

## README

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Current paper title: Fitness benefits from co-display favor subdominant male-male partnerships between phenotypes

Authors of ms: there are four additional authors to this manuscript which will appear on the final version of this readme file if/when the associated manuscript is accepted.

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This code was written in MatLab R2017a, © 1994-2021 The MathWorks, Inc and R package “digitize” (3.5.2 (2018-12-20) -- "Eggshell Igloo"). All the code was written for the extraction of data from published sources or for calculating predictions based on the model of resident/satellite co-display dynamics.

The code is in two parts: `main_text` and `supplementary_code`.

`main_text/functions` contains the major model functions, while `main_text/figure_2` contains the scripts for reproducing figure 2 of the main text. Elements of these scripts can be used to find the satellite and resident reward values though they are presented as one running script to produce the figure.

`supplementary_code` holds all the scripts for reproducing the supplementary figures as well as the rcode used to extract data from literature data.

To have a logical organization of the code, plot functions and model functions are in different folders. *Therefore, all scripts act as an entire package for the paper and should be placed in the same folder location before running the scripts in MatLab.* Each function and script has its own documentation and description. Table 1Code summarizes the essential elements within the model and the code. Note that most functions call for `L`, `r`, `h`, `sat_strength`, and `comp_level` in that order this order does not change. *Also note that colormaps must be edited within MatLab plot editor to reproduce the exact figures that appear in the main text and the supplementary material. These alterations are summarized in the code for the figures in comments.*

Table 1Code. Model elements from Fitness benefits from co-display favor subdominant male-male partnerships between phenotypes (*in revision*). Elements (Elements) and their associated notation in the code (Element in code), how they appear in the code (Type), and their associated function name with in the code (Function).

Element	Element in code	Type	Function
$r$	r	Input variable	--
L	L	Input variable	--
T	444	Constant within a function	--
$F^{Lek}$	F_Lek	Function	Total_cops_on_lek
B	B	Function	Skew_of_lek
$\hat{B}$	B_Hat	Function	Norm_skew_of_lek
$K_r$	K_r	Parameter estimated within a function	--
$h$	h	Input variable	--
$H_r^h$	H_h_r	Parameter estimated within a function	--
$F_r^{Res}$	F_Res_r	Function	Single_res_cops
$F^{Sat}$	F_s	Constant within a function	--
$F^{Res\ total}$	F_Res_total	Function	Total_res_cops
$F^{Sat+Res}$	F_SatandRes	Function	Co_dis_benefit
$F_r^{Display}$	F_Dis_r	Parameter estimated within a function	Total_cops_co_dis
$D_r$	D_r	Function	Dis_risk
$M^{Sat}$	M_Sat	Input variable	--
$M_r^{Res}$	M_Res_r	Function	Mono_coeff
$C_r^{Res}$	C_Res_r	Function	Res_payoffs
$C_r^{Sat}$	C_Sat_r	Function	Sat_payoffs
$G_r^{Res}$	G_Res_r	Function	Res_reward
$G_r^{Sat}$	G_Sat_r	Function	Sat_reward
$C_r^{Res+Res\ choice}$	C_Res_r_ch	Function	Res_payoffs_res_choice
$C_r^{Sat++Res\ choice}$	C_Sat_r_ch	Function	Sat_payoffs_res_choice