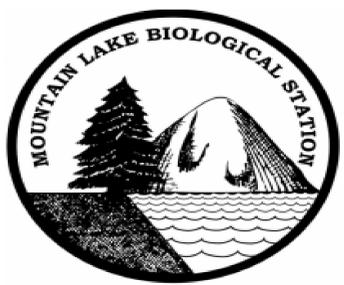




Evidence of social niche construction in *Bolitotherus cornutus*



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Introduction

- Social niche construction describes a phenomenon that occurs when an organism actively alters its social environment to better the condition of its present social niche¹
- The clustering coefficient of a forked fungus beetle (*Bolitotherus cornutus*) has been shown to negatively covary with its fitness²
- Social network metrics are mathematical descriptions of an individual's location in a social network
- Strength, and betweenness are network metrics that are measure of centrality within a social network. Clustering coefficient is a measure of cliquishness.

Questions

- Do forked fungus beetles that change their social network position have higher fitness?
- Is there sufficient evidence to show that social niche construction occurs among wild beetle populations?

Methodology

- Network data from two large populations was split into two halves of the field season from July to August
- Three network metrics were included- strength, betweenness, and clustering coefficient
- Analysis was run separately for the sexes
- Network data was calculated from a joint sex network and all network data was standardized at T_1 and T_2 before the change was calculated ($T_2 - T_1$)
- Fitness was measured using sex-specific data. Number of times guarding was observed was used for males. Number of times laying was observed was used for females.
- A generalized linear model was used in conjunction with a Poisson distribution

Results

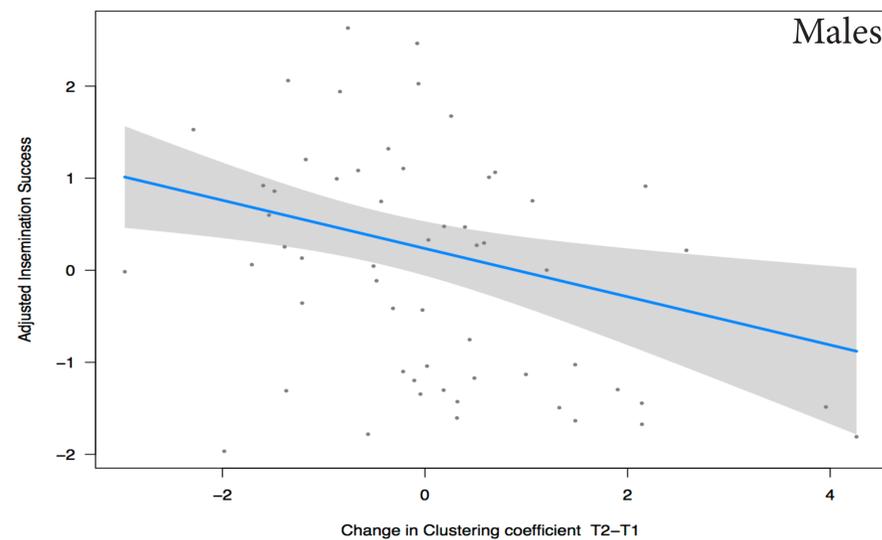


Figure 1. Fitness effects of a change in clustering coefficient from July to August ($p = 0.0033$).

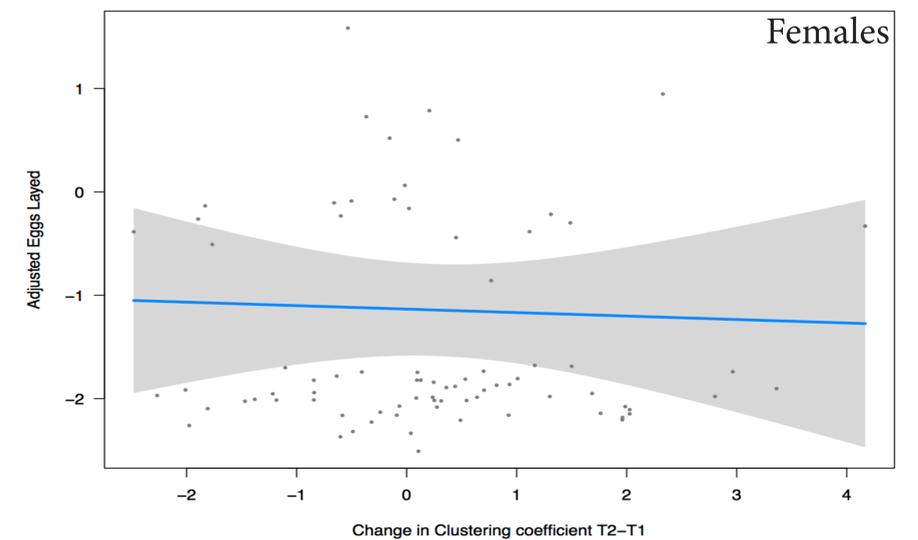
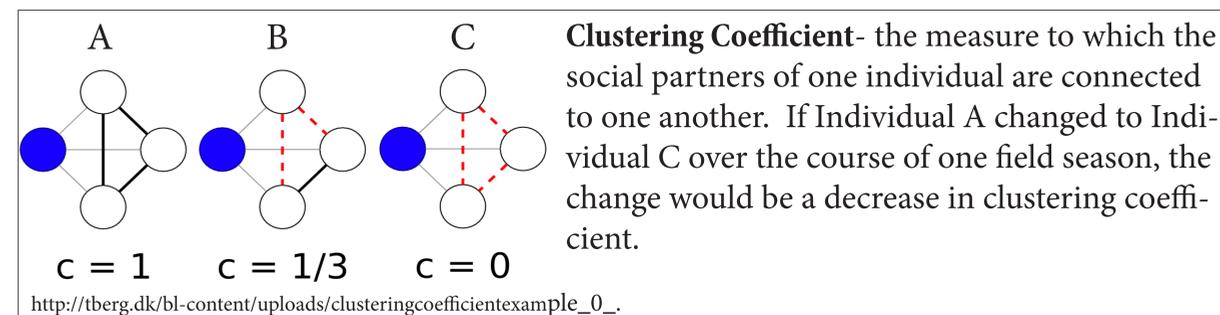


Figure 2. No fitness effects of a change in clustering coefficient from July to August ($p = 0.7719$).



Males				Females			
	Clustering Coefficient				Clustering Coefficient		
	LR Chisq	Df	P-Value		LR Chisq	Df	P-Value
Elytra Size (mm)	8.455	1	0.004	Elytra Size (mm)	2.796	1	0.095
Population	1.071	1	0.301	Population	4.036	1	0.045
Change in network metric	8.231	1	0.004	Change in network metric	0.840	1	0.840

Conclusions

- Individuals that became less “cliquish” (a decrease in clustering coefficient) had higher fitness in August
- Changes in strength and betweenness were not found to significantly covary with individual fitness among males and females (Data not shown)

Acknowledgements

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Citations

¹Formica 2012. Fitness consequences of social network position in a wild population of forked fungus beetles. *Journal of Evolutionary Biology*. 25(130-137)

²Saltz 2015. What, if anything, is a social niche? *Evolutionary Ecology*. 30(349-364)