Deceived by Chance:

Pessimism in Learning and the Adaptive Value of Conformity Under Uncertainty

Alejandro Pérez Velilla, Bret Beheim & Paul E. Smaldino

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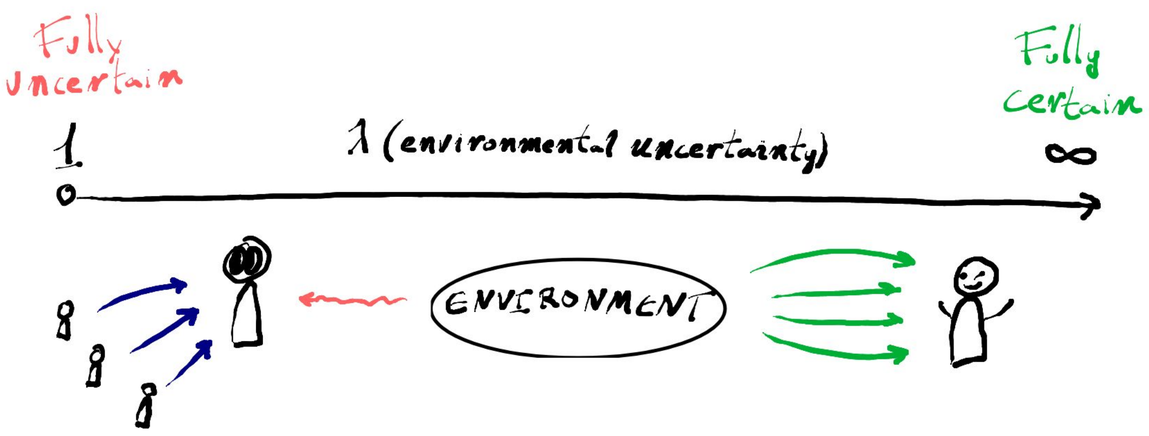
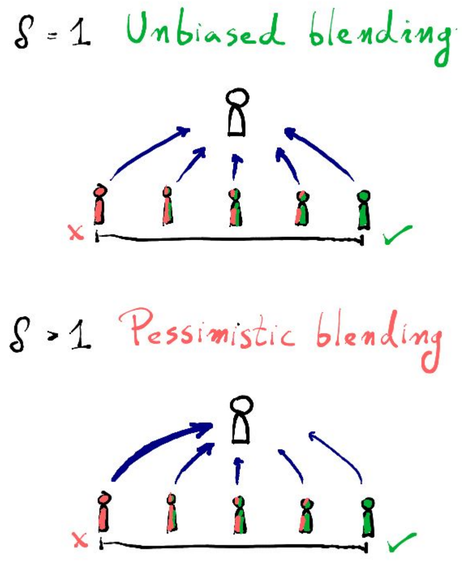
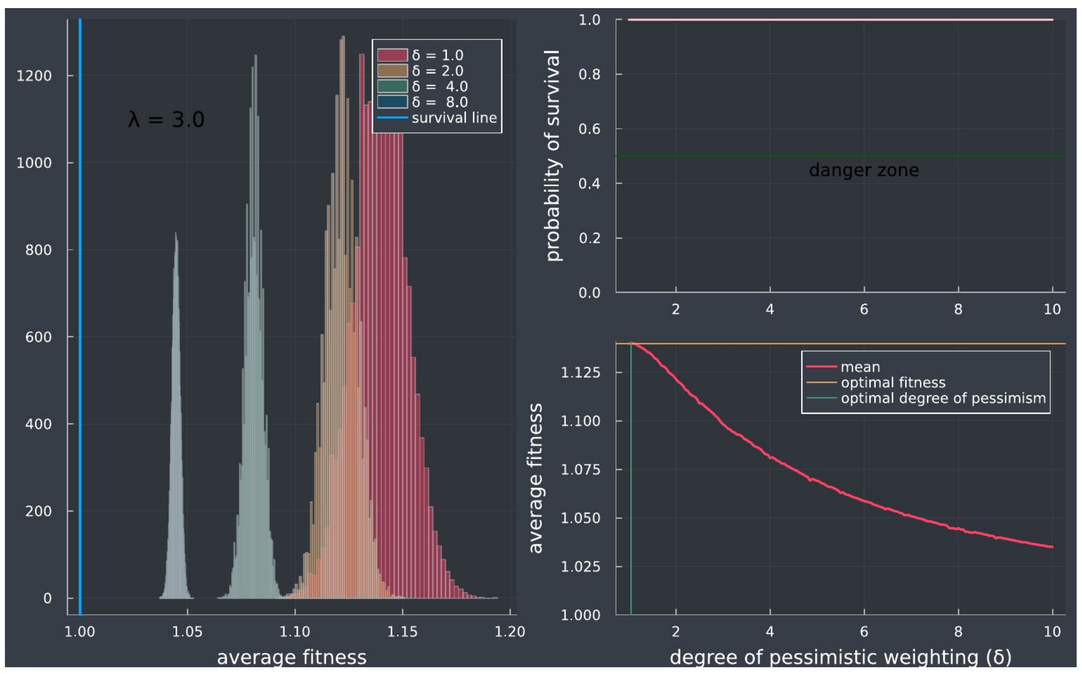


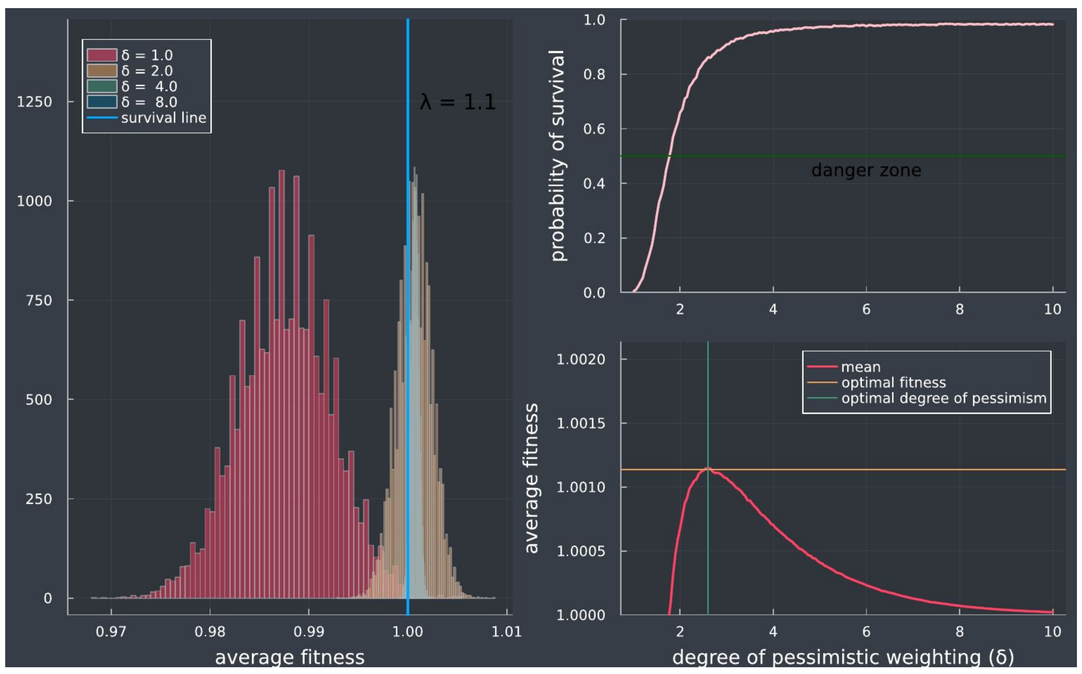
Learning involves the acquisition of adaptive information over time. In **stable** environments, individuals can learn from their surroundings easily, and **individual learning** suffices. As environments become more **uncertain** and individual learning more constrained, **social learning** can be employed to make up for constraints in individual sampling.



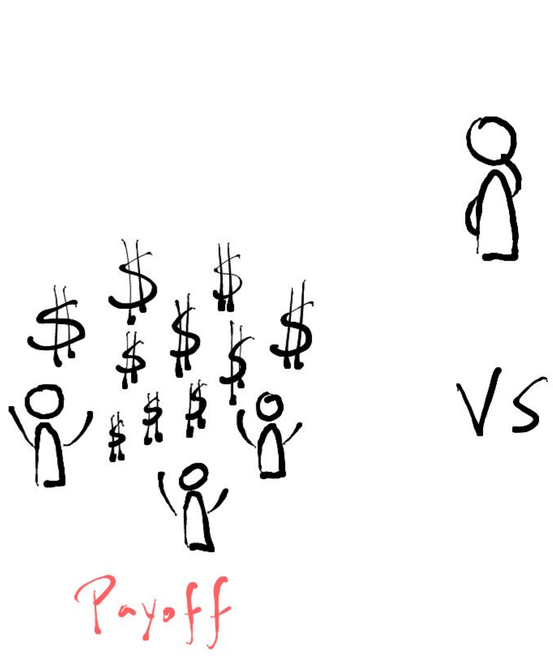
However, learning from others can be affected by **convexity** when the social information obtained from behavior over-represents successes.

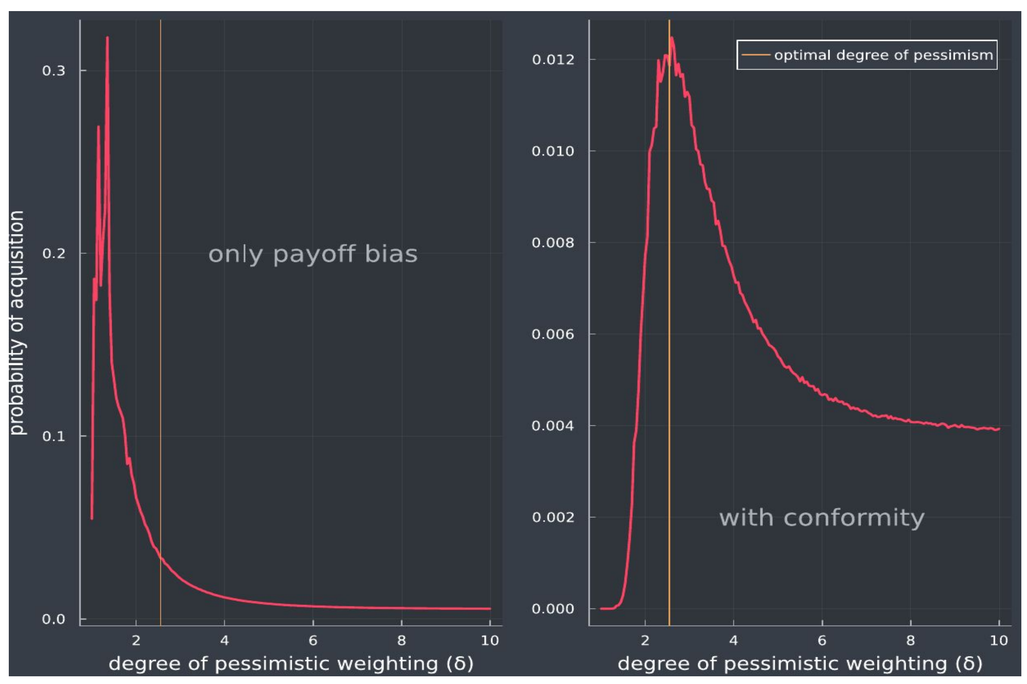
Pessimistic social transmission can help solve this problem by giving more weight to the social information that implies higher environmental risk.





When environments become more uncertain, previously safe, high-paying behavior can now lead to catastrophe. In **highly uncertain environments** pessimistic social transmission **decreases** the **risk of loss** over the lifetime. Acquiring the right degree of pessimism becomes of utmost importance for survival.





As a mechanism of behavioral inheritance, intergenerational social learning can provide the needed support for the evolution of adaptive pessimism. However, it can itself be prone to its own sources of convexity, such as **survivorship bias** in the **set of potential learning models**. In this case, **conformity** arises as a way to correct for convexity by employing information on survivor frequency, culling low frequency variants regardless of potentially high associated payoffs. Thus, we **link** the literature on **social learning strategies** in cultural evolution with that of **risk and uncertainty attitudes** in decision theory.

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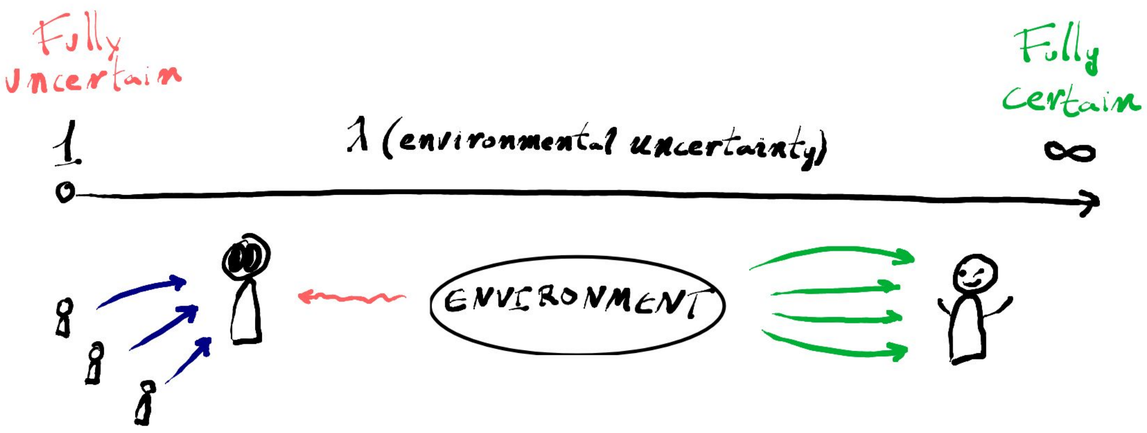

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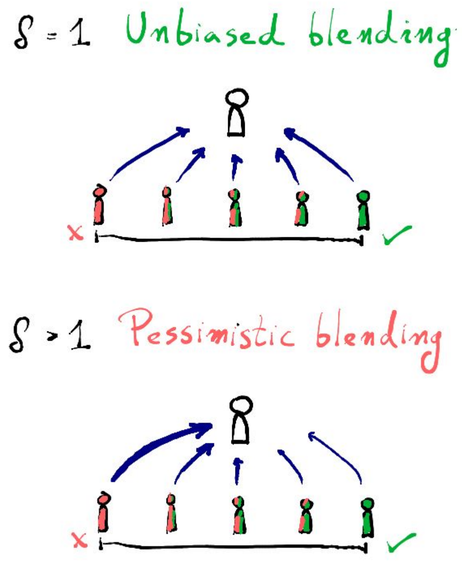

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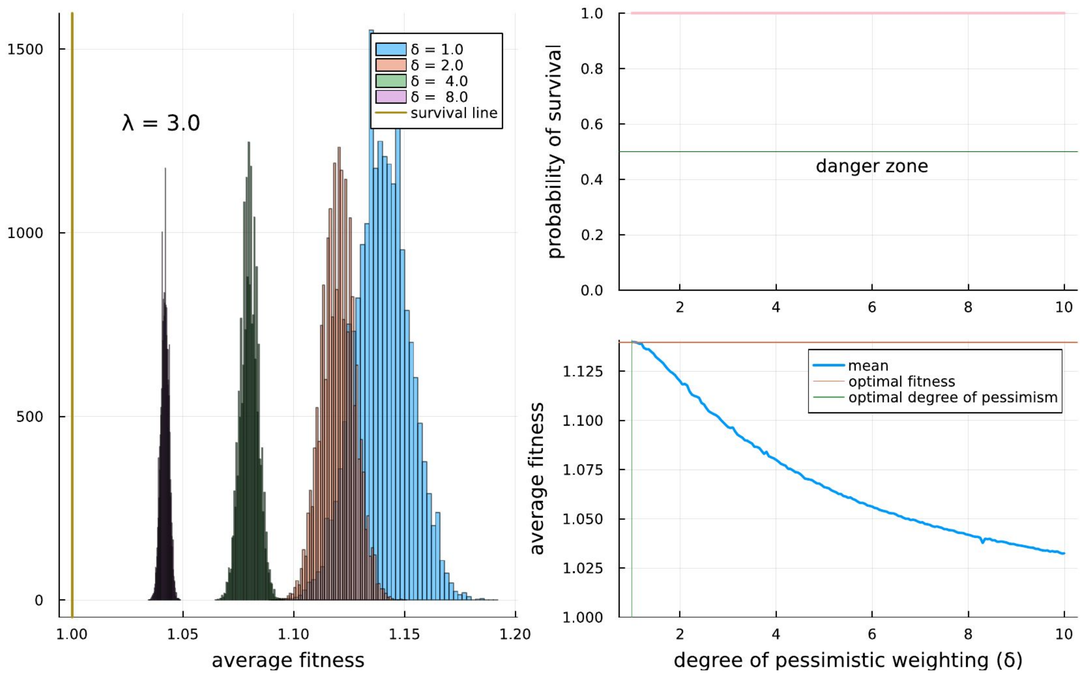

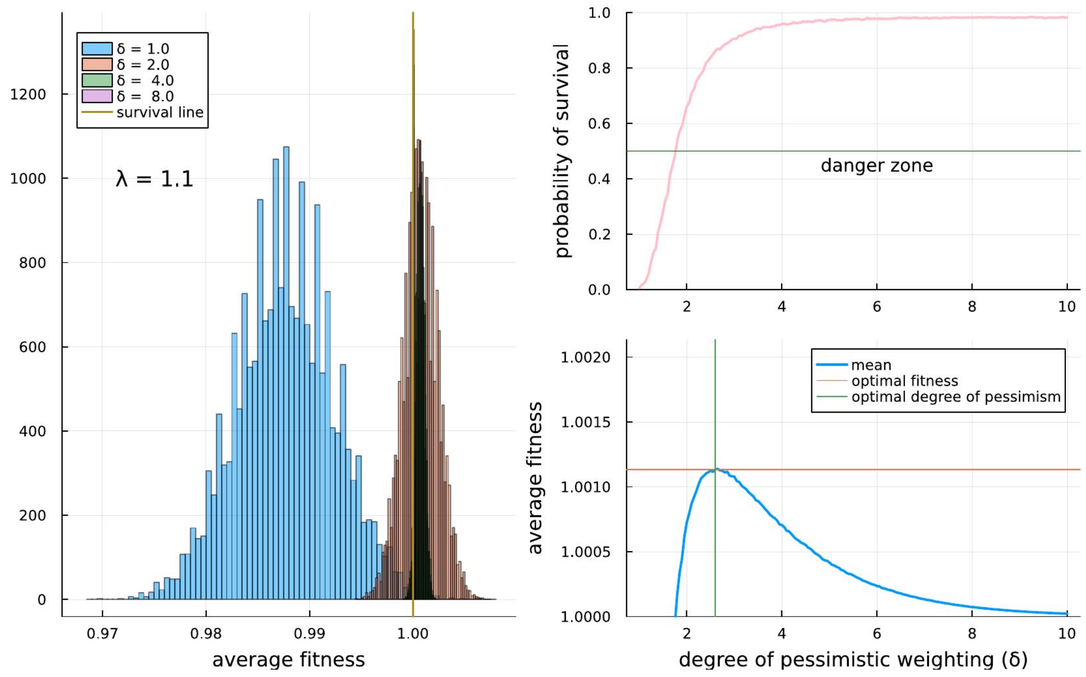

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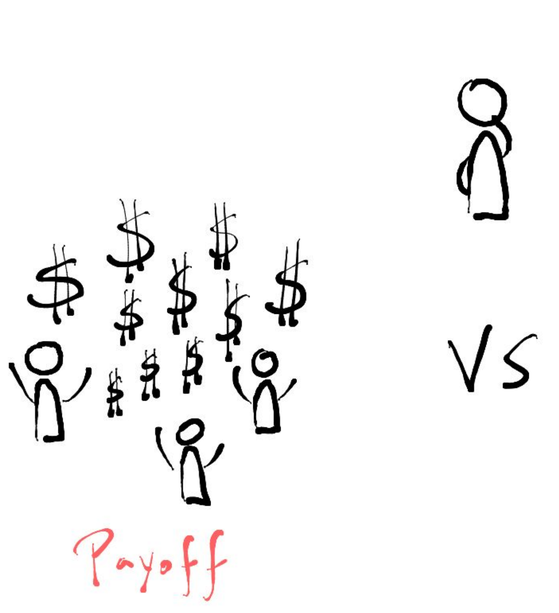

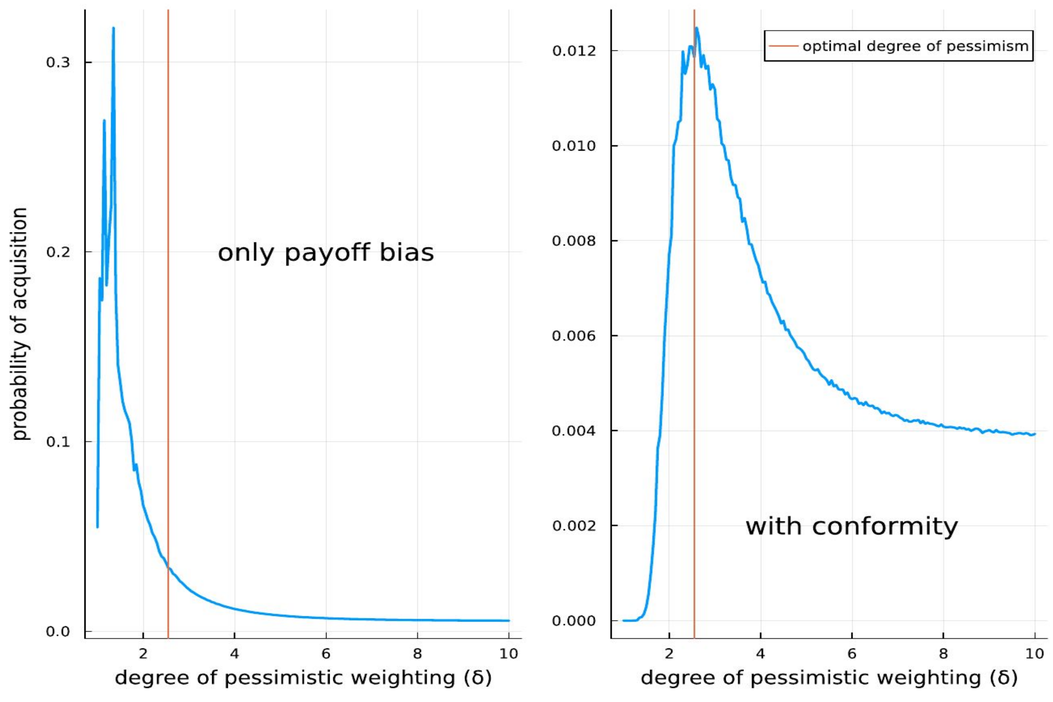

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