With Age Comes Wisdom: Age-Based Differences on Choice Dependent and Choice Independent Decision-Making Tasks

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Introduction

Older and younger adults must both regularly make numerous important decisions.

One common variable in decision-making situations is whether rewards are dependent or independent of previous choices.

Many previous studies have examined how aging affects decision-making in choice independent situations;1,2 very few have examined choice-dependent decision-making.

Several brain regions implicated in decision-making have also been shown to be susceptible to age-related deterioration.1,2

Older adults may engage a broader network of frontal regions to compensate for reduced activity in striatal-cortical networks.3

This may enhance their ability to make choice-dependent decisions relative to younger adults.

Choice-Independent

28 healthy older adults (60-84 yrs.) & 28 younger adults (18-23 yrs.) participated.

Younger adults earned significantly more points on the task.

Choice-Dependent

25 health older adults (60-82 yrs.) and 51 younger adults (18-26 yrs.) participated.

Participants had to discover the underlying choice dependent nature of the reward structure to decide whether Increasing or Decreasing option is the better choice.

Choice-Dependent

In these tasks the rewards were dependent on the number of Increasing options selected over the previous ten trials.

The Decreasing option gave a higher reward on each trial, but decreased the rewards for both options on future trials.

Increasing-Optimal Task

Repeatedly selecting the Increasing option led to a reward of 80 points; repeatedly selecting the Decreasing option led to a reward of only 40 points, despite giving a higher reward on any given trial.

Decreasing-Optimal Task

The long-term gain from selecting the increasing option is not greater than the short-term gain from selecting the decreasing option.

Discussion

These results suggest a qualitative difference in how younger and older adults make decisions.

Younger adults – better when rewards are choice-independent.

- May focus on identifying the underlying structure of the environment – decision-making is more model-free

Older adults – better when rewards are choice-dependent

- May focus on identifying the underlying structure of rewards in the environment – decision-making is model-based

Model-free – striatially-mediated

Model-based – frontally mediated

Results

Older adults selected the Increasing option more than younger adults in the Increasing-optimal task

Less than younger adults in the Decreasing-optimal task

Proportion of Increasing options were not statistically different between task for younger adults.

Older adults earned more points on both choice-dependent tasks.

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Results support the neural scaffolding theory of aging.

Older adults may recruit a broader area of frontal regions to compensate for age-related declines.

References


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