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Supplementary Materials for

The effect of mating market dynamics on partner preference and relationship quality among Himba pastoralists

Sean Prall* and Brooke Scelza

*Corresponding author. Email: sprall@missouri.edu

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Sections A to D Figs. S1 to S16

A. Preference model details and posteriors

Baseline desirabilty model

To estimate desirability, the following cumulative ordered logit model with varying intercepts by rater and ratee was used.

$$Rating \sim OrderedLogit(\theta, \kappa)$$
$$\theta = \alpha_{Ratee} + \alpha_{Rater}$$

To estimate individual ratee desirability, the mean posterior from each individual ratee was calculated and used in future models. This initial model included 12362 ratings from 145 raters on 304 individual ratees.

Figure S1 - Posterior distribution of parameters in the base desirability model



Rater desirability on preference ratings

To assess how individual rater desirability predicted preference ratings, the posterior mean of the varying intercept from each rater from the original desirability model was included as a predictor (RD below). Since there was a clear sex difference in baseline ratings, we include a varying intercept by rater sex. Additionally, to correct for the effect of sex specific sex differences, we include standardized age difference as a varying slope by rater sex. This model included 11332 ratings from 132 raters on 303 individual ratees.

 $\begin{aligned} Rating \sim OrderedLogit(\theta,\kappa) \\ \theta = \alpha_{RateeID} + \alpha_{RaterID} + \alpha_{RaterSex} + (\beta_{RD} + \beta_{RD[RaterSex]}) * RD + \beta_{AgeDiff[RaterSex]} * AgeDiff \end{aligned}$



Figure S2 - Posterior distribution of parameters in the market model estimating rater desirability on preference





Desirability gap on preference ratings

To compare the impact of desirability differences in preference ratings, gap between rater and ratee as a categorical variable was included as a fixed effect with "ratee higher" (hereafter EH) and "rater higher" (hereafter RH) as deviations from the index category "same." Again, varying intercepts by rater, ratee, and rater sex were included, and varying slopes by age difference and the categorical variable on rater sex. This model included 11332 ratings from 132 raters on 303 individual ratees.

 $\begin{aligned} Rating \sim OrderedLogit(\theta, \kappa) \\ \theta &= \alpha_{RateeID} + \alpha_{RaterID} + \alpha_{RaterSex} + (\beta_{EH} + \beta_{EH[RaterSex]}) * EH + \\ & (\beta_{RH} + \beta_{RH[RaterSex]}) * RH + \beta_{AgeDiff[RaterSex]} * AgeDiff \end{aligned}$



Figure S4 - Posterior distribution of parameters in the desirability gap model

Figure S5 - Posterior distribution of parameters for varying effects by rater sex in the desirability gap model



B. Sexual history model details and posteriors

Sexual recall data came from the partnership preference task, where raters were asked to note whether or not they had had previous sexual intercourse with each ratee. These ratings were transformed so that each line in the data set consisted of a unique dyad, where at least one party had reported on sexual intercourse. In some cases, both parties reported on each other, but many of the reports are one-sided.

To estimate the probability of reported sexual history between any dyad for which we have data, the following bernoulli was used. Age gap was included as a fixed effect via the spline function s() as part of the brms() package with default priors, calculated as the standardized female minus male age gap and denoted as $\sum w_k A_k$ below. Additionally, since we expected differential reporting of sex by respondent sex, we included whether the sexual history for any dyad came from the woman, the man, or from both parties in the dyad as a varying effect(α_{gp} below). If either party reported a past sexual history, then we we assumed that sex between the dyad had occured. Results shown below suggest, as expected, when women only are reporting, probabilities are lower than when men or both women and men are reporting. To determine the impact of differences in mate value on previous sexual history, the absolute difference in mate value was used also included as a fixed effect predictor (Diff below). Finally, varying intercepts by individual male and individual female were also included. This model included 9720 dyads from 172 women and 131 men.

$$Sex \sim Bernoulli(p)$$
$$logit(p) = \alpha + \alpha_{male} + \alpha_{Female} + \alpha_{qp} + \sum w_k A_k + \beta_{Diff} * Difj$$





Figure S7 - Posterior distribution of varying intercepts on respondent sex in reporting sexual history





Figure S8 - Posterior prediction of the age gap effect on reported sexual history

Figure S9 - Posterior prediction of the absolute difference in mate value on reported sexual history



C. Relationship model details and posteriors

Models predicting frequency of contact

To estimate impact of differences in desirability on frequency of contact, for three item likert ratings of both physical and phone contact, the following cumulative ordered logit model was used. Standardized age of respondent and whether or not the relationship was with a spouse (1=marital, 0=nonmarital) was also included. These models included 94 ratings from 59 respondents to predict physical contact, and 94 ratings from 59 respondents to predict physical contact.

$$Frequency \sim OrderedLogit(\theta, \kappa)$$
$$\theta = \alpha_{ID} + \beta_{RH} * RH + \beta_{EH} * EH + \beta_{Aqe} * Age + \beta_{S} * Spouse$$



Figure S10 - Posterior distribution of parameters in model predicting frequency of physical contact

Figure S11 - Posterior distribution of parameters in model predicting frequency of phone contact



Figure S12 - Posterior predictions for models predicting frequency of contact
Physical Contact
Phone Contact



Models predicting whether a partner is believed to have many additional partners

To estimate the effects of differences in desirability on reporting whether respondent believes their partner has many additional partners, the following bernoulli model was used to predict the binary outcome (1=yes).

Predictors include standardized age of respondent, and whether the partner reported on is a marital (spouse = 1) or non-marital (spouse=0) partner. This model includes 81 ratings from 53 respondents.

$$Partners_i \sim Bernoulli(p)$$
$$logit(p) = \alpha_{ID} + \beta_{RH} * RH + \beta_{EH} * EH + \beta_{Age} * Age + \beta_S * Spouse$$

Figure S13 - Posterior distribution of parameters in model predicting whether or not partner is believed to have many informal partners



Figure S14 - Posterior prediction of model predicting whether or not partner is believed to have many informal partners



Model predicting length of relationship

To model length of relationship in years from the relationship history data, the following poisson regression was used. Fixed effect predictors included standardized age of respondent, and whether the partner reported on is a marital (spouse = 1) or non-marital (spouse=0), and log of the absolute difference of desirability between respondent and their partner (Diff). This model includes 92 observations from 58 respondents.

$$Length \sim Poisson(\lambda)$$
$$log(\lambda) = \alpha + \alpha_{ID} + \beta_{Diff} * log(Diff) + \beta_{Age} * Age + \beta_{S} * Spouse$$





D. Mate value correlation from relationship and marital data

The association between partner mate value in real world relationships was determined by examining the mate value of non-marital and marital partners from the relationship history surveys as well as marital data. This resulted in 128 partnerships to compare. To get a Bayesian estimate of the association in mate value between partners, a multivariate model independently predicting male and female mate values was used, and residual correlations estimated. The correlation estimate based on this model is 0.51 (mean of posterior distribution), while a simple frequentist correlation estimate for these same variables using the *cor.test()* function results in an estimate of 0.52. The distribution of the correlation estimate from the Bayesian model is shown below in Figure S16.

Residual correlations for marital and non-marital relationships were also calculated separately. Marital relationships have a correlation estimate of 0.45 (or 0.5 using a frequentist estimate), while non-marital relationships have a correlation estimate of 0.55 (0.59).



Figure S16 - Distribution of the posterior estimate for the residual correlation between partners