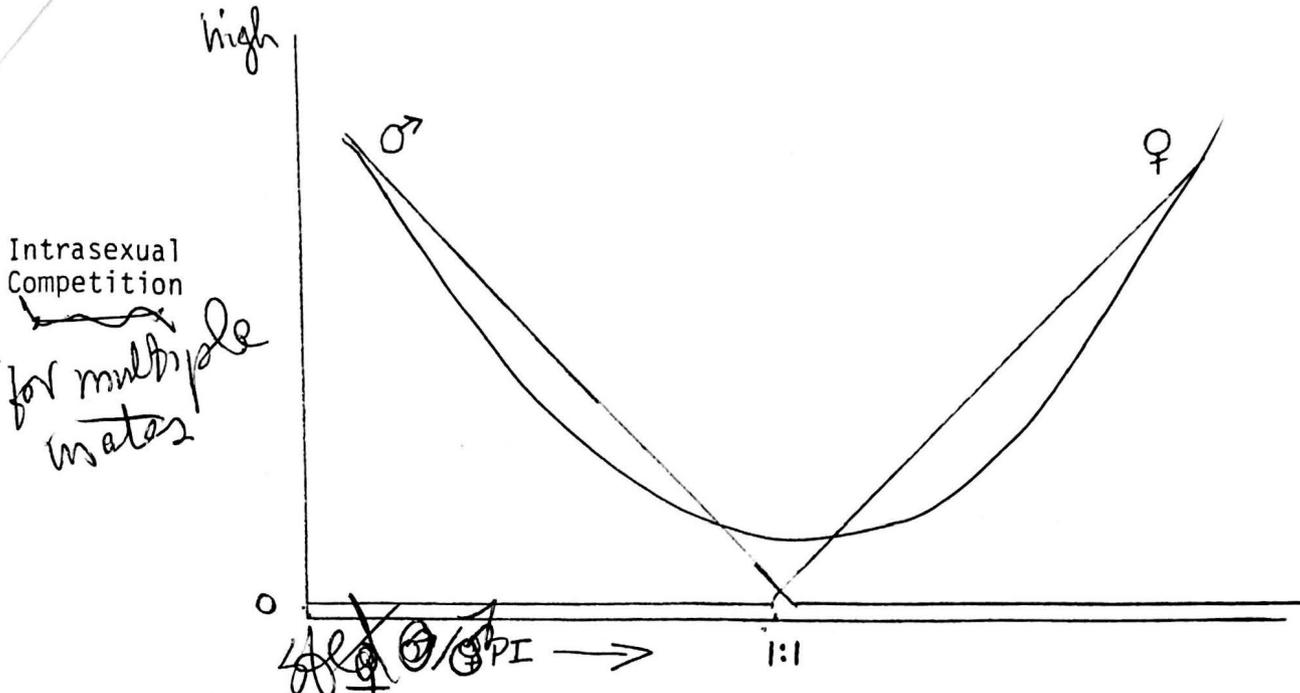


Fig. 1) Degree of intrasexual competition over mates as a function of the relative amounts of parental investment provided by males and females. Shape of increase (and decrease) is arbitrary - they should probably be stepwise.

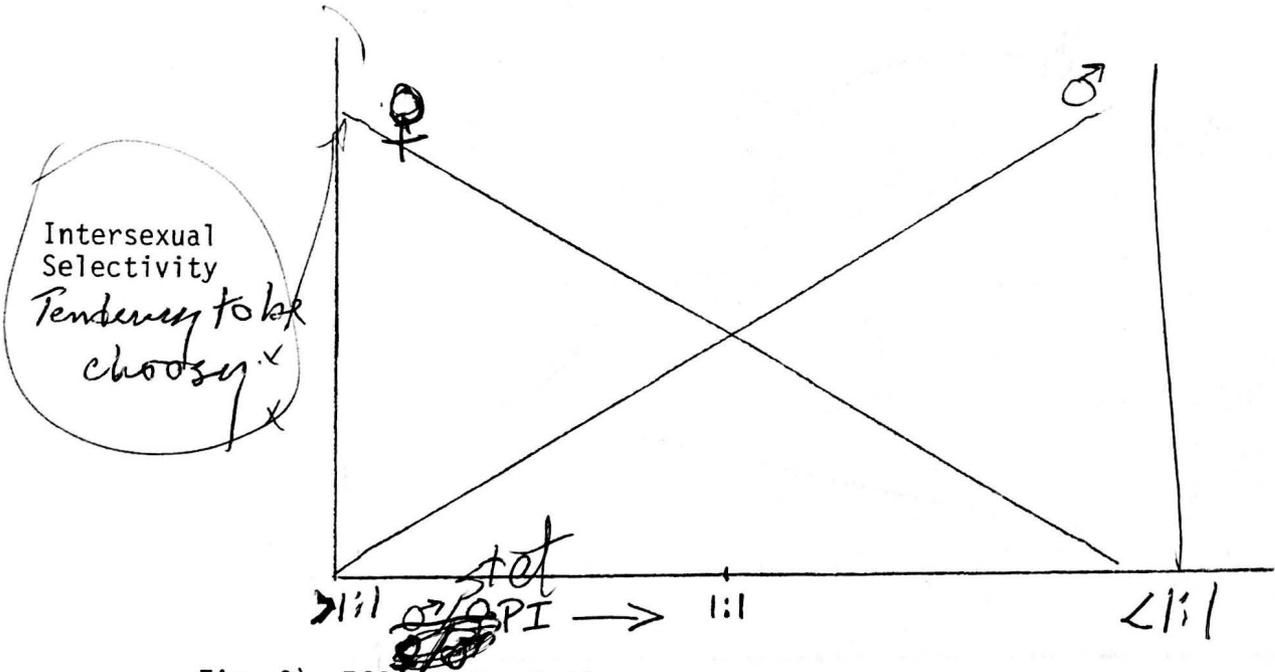


Fig. 2) Effect of relative parental investment on value of selectivity.

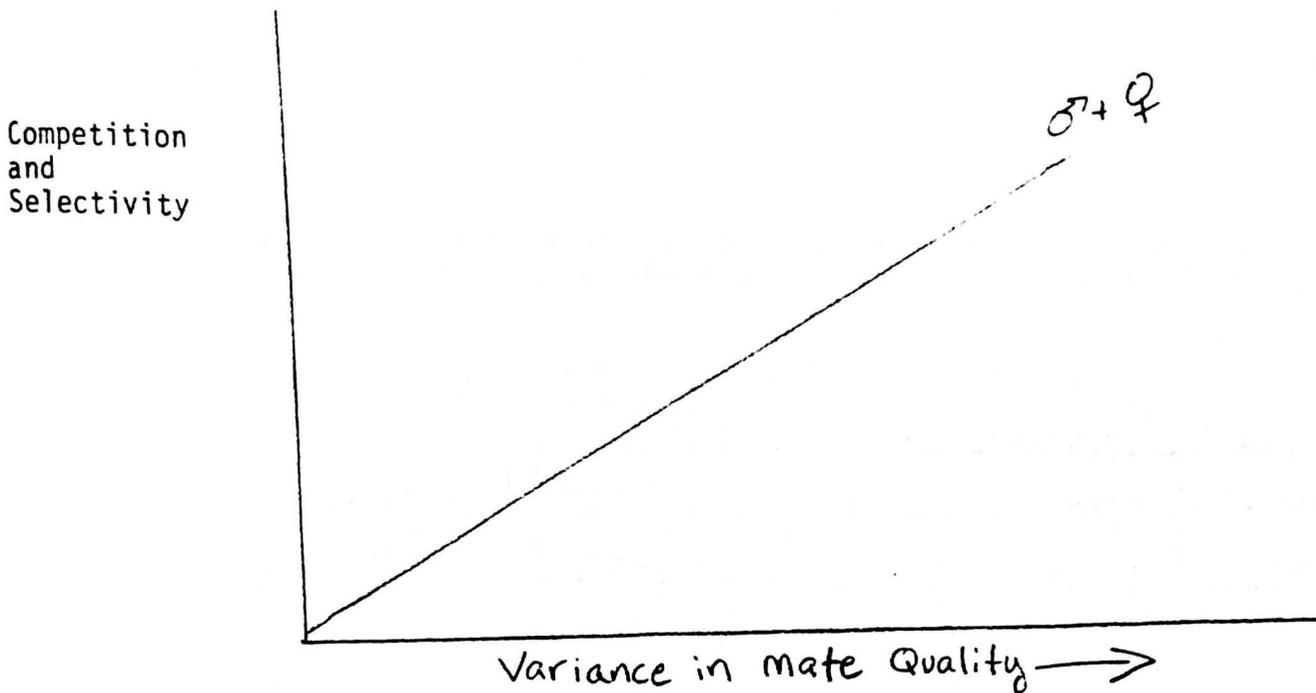


Fig. 3) Effect of increasing variance in mate quality on degree of intrasexual competition and intersexual selectivity in males and females. Competition argument assumes a constant degree of male (female) parental investment across species or populations being compared which is high enough to limit the number of females (males) a male (female) can profitably mate with.

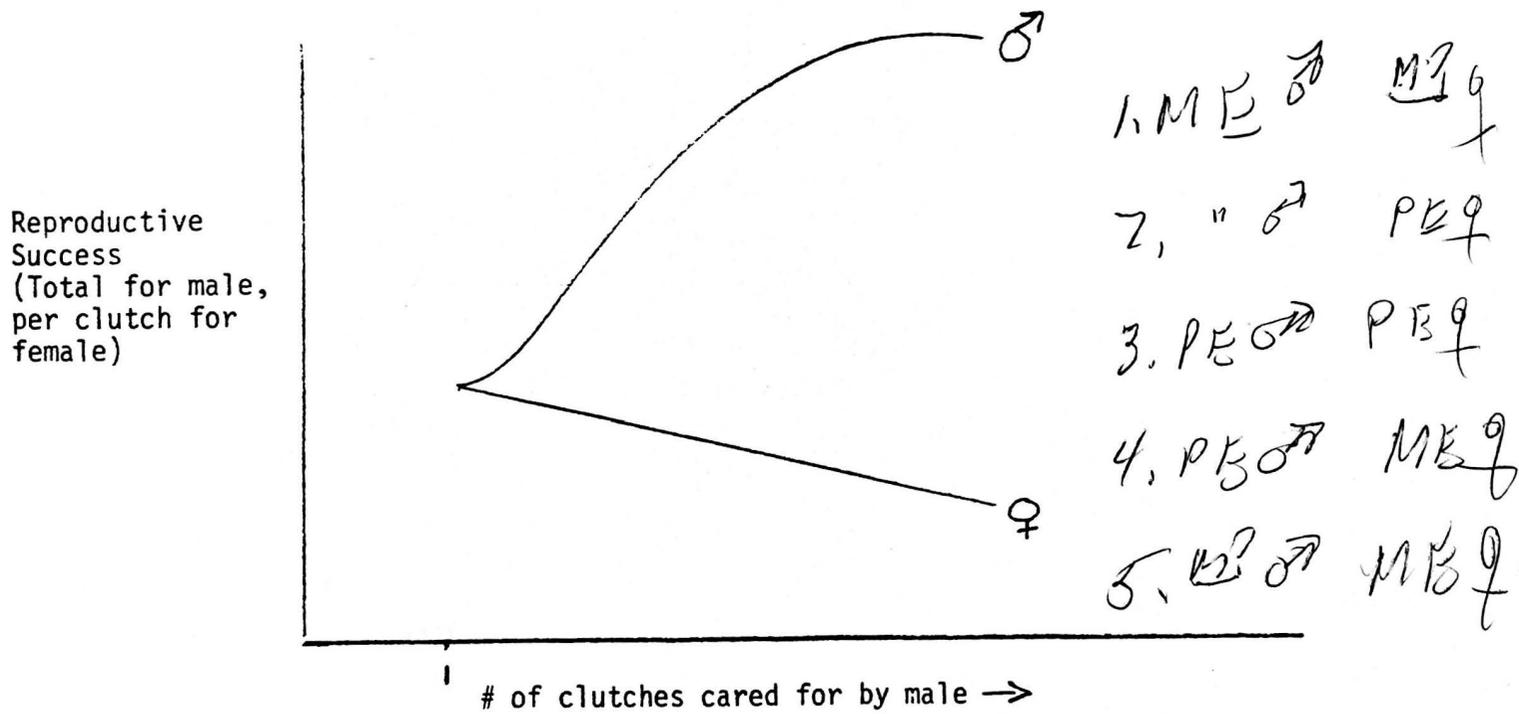


Fig. 4) Hypothetical relationship between the number of clutches a male is caring for and the reproductive success of a male and his mate.

Effects of increasing male parental investment and variance in male quality on female competition and female choice

	male parental investment	variance in male quality	
		between	within
competition	increase	increase	increase
selectivity	decrease	increase	increase

[Transcription:]

Can activities of human males and females be divided into mating effort and parental effort-- and combinations (if so, male as probably more mating effort and female parental effort)-- can each turn potential parental effort into mating effort?

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