Psychophysical correlates of bias in decision-making

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The sensory information required to make a decision can be inferred before obtaining evidence about it. Formally, this is the probability or prior that one of the hypothesis to make a decision is true before obtaining evidence about it. How to reveal this bias and what and where are their neural correlates? To address these questions we have design a task in which the prior probability that a given response is correct depends on a visual cue.

Subjects performed in a discrimination reaction-time task in which they had to decide whether the length of a line (S2) is larger or shorter than another one showed a few milliseconds before (S1). Subjects communicate their decision by clicking one of two buttons of a computer mouse. A bias in the response is introduced by manipulating the prior probability that one of the responses is correct. The color of two circles displayed at both sides of the screen changed from block to block (64 trials/block): when the color is blue (low bias) S2 will be shorter in 75% of trials; red (large bias) S2 shorter in 25% trials; gray (neutral trials) S2 shorter in 50% trials.

Five subjects (1 male and 4 females, ages 21-24) were tested in the task, nine sessions each. Psychophysical and signal detection theory analyses suggest that this task induces and reveals the subjects' bias during decision-making. Biases related to probability and decision making significantly affect our everyday behavior. Furthermore, our task allow us to measure cognitive responses that depends on memory traces left by visual stimulus and to study the neural correlates of these processes.

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