

Early-life adversity and individual differences in cognition in the European starling.

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Aim

To investigate whether, in European starlings, starting life in an adverse environment results in greater later life pessimism relative to starting life in a less adverse environment.

Introduction

Early-life adversity in humans refers to events during the first five years of life that are difficult, challenging, and/or stressful. These can include: parental illness and/or separation, poor child welfare, low socio-economic status, and family overcrowding (Sadowski et al., 1999).

It has been suggested that these events result in greater sensitivity to stress and put an individual at greater risk for mental illnesses related to stress, such as depression, in later life (Post, 1992).

A criticism of studies in this area is their post hoc logic. Just because early-life adversity predates adult mental illness does not mean that it causes it.

This study attempted to remedy this by causing early-life adversity, by natal nest overcrowding, in a model animal species, the European starling, to see if this is sufficient to cause an increase in an animal measure of pessimism; a known risk factor for depression (Forgeard and Seligman, 2012).

References

- Sadowski, H., Ugarte, B., Kolvin, I., Kaplan, C., and Barnes, J. (1999). Early life family disadvantage and major depression. *The British Journal of Psychiatry*, 174, 112-120.
- Post, R.M. (1992). Transduction of psychosocial stress into the neurobiology of recurrent affective disorder. *The American Journal of Psychiatry*, 149, 999-1010.
- Forgeard, M.J.C. and Seligman, M.E.P. (2012). Seeing the glass half full: A review of the causes and consequences of optimism. *Pratiques Psychologiques*, 18, 107-120.

Methods

Manipulation of Early Adversity

A total of 36 chicks began the study. Three days after hatching they were caught and redistributed to various nesting sites. They would then mature in a nest of two (low adversity) or seven (high adversity) members. On day 15 the chicks were caught once more and brought back to the lab.

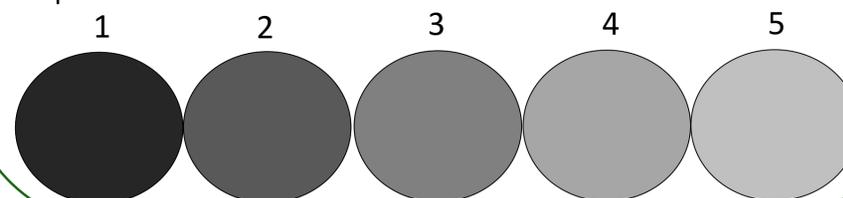


The image to the left shows two chicks having measurements of wing, beak, and leg length taken as indicators of general health shortly after being brought back to the lab.

Test for Pessimism

The birds were taught that if they flipped a light grey lid (lid 5) from the top of a small food container then they would find a mealworm reward. They were also taught that if they flipped a dark grey lid (lid 1) from the top of a container they would find a bitter quinine injected mealworm punishment. The colour assignments here were counter balanced across birds. Once they had learned this, as indicated by a significant difference in speed to attack the two lids, they were then given the test.

This test measured the response time to attack lids 1 and 5 as well as three novel lids that had colours intermediate to those previously presented (i.e. lids 2,3 and 4). A pessimist should interpret the novel lids as akin to a punishment (lid 1) and show a longer response time to them. An optimist should interpret them as akin to reward (lid 5) and should show a shorter response time to the novel stimuli.



Results

A repeated measures analysis of variance revealed no significant difference between groups at any stage of the test of pessimism. This can be seen in Figure 1.

A general linear model analysis revealed a significant difference between groups in how quickly the subjects learned that lids 1 or 5 were associated with either a reward or punishment. This can be seen in Figure 2.

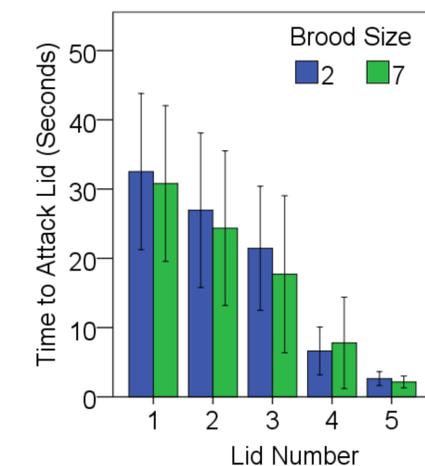


Figure 1. Mean response to attack lids 1 to 5 during the cognitive bias task for subjects raised in a brood of 2 versus a brood of seven. Error bars show 95% confidence intervals.

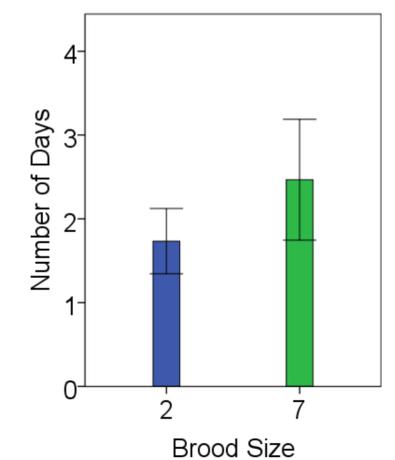


Figure 2. Mean number of days it took subjects raised in a brood of 2 versus a brood of 7 to show a significant difference in time to approach lids associated with a reward and with a punishment. Error bars show 95% confidence intervals.

Conclusion

This study found that early-life adversity in European starlings did not result in a greater degree of later-life pessimism.

However, early-life adversity was associated with slower learning. This suggests early-life adversity may influence individual differences in cognitive processes other than optimism/pessimism, such as intelligence.

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