Supplementary Material

for

Variability and accessibility of information guide gaze dynamics in decision-making

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We designed our experiment such that the differences in the generative mean, the generative variance, and the generative accessibility (probability of each sample being a number rather than letters) of the options within each trial would be orthogonal to each other. However, due to the manner in which we established the parameters for each trial, the sum and difference of variability and the sum and difference of accessibility were perfectly correlated. Nevertheless, the fact that we based on analyses on observed samples rather than generative parameters and our definition of difference to be the measure of the higher-mean-valued option minus the measure of the lower-mean-valued option should have removed such correlations. To validate that the intended orthogonality held for the observed variables that we included in our analyses, we tested for correlations across all primary decision variables (sums and differences in mean, variability,

and accessibility: sMean, dMean, sVar, dVar, sAcc, dAcc). We did not find any correlations (see Figure S1).

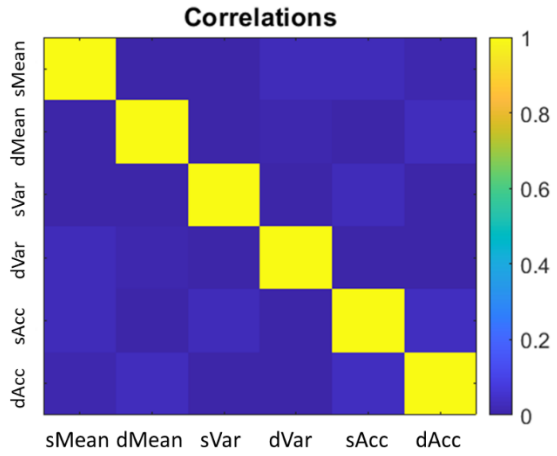

Figure S1. *Correlation of decision variables.* None of the primary decision variables correlated with each other.

When designing our experiment, we established discrete levels of mean, variability, and accessibility, which in turn resulted in pre-determined discrete levels of the sums and differences of each decision variable (sMean, dMean, sVar, dVar, sAcc, dAcc). These pre-determined levels were used to generate the samples that each participant was shown on each trial. However, our analyses were based on the actual samples that participants observed, not on the generative levels of each variable. Figure S2 summarizes the relationship between the generative levels and the observed levels of each decision variable across participants and trials.

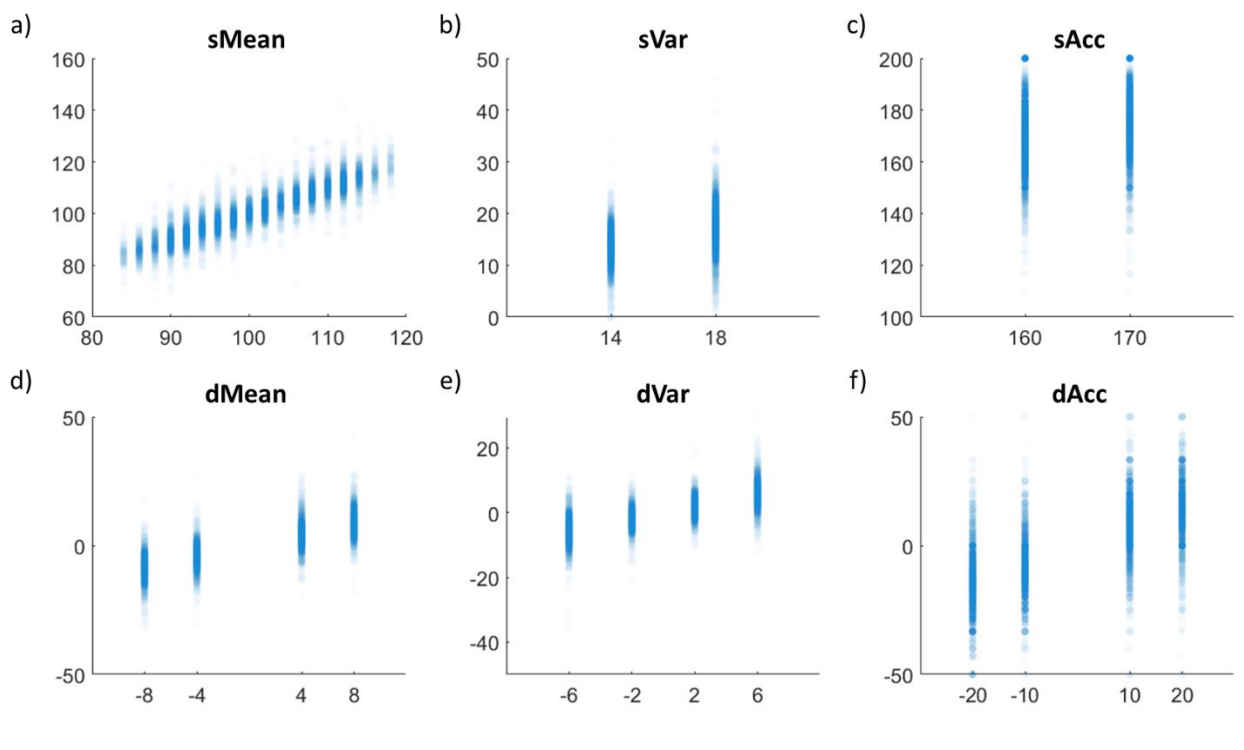

Figure S2. *Generative versus observed decision variables.* For each primary decision variable, the pre-determined discrete generative values resulted in a range of observed values across trials and participants. Each blue dot represents one trial.

Our gaze fixation location analyses relied on a simple coarse classification of left versus right. However, it could have been the case that participants frequently viewed towards the middle of the screen as they attempted to simultaneously view both options in their peripheral vision. Or perhaps participants might have gazed towards other parts of the computer screen in ways that we did not anticipate. Figure S3 shows that the momentary gaze location across all trials and participants was predominantly towards either the left or right options, with a high degree of precision. Gaze was very rarely directed towards the center of the screen (this typically occurred only at the beginning of each trial).

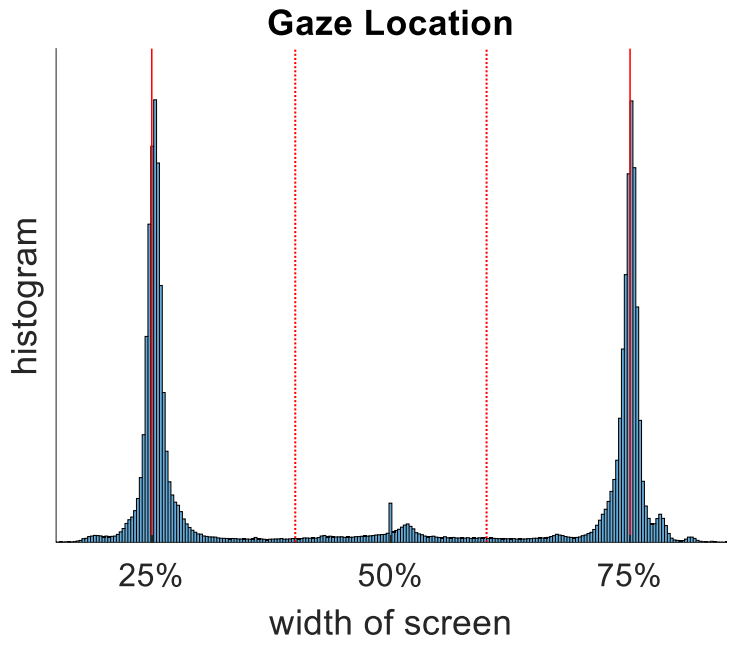

Figure S3. *Gaze location distribution.* Across all trials and participants, gaze location was almost always directed toward the choice options (either left or right) and only rarely toward the center (mostly at the beginning of each trial). Solid red lines indicate the exact center of each stimulus. Dotted red lines indicate the frontiers by which we defined whether a gaze was directed toward the left, center, or right side of the screen.

Test for significance of changes in regression weights for gaze across time bins

In the main text, we showed that the drivers of gaze allocation might be dynamic in the sense that they seemed to develop across decision time (see Figure 3b). As a reminder, we divided the data into quarters based on time from stimulus onset until eventual response (within each trial for each participant). We regressed dGaze during the first quarter of each trial on the same regressors as before (dMean, dVar, dAccess) except now calculated using only the samples that the participants observed during the first quarter of each trial. We then regressed dGaze during the second, third, and fourth quarters of each trial (Q1-4) on dMean, dVar, and dAccess, now

calculated according to all samples that participants observed through that time interval (i.e., Q2 included samples from Q1-2, Q3 included samples from Q1-3, Q4 included samples from Q1-4). The values of dGaze for each quarter were calculated in a similar manner. We found that at the beginning of trials, participants gazed more at more uncertain options and less at more accessible options. We found that at the end of trials, participants gazed more at the higher-valued option as well as the lower-accessibility option. This differentiation between early and late effects seems to have arisen across time, as demonstrated by the gradual change in regression coefficients from Q1-4 (see Figure 3b). To test whether these changes were statistically significant, we combined the design matrices and outcome vectors from all of the separate regressions (for each time bin) into one expanded design matrix and one expanded outcome vector. In this expanded model, we also included the following indicator variables: "includes Q2" for the data from quarters 2-4, "includes Q3" for the data from quarters 3-4, and "includes Q4" for the data from quarter 4. The regression model thus consisted of each primary regressor (mean, variability, and accessibility) plus the interactions of each primary regressor and each of the indicator variables. The main effects of variability and accessibility were significant (variability beta = 0.18, $p < .001$; accessibility beta = -0.10, $p < .001$), showing that these variables had an impact on gaze in Q1. The interaction effects for variability were all significant ("includes Q2" beta = -0.04, $p = .005$; "includes Q3" beta = -0.06, $p < .001$; "includes Q4" beta = -0.09, $p < .001$), showing that the impact of variability on gaze reliably diminished across trial time. The interaction effects for mean were not statistically significant ("includes Q2" beta = 0.01, $p = .584$; "includes Q3" beta = 0.00, $p = .799$; "includes Q4" beta = 0.01, $p = .466$).