Males Harm Females Less when Competing with Familiar Relatives

Supplementary Materials

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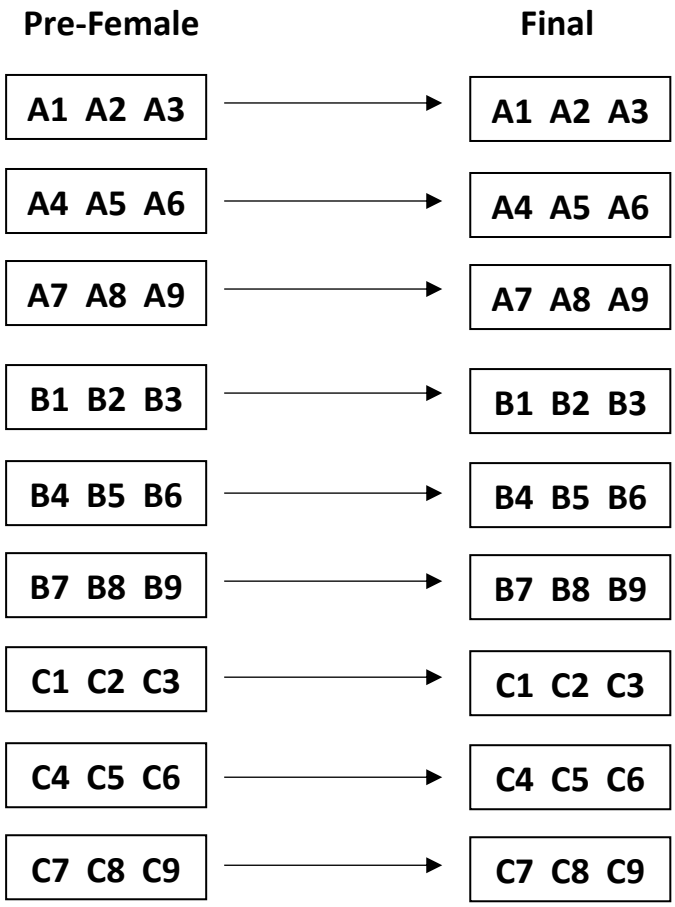
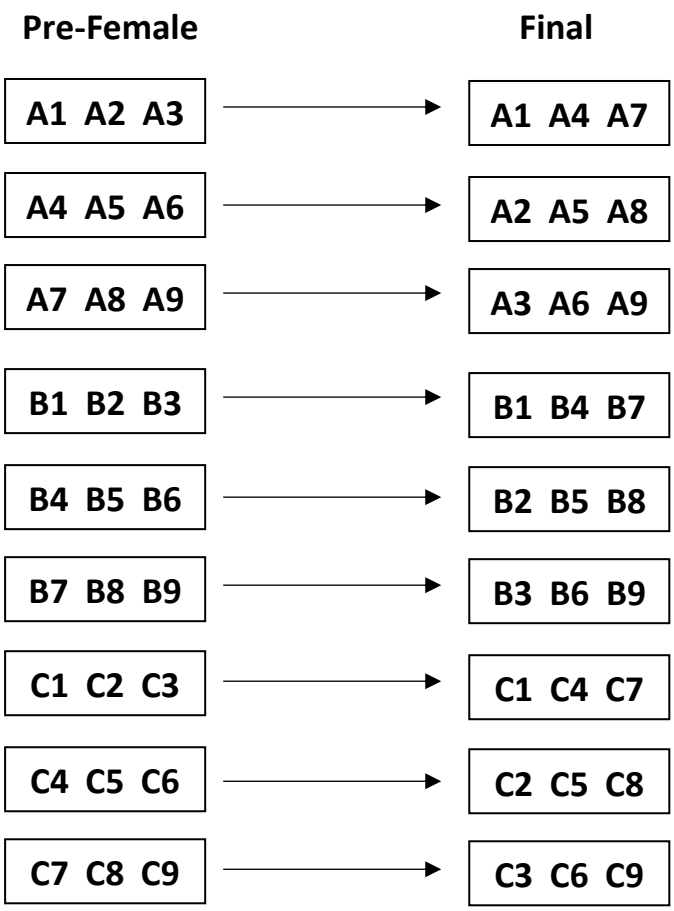
Husbandry of Stock Populations of *Callosobruchus maculatus* at the Centre for Evolutionary Biology, School of Biological Sciences, University of Western Australia

The stock populations of *Callosobruchus maculatus* maintained at the University of Western Australia (UWA) Centre for Evolutionary Biology (CEB) were originally sourced from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in 2005. They are maintained at ambient laboratory conditions (22 to 24˚C) in plastic containers, and are supplied with black-eyed beans (*Vigna unguilicata*) as a laying substrate and larval food source. Stock populations are typically composed of more than 1000 adults per generation. As population size varies depending on the amount of beans which are supplied, the size of the stock populations is increased prior to beginning experimental work by adding more beans. Every four to six weeks, each stock population is "refreshed." This process involves adding approximately 500 new beans in a small plastic container to each stock population. After one week, during which adult females lay eggs on these fresh beans, the new beans are removed to a separate plastic container and the old beans are disposed of by freezing. The new beans then compose the next generation of the stock population.

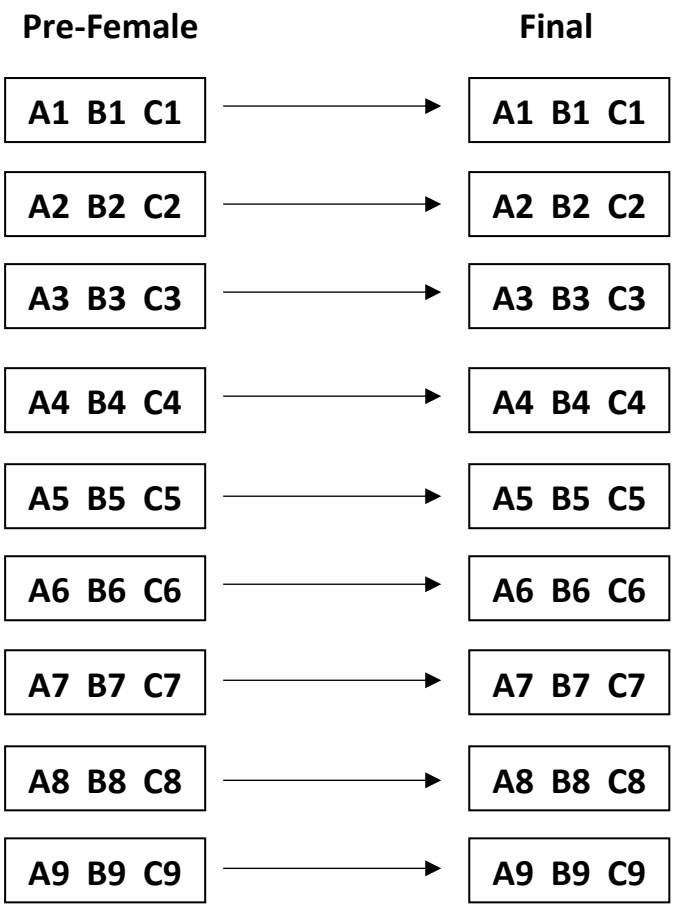
Supplementary Figures: Treatment Formation and Non-Independence among Groups



Supplementary Figure 1: Schematic of group formation in the Related/Familiar treatment. Each letter represents a family, and each number represents an individual. A1 to A9 are therefore nine full siblings from the A family, and likewise for B1 to B9 and C1 to C9. Each group of three individuals contained in a square represents a group of males in the 24 hours before a female was introduced (Pre Female) and for the remainder of the experiment after a female was introduced (Final). For this treatment, groups are identical before and after the introduction of a female. Although non-independence among groups is therefore potentially high, we are able to exactly specify this non-independence using a random "Family ID" effect (i.e. all groups with A individuals would receive the same Family ID, and likewise for B and C).

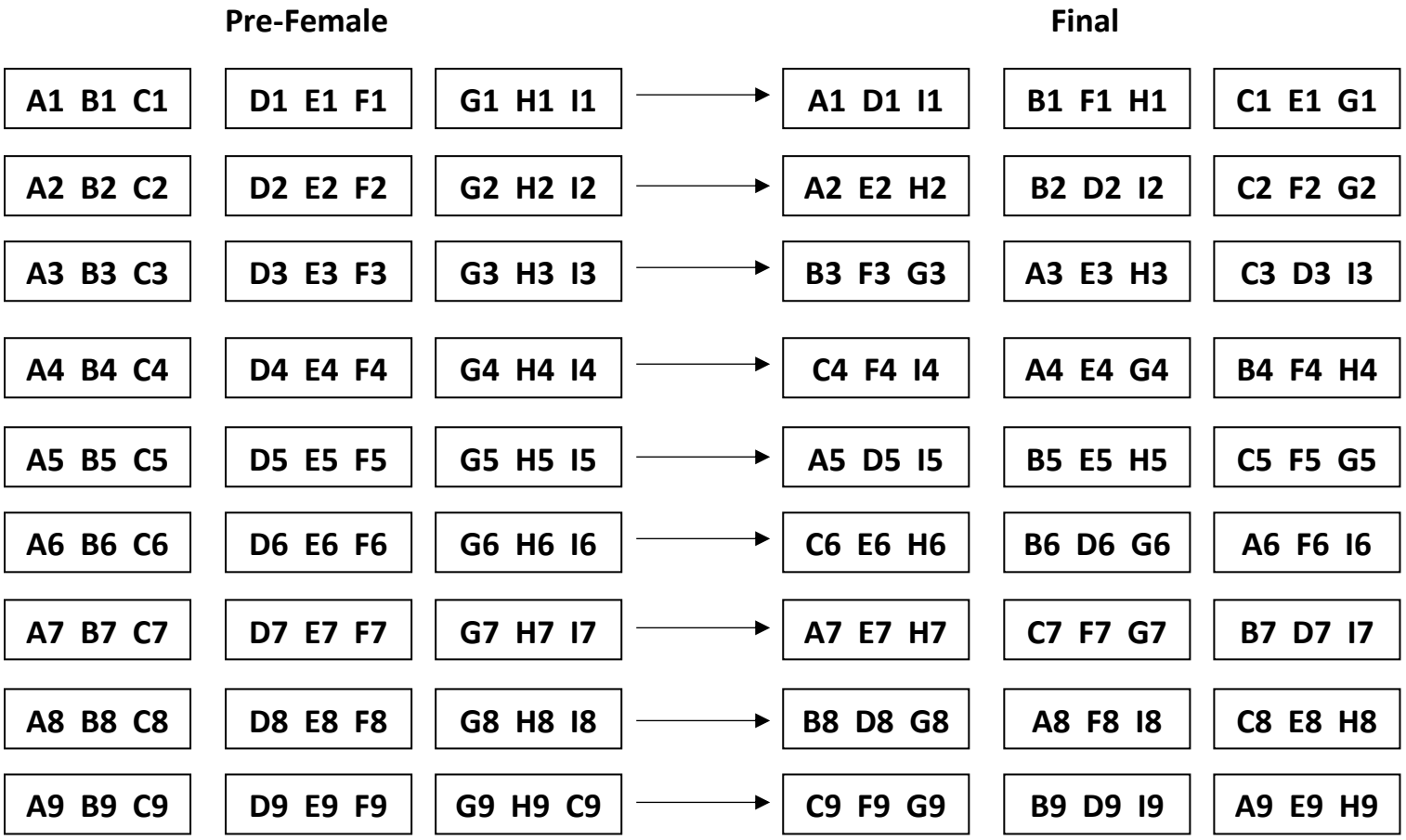


Supplementary Figure 2: Schematic of group formation in the Related/Unfamiliar treatment. Each letter represents a family, and each number represents an individual. A1 to A9 are therefore nine full siblings from the A family, and likewise for B1 to B9 and C1 to C9. Each group of three individuals contained in a square represents a group of males in the 24 hours before a female was introduced (Pre Female) and for the remainder of the experiment after a female was introduced (Final). For this treatment, groups change from before to after the introduction of a female, but all individuals remain with other individuals from the same family. Once again, therefore, non-independence among groups is potentially high but can be exactly specified.



Supplementary Figure 3: Schematic of group formation in the Unrelated/Familiar treatment. Each letter represents a family, and each number represents an individual. A1 to A9 are therefore nine full siblings from the A family, and likewise for B1 to B9 and C1 to C9. Each group of three individuals contained in a square represents a group of males in the 24 hours before a female was introduced (Pre Female) and for the remainder of the experiment after a female was introduced (Final). Although no pair of groups share six full siblings, non-independence is still potentially significant since each individual in a pair of groups can have one full sibling in the other group in the pair. Because groups are identical before and after the introduction of a female, we can still specify the family effect by assigning each group a Family ID (note that the assumed relationships among groups would be identical whether this Family ID was based on the "first," "second," or "third" male in

each group). This specification, however, is not quite consistent with that for the Related/Familiar and Related/Unfamiliar treatments. The group A1/B1/C1 is non-independent from the group A2/B2/C2, but the degree of non-independence should not be as high as that between groups A1/A2/A3 and A4/A5/A6.



Supplementary Figure 4: Schematic of group formation in the Unrelated/Unfamiliar treatment. Each letter represents a family, and each number represents an individual. A1 to A9 are therefore nine full siblings from the A family, and likewise for B1 to B9, C1 to C9, D1 to D9 etc. Each group of three individuals contained in a square represents a group of males in the 24 hours before a female was introduced (Pre-Female) and for the remainder of the experiment after a female was introduced (Final). In this schematic, you can see that each group in the Final section contains one random individual from each column of groups in the Pre-Female section. Because of this mixing process, Final groups can have varying levels of average relatedness. For example, all individuals in the group A1/D1/I1 (row one, column one) have one full sibling each in the group A5/D5/I5 (row five, column one). On the other hand, only one individual in the group A1/D1/I1 has a full sibling in the group A7/E7/H7

(row seven, column one). This treatment therefore has, on average, the lowest degree of potential non-independence among groups. On the other hand, because of the mixing process and the difficulty of identifying individual males after they have been grouped, the non-independence in this treatment (which strictly speaking is not zero) cannot be exactly specified.