

Temporal Discounting Predicts Risk Sensitivity in Rhesus Macaques

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Supplemental Experimental Procedures

We examined individual responses of each monkey to make sure that both of them showed decreased risk seeking with longer ITIs. Figure S1 shows the behavioral data for both monkeys individually. Both monkeys individually show decreased risk seeking with increasing ITI.

We also examined changes in risk seeking over time. We first examined whether subjects changed their behavior across the blocks of ITIs. Figure S2A shows that, aside for a brief period of risk neutrality after a switch, risk seeking does not vary across these blocks. We next examined whether subjects become more risk seeking throughout the day. Figure S2B shows that risk seeking does not vary much across the day. Although there is a trend toward increased risk seeking, this effect is small and is not statistically significant. These data indicate that satiation does not greatly affect risk-seeking behavior in this experiment. Finally, we examined whether subjects change their risk-seeking behavior when the risky target is switched from the left to right side or vice versa. Figure S2C shows that subjects reliably change their behavior on the first trial after the switch occurs, and that their behavior is back to normal within three trials.

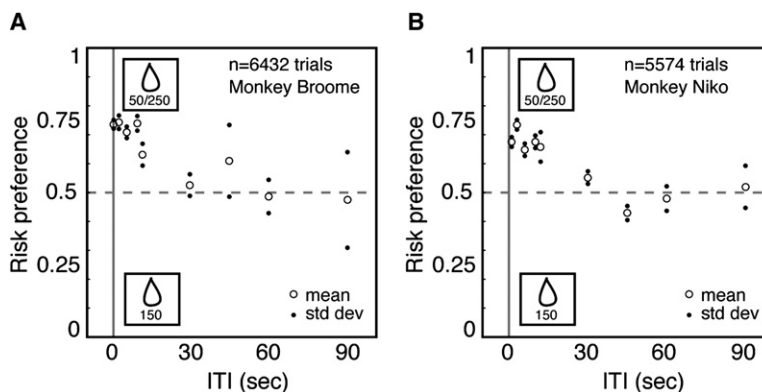


Figure S1. Increasing Time between Choices Reduces Preference for Risk in Both Monkeys Individually, Just As It Does for Both Monkeys Together

(A) Probability of choosing the risky target plotted as a function of intertrial interval (ITI) for monkey Broome. As ITI becomes longer, risk preference declines. Open circles show mean values, solid dots show one standard error above and below the mean (calculated via bootstrap). Dashed line indicates risk neutrality.

(B) Probability of choosing the risky target as a function of ITI for monkey Niko.

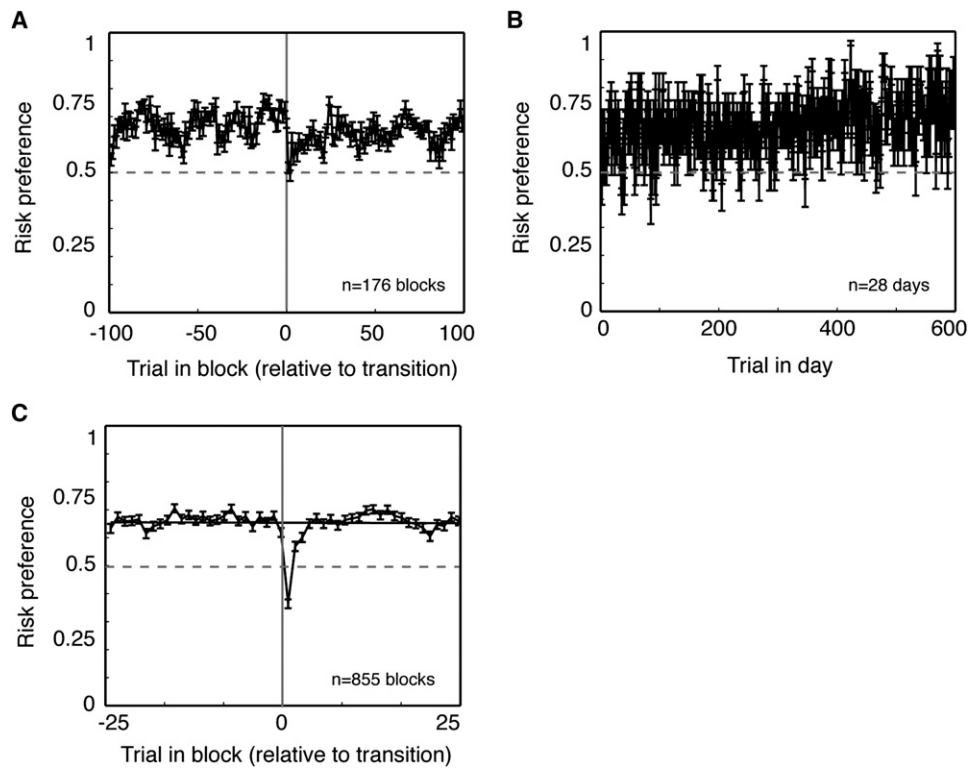


Figure S2. Performance of Monkeys across Blocks and Days

(A) Average risk preference of both monkeys across behavioral blocks of different (ITIs). All ITIs have been averaged together. Blocks were 50–200 trials long; only the first 100 trials are shown here. Across all trials, monkeys tended to be slightly risk seeking. When ITI was switched, subjects tended to become risk neutral for a few trials, and then returned to risk seeking. This figure demonstrates that, aside from the initial tendency toward risk neutrality at the block transition, choice preference does not much depend on position within block. This trend is continued out beyond the 100th trial for longer blocks (data not shown). Vertical line indicates trial of block transition. Horizontal dashed line indicates risk neutrality. Error bars indicate one standard error.

(B) Average risk preference of both monkeys across the recording session averaged across all ITIs. Monkeys did not become significantly more risk seeking or risk averse throughout the day. These data indicate that satiation does not have a significant effect on risk sensitivity. Error bars indicate one standard error. Horizontal dashed line indicates risk neutrality. Horizontal solid line indicates best-fit line.

(C) Average risk preference of both monkeys across left-right blocks. Every 25 trials, the location of the risky and safe targets were switched. Figure shows the preference aligned to switch trial. Subjects adapted their behavior to the switch by the first trial after the switch was detected and had completely adjusted by the third trial after the switch. Error bars indicate one standard error. Horizontal dashed line indicates risk neutrality. Solid line indicates best-fit line.