

# Is There Anything In Risk Besides Tendency to Exploration and High Rewards Discounting?

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It is observed that adolescents manifest different risk patterns than adults. The adolescents risk is more reward or exploration driven while adult risk is more situation driven (e.g., adults risk more than adolescents in “cold” tasks). The main goal of this experiment was to test if the differences in risk can stem from differences in environment as it is perceived by adolescents and adults. The two differences that we have examined was (a) the familiarity of the environment and (b) the degree to which someone status (reward) was dependent on their performance.

Also we assumed that the environment can influence the risk propensity indirectly by some variables that arise from the familiarity - the tendency to exploration, and from independence of the reward - the shape of the subjective utility function (from Kahneman and Tversky's prospect theory) operationalised as  $\alpha$ .

## Method

The Composite Risk Task was used to assess independently three distinct measures: risk propensity, exploration-exploitation tendency, and Kahneman-Tversky's  $\alpha$ , with one environment. The task consisted of two alternating phases, the choosing and the decision phase. In the choosing phase (top figure) the participant was to choose one of the objects in the set. In the decision phase the object was paired with another random object of comparable profitability (middle figure). In the decision phase participant could choose any of the two objects any number of time incrementing the number of points gathered in the phase. However every decision had 25% risk of losing, when all points gained in the current phase were lost and the phase ended.

## Results

Two manipulations were tested: (a) the familiarity of the environment - how much information participants had on profitability of each of the objects, and (b) the stability of the reward - did the value of the reward depended on one's performance in the task.

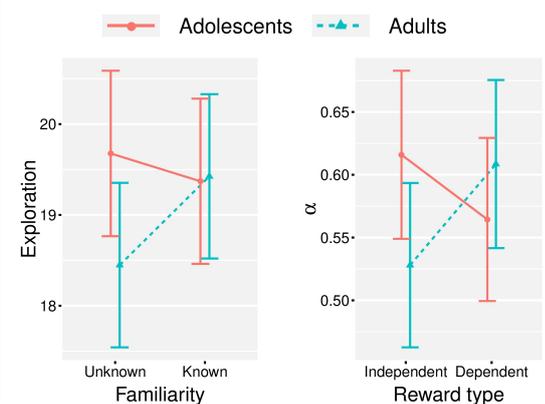
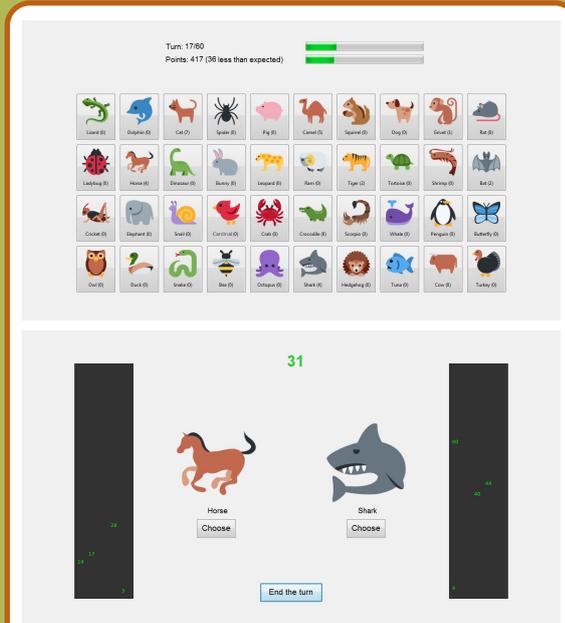
It appeared that familiarity of the environment affected the tendency to exploration differently in the adolescents and in the adults ( $p < .001$ , bottom left figure). The familiarity also had an effect on the risk propensity ( $p = .007$ ), in the known environment people risked more than in unknown one (3.62 vs 3.29). The exploration seemed to mediate part of the influence of the familiarity on the risk propensity (2%,  $p < .001$ ).

On the other hand, although we observed interaction between the reward stability and the age group ( $p = .48$ , bottom right figure) in the effect on  $\alpha$ , there was no relationship between reward stability and risk propensity.

## Conclusions

Their results show that, first, familiarity of the environment affects both tendency to exploration (in interaction with age) and risk propensity, and, second, that the tendency to exploration mediates between the familiarity of the environment and the risk propensity.

Otherwise, results do not allow for conclusion that risk is determined by volatility of one's status. The participant who were sure about their reward did not differ in risk from those who had to strive to get higher reward.



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