



Epigenetic consequences of poor parenting can be partially ameliorated by environmental enrichment in a rat model

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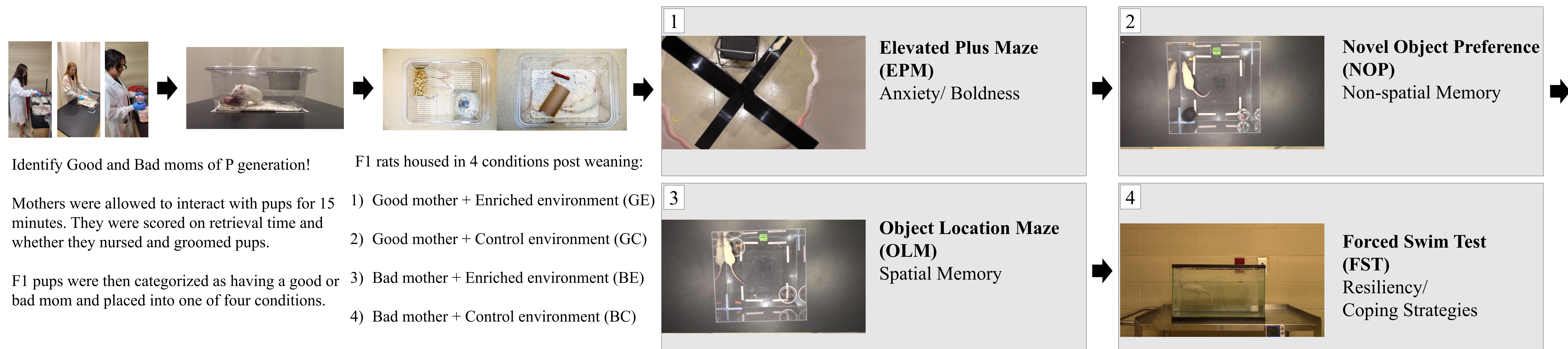
Background

1. For both humans and rodents, we know that a difficult childhood can have negative neurological and psychological consequences.¹
2. Additionally, there is a robust literature detailing the epigenetic heritability of maternal behavior.^{2,3}
 - Good moms raise *relaxed* pups that become Good moms & bad moms raise *anxious* pups that become Bad moms
3. Anxiety has been shown to negatively affect learning and memory in rats⁴; therefore, bad maternal behavior can result in transgenerational anxiety in a rat model.
4. There is potential good news: enriching the developmental environment has been demonstrated to reduce anxiety in adult rats.⁵

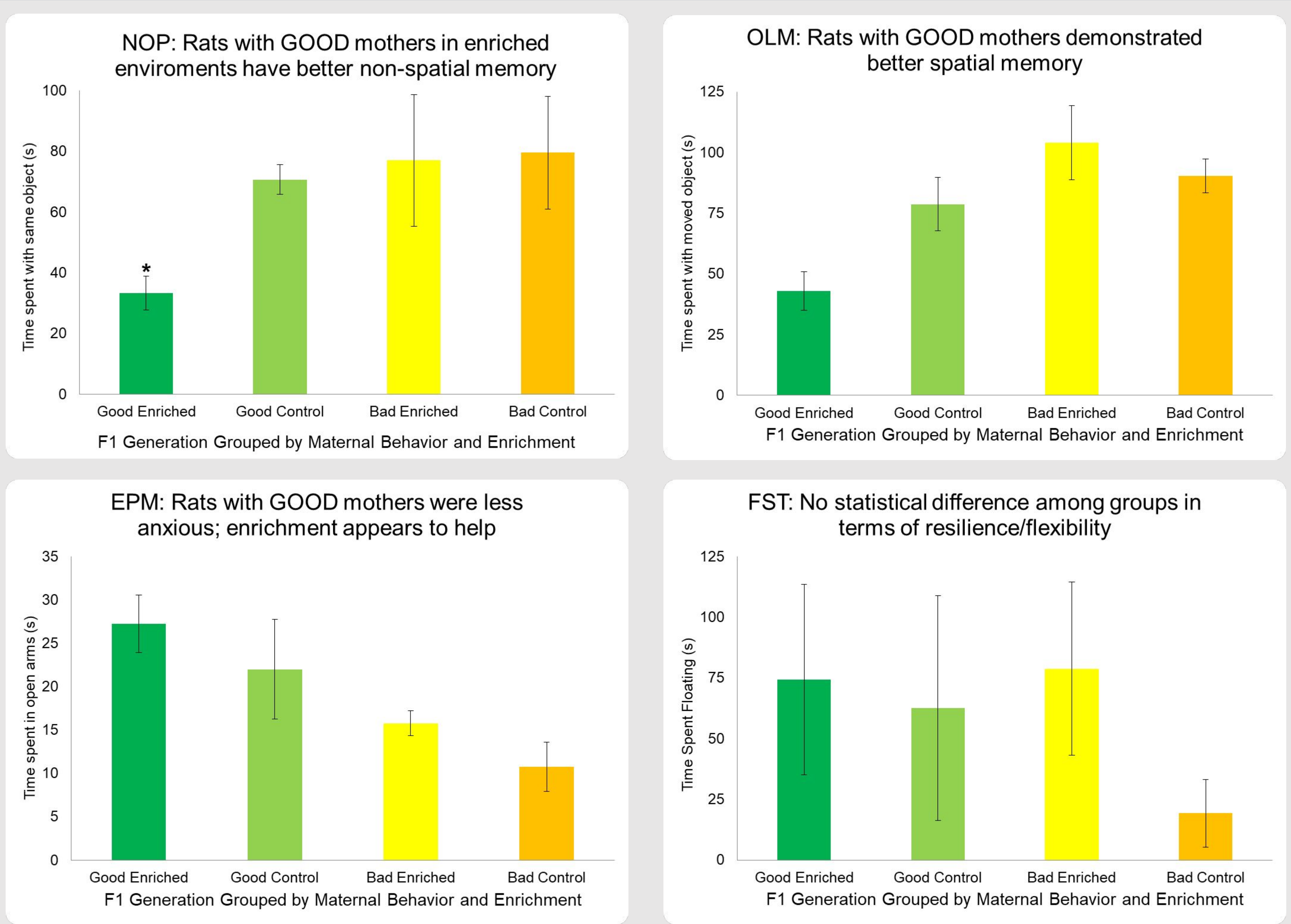
Research Questions/Hypotheses

1. **In addition to anxiety, we wish to identify other potentially epigenetic, transgenerational consequences of maternal behavior.** These include, boldness, resiliency, spatial memory, and non-spatial memory.
2. We also hypothesize that **enriched environments will improve rat performance on behavioral tasks**, indicating that negative parenting can be ameliorated by developmental environment.

Methods in Brief – Scan the QR Code for More Videos and Details!



Preliminary Results



Preliminary Conclusions

NOP: No Significant difference between GC and both BC and BE; However, GE had significant evidence that suggest the rats had better non-spatial memory compared to the other groups

➤ GE = better non-spatial memory

OLM: No Significant difference between GC and both BC and BE

➤ GE = better spatial memory

EPM: GE and GC had a significant difference compared to BE and BC; However, enriched conditions were slightly less anxious than the BC

FST: All groups showed relatively the same resilience

Continuing Research

Next step: The lab is currently working on increasing statistical power by adding animals to the study.

We hope to clearly identify whether enriched environments are sufficient to rescue poor performance on behavioral tests alone or if it is necessary to also have a Good mother.

Ongoing Question: If enrichment *is* sufficient, will the effects also be epigenetic, disrupting the transgenerational consequences of Bad mothers?

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Interested in collaboration or other feedback/questions? Contact franssenra@longwood.edu