



A dynamic game theoretical model predicts variance in choosiness when mate availability fluctuates

Louise Chevalier, Jacques Labonne, François Xavier Dechaume-Moncharmont

► To cite this version:

Louise Chevalier, Jacques Labonne, François Xavier Dechaume-Moncharmont. A dynamic game theoretical model predicts variance in choosiness when mate availability fluctuates. 2. Joint Congress on Evolutionary Biology (EVOLUTION 2018), Aug 2018, Montpellier, France. 2018. hal-02184256

HAL Id: hal-02184256

<https://hal.science/hal-02184256>

Submitted on 5 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

A DYNAMIC GAME THEORETICAL MODEL PREDICTS VARIANCE IN CHOOSINESS WHEN MATE AVAILABILITY FLUCTUATES

LOUISE CHEVALIER, JACQUES LABONNE, FRANÇOIS-XAVIER DECHAUME-MONCHARMONT

UMR INRA/UPPA 1224 ECOBIOP, ÉCOLOGIE COMPORTEMENTALE ET BIOLOGIE DES POPULATIONS DE POISSONS

louise.chevalier@inra.fr

INTRODUCTION

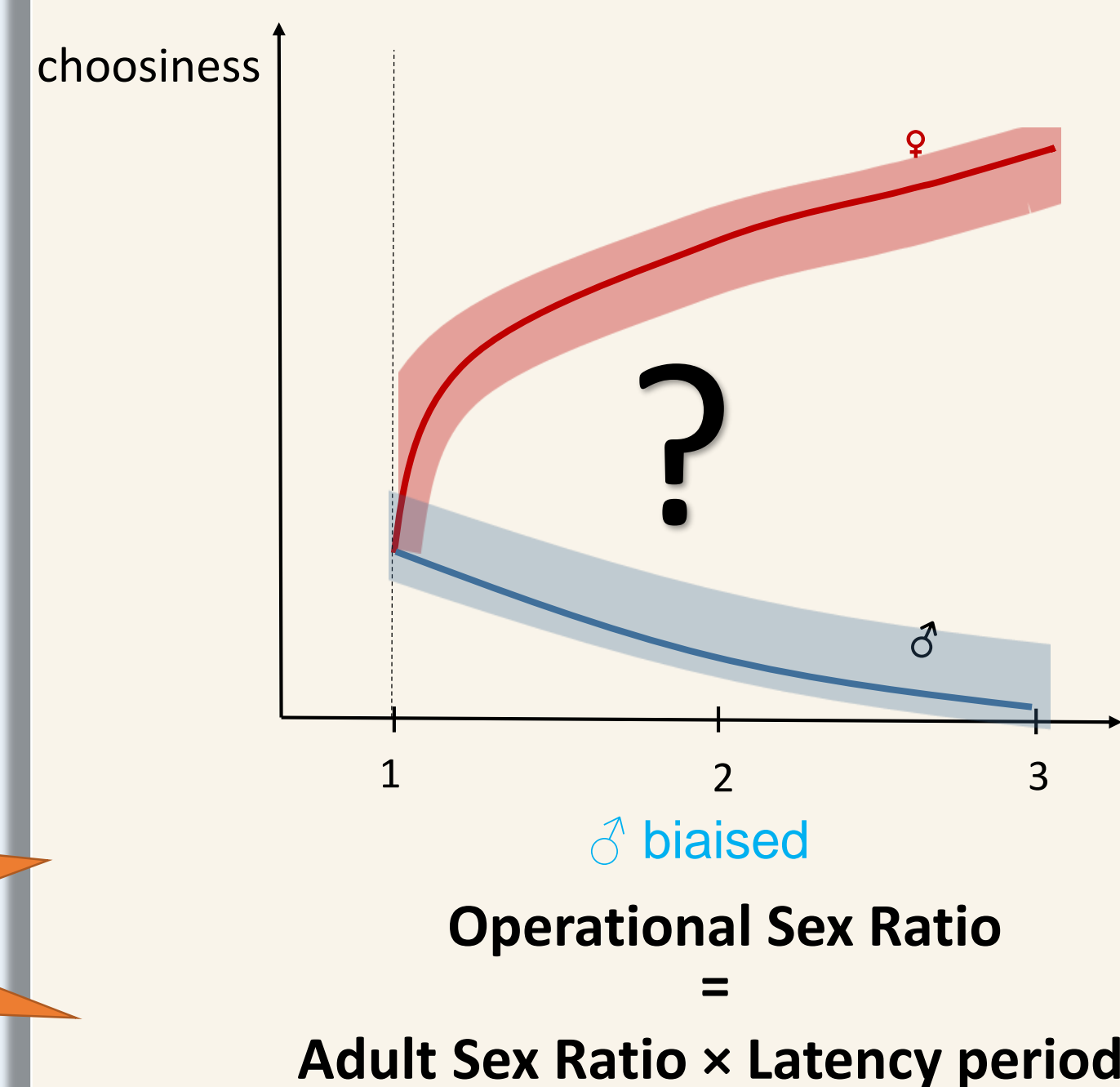
You are in the market for love, you want a partner of good quality to have many and healthy children. You have same sex competitors looking for mates therefore available partners become scarcer.

How choosy should you be?



test your choosiness!

OBJECTIVES



Under what conditions should between sexes divergence evolve? Can choosiness evolve in the most common sex?

Do we observe intra-sex variance in choosiness and it is possible for both sexes?

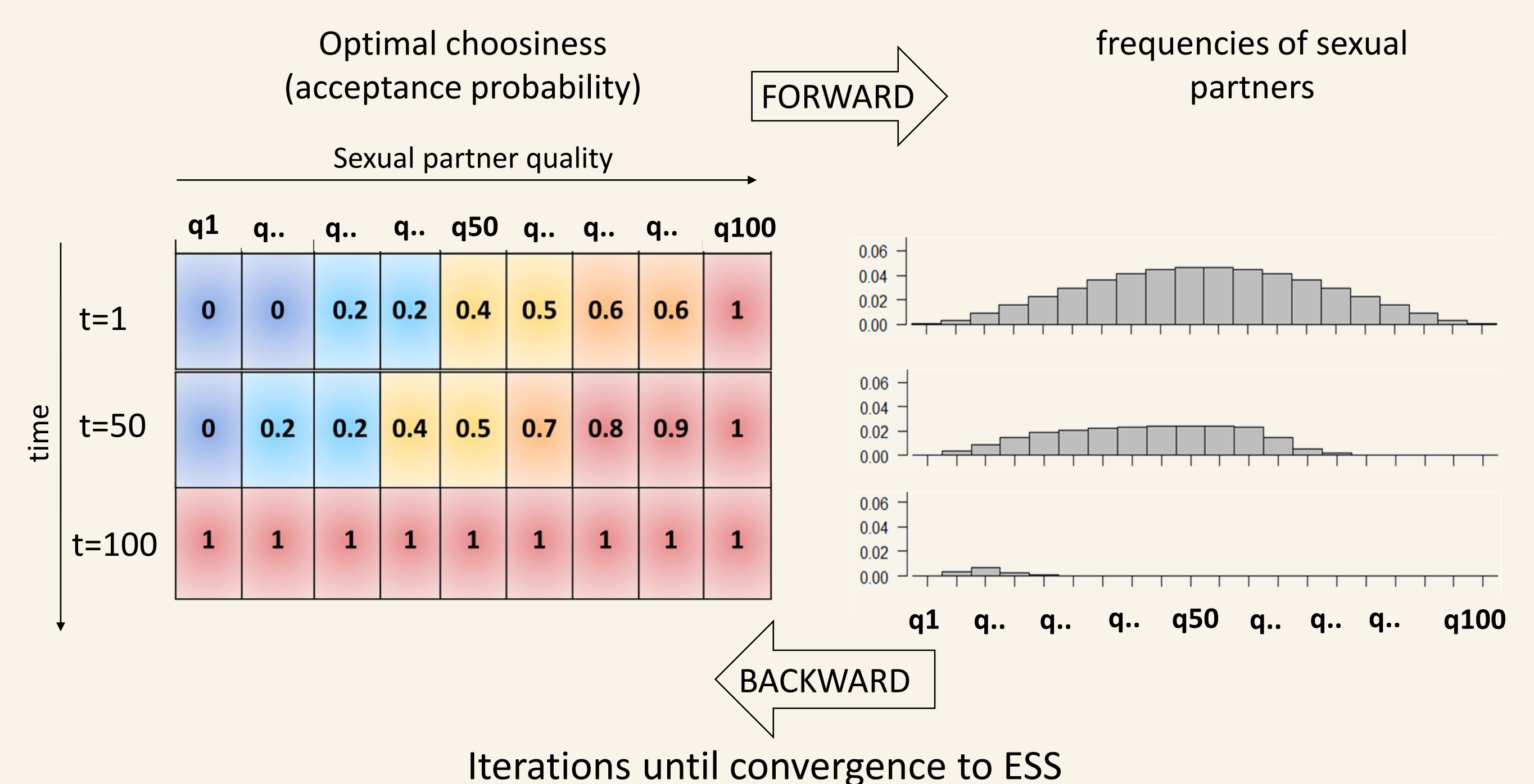
Is flexibility in choosiness an optimal strategy for a large span of mating systems?

METHODS

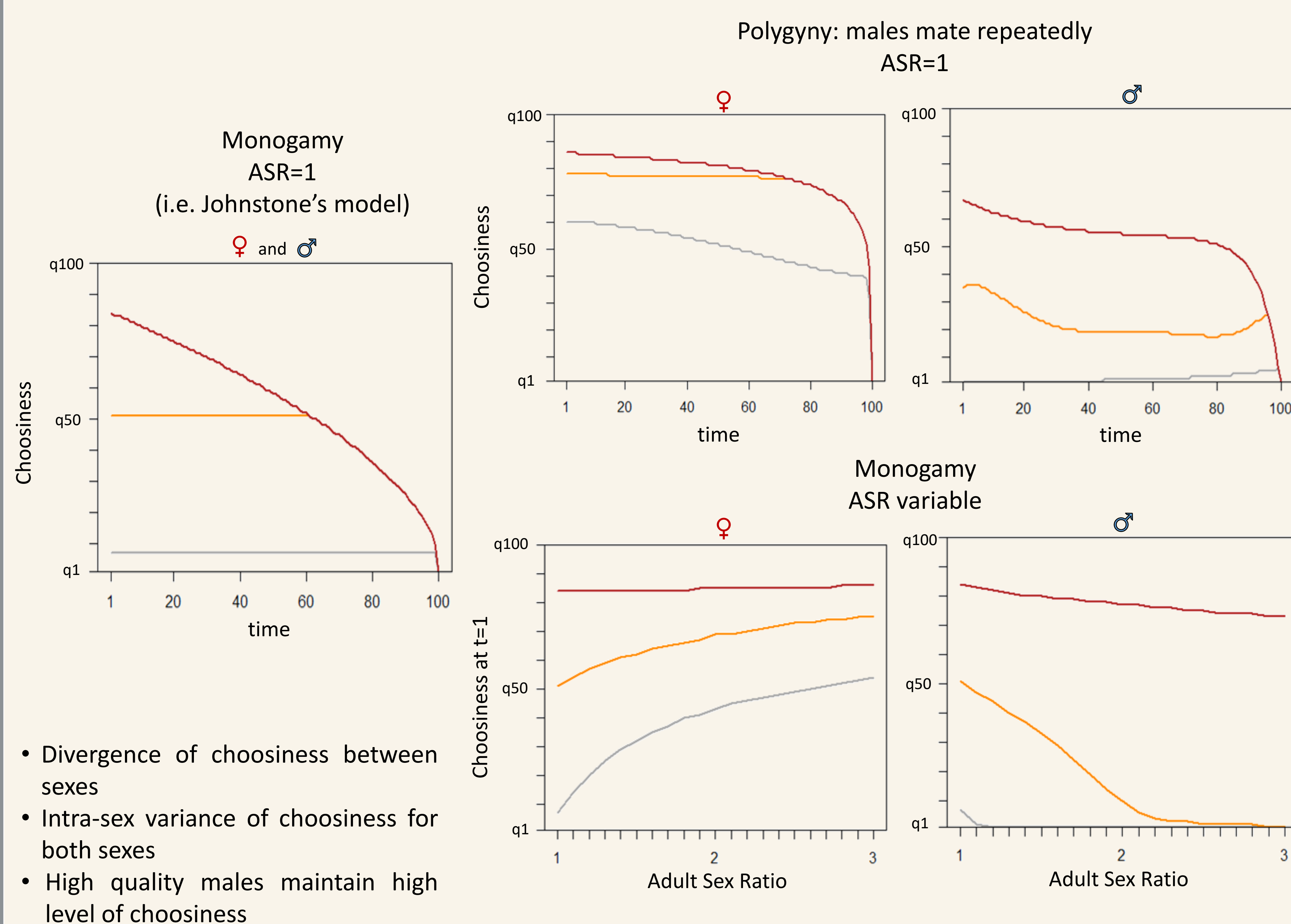
The theoretical game model (1-2)

- Individuals compete for mate
- The breeding season is finite
- The fitness payoff of an individual depends solely on the quality q of his mating partner.
- Different mating systems are considered:
 - Monogamy:** individuals mate once
 - Repeated mating (from polygyny to polygynandry):** males and females can mate repeatedly and become available again after a latency period

Dynamic Programming

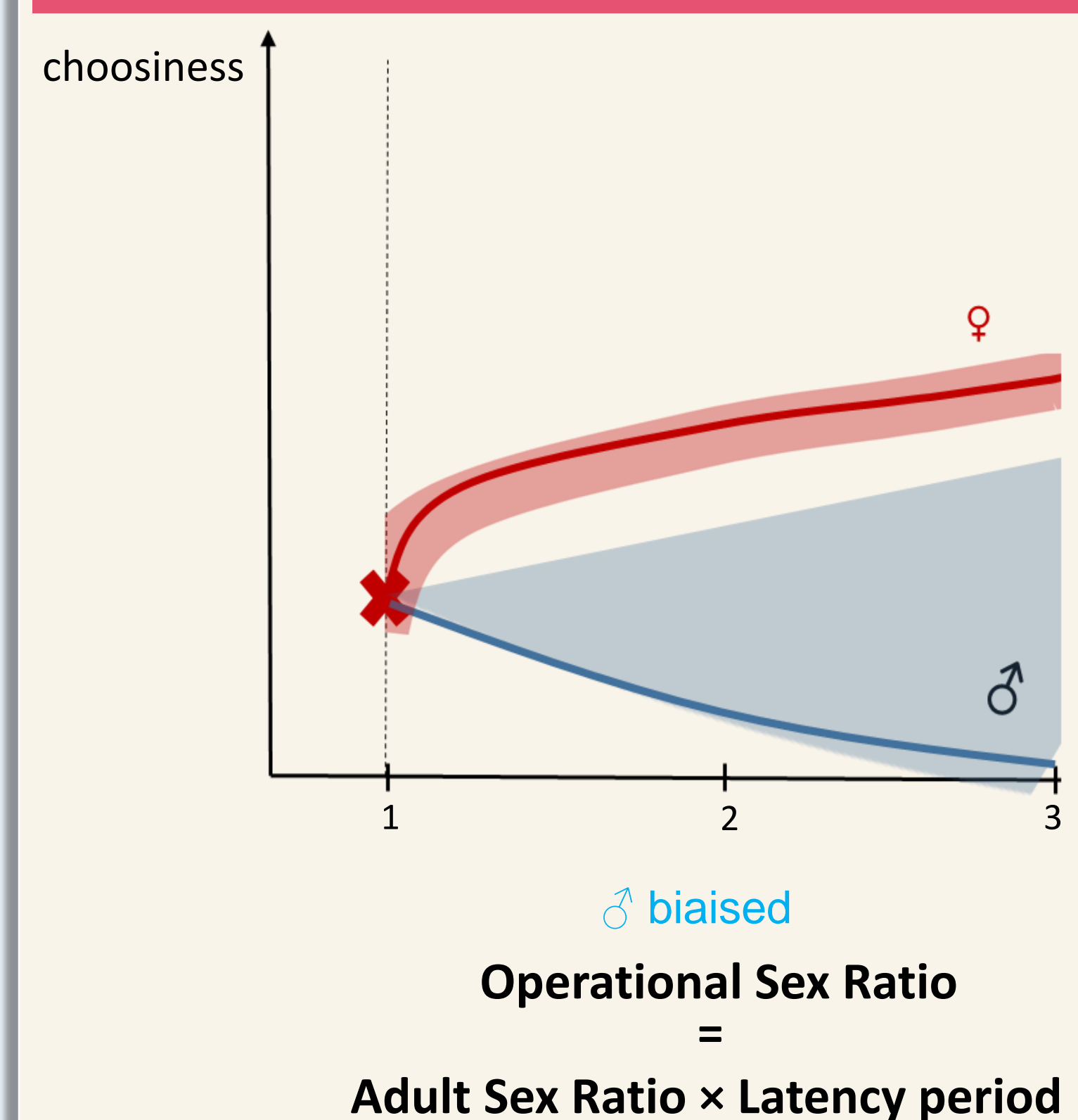


RESULTS



- Divergence of choosiness between sexes
- Intra-sex variance of choosiness for both sexes
- High quality males maintain high level of choosiness

CONCLUSION



- Difference between the choosiness of males and females arises in asymmetric mating systems
- Maintenance of intra-sex variance and flexibility in choosiness
- Despite this divergence between sexes, the model does not predict lack of choosiness in the most common sex
- Consistency of our results with empirical studies (3-4)

References:

- Johnstone, R. A. (1997). The tactics of mutual mate choice and competitive search. *Behavioral Ecology and Sociobiology*, 40(1), 51-59.
- Houston, A. I., & McNamara, J. M. (1999). *Models of adaptive behaviour: an approach based on state*. Cambridge University Press.
- Candolin, U., & Salesto, T. (2008). Does competition allow male mate choosiness in threespine sticklebacks? *The American Naturalist*, 173(2), 273-277.
- Kraak, S. B., & Bakker, T. C. (1998). Mutual mate choice in sticklebacks: attractive males choose big females, which lay big eggs. *Animal Behaviour*, 56(4), 859-866.