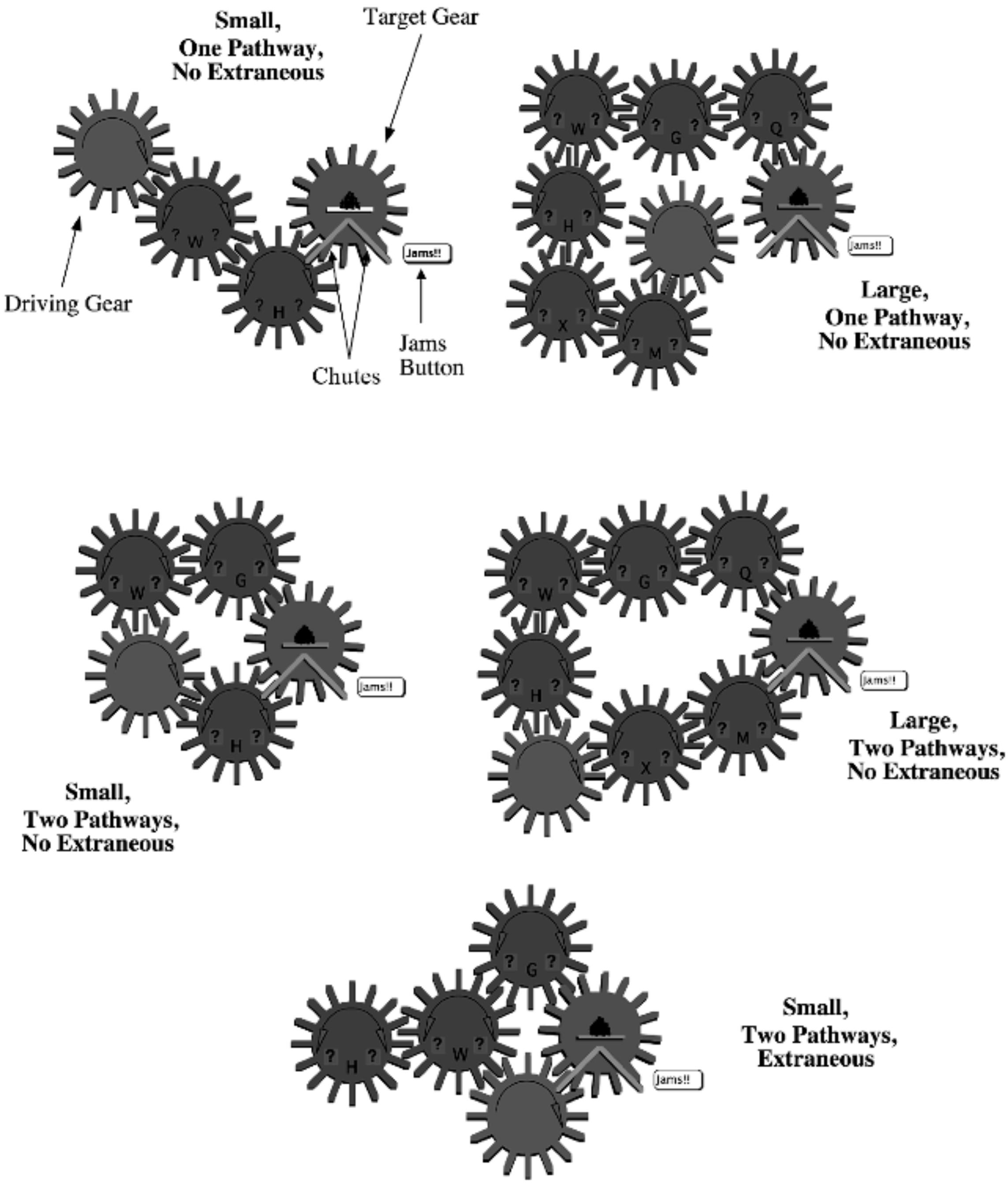

Figure 1. Examples of gear-system problems. The gear systems varied along three dimensions: size (small, 4 or 5 gears; large, 7 or 8 gears), number of pathways (one or two), and whether an extraneous gear was present. Extraneous gears were not part of the causal pathway from the driving gear to the target gear. Gear systems with two pathways had the potential to jam—to fail to turn because of opposing forces on the target gear; thus, a button labeled "Jams!!" constituted a third response option (in addition to clockwise and counterclockwise rotation).

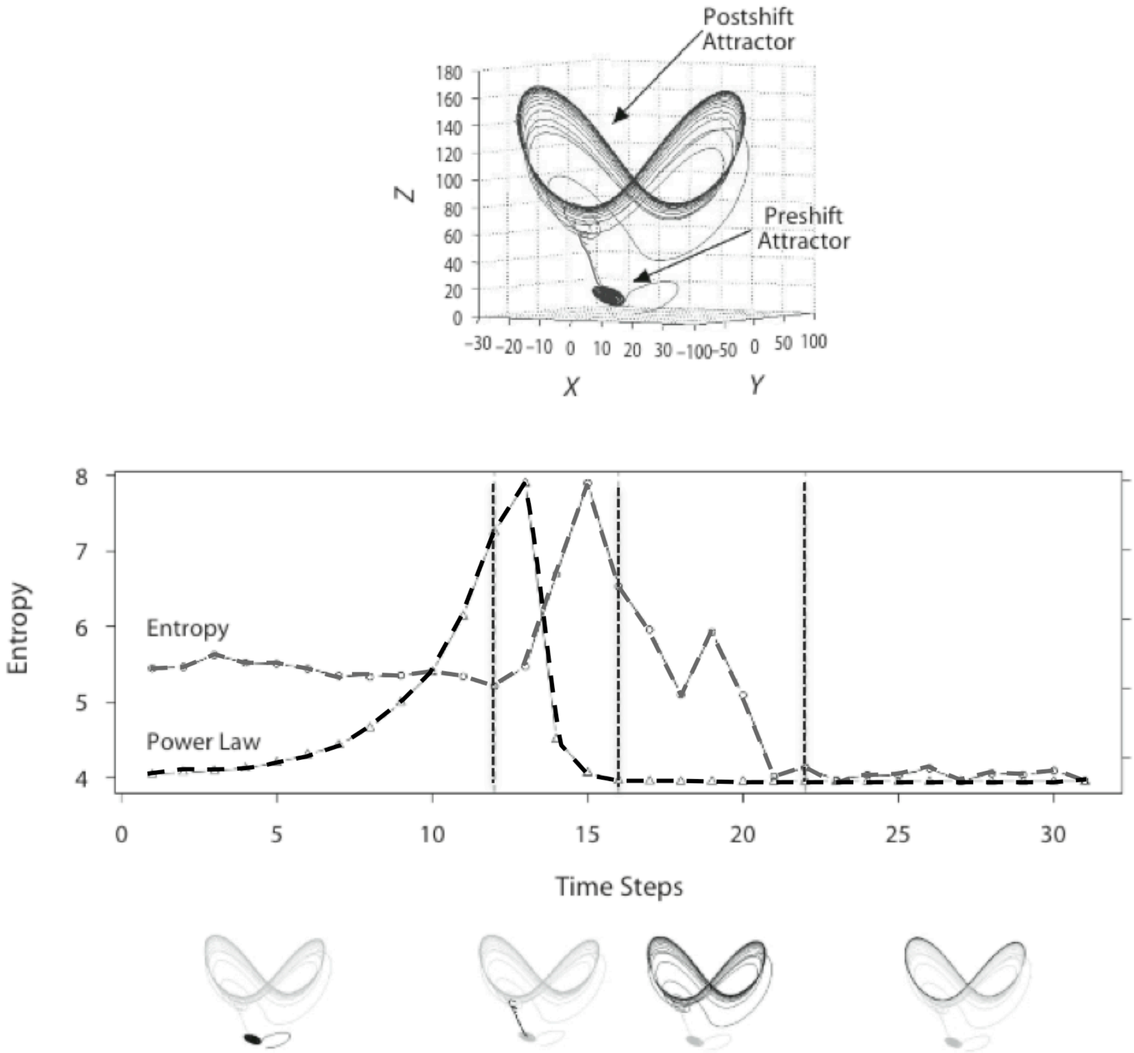

Figure 2. The top panel shows the trajectory of the Lorenz system as it undergoes a phase transition from a preshift to a postshift attractor. The middle panel shows measures of entropy and the power-law exponent over time steps as the Lorenz system approaches and goes through its phase transition. The dark gray curve shows the entropy of the phase-space trajectory over time; the light gray curve shows the power-law exponent. The panels beneath the horizontal axis show the phase-space trajectory of the Lorenz model as its control parameter is increased. The darkened region of each trajectory shows the activity of the system during the portion of the time course distinguished by the dashed vertical lines in the figure.

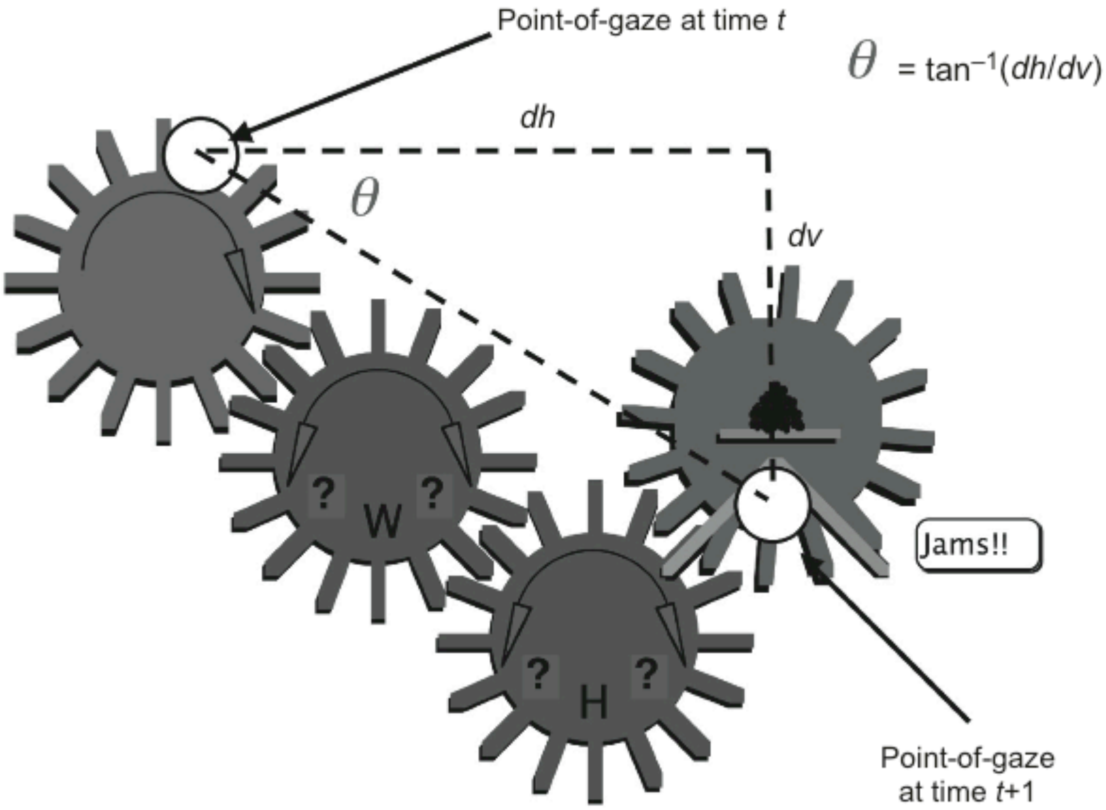

Figure 3. An example of the computation of angular change for two hypothetical, successive eye positions. Change on the *h* coordinate, *dh*, and change on the *v* coordinate, *dv*, allow the angle, θ, to be calculated.

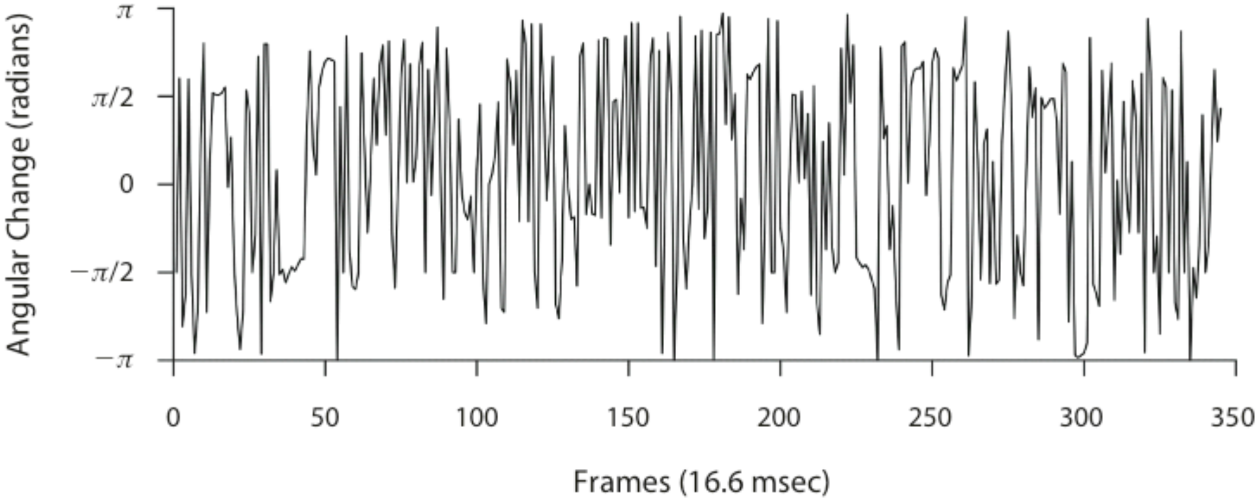

Figure 4. An example of a typical angular change time series for a single trial for a single participant. Angular change in radians is plotted as a function of time, expressed in frames; each frame was 16.6 msec.

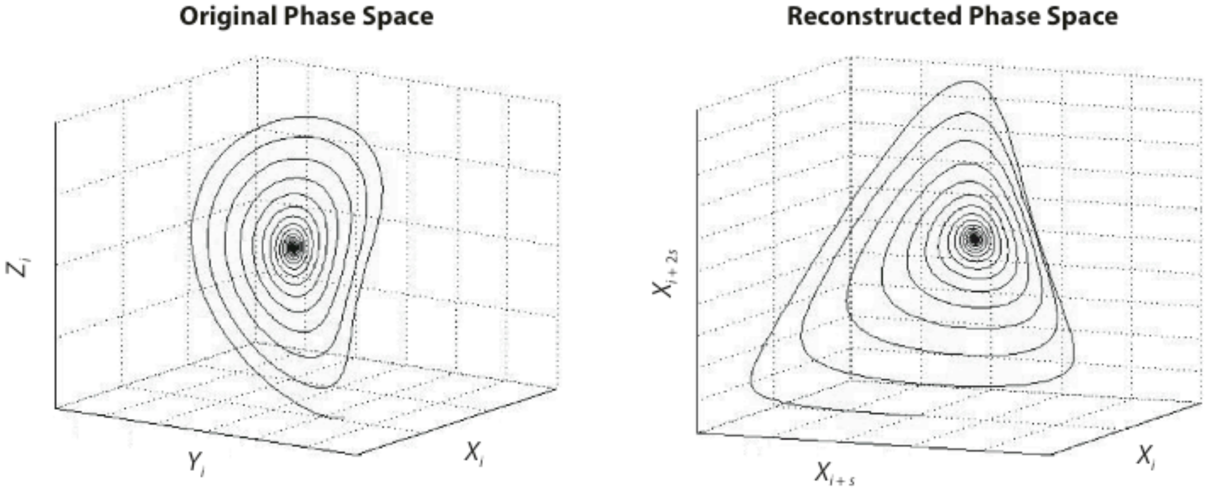

Figure 5. The panel on the left shows an example of a three-dimensional phase space for the Lorenz model. The points in the left panel (actual phase space) are given by the values of three variables: $p_i = [X_i, Y_i, Z_i]$, where i indexes time steps in the series. The panel on the right shows the reconstruction of that phase space using only the X dimension. To reconstruct phase space, the original time series of value X is lagged by s time steps ($s = 7$, in the present example) for each dimension. The points in the right panel (reconstructed phase space) are given by values of X and lagged copies of X: $p_i = [X_i, X_{i+s}, X_{i+2s}]$.

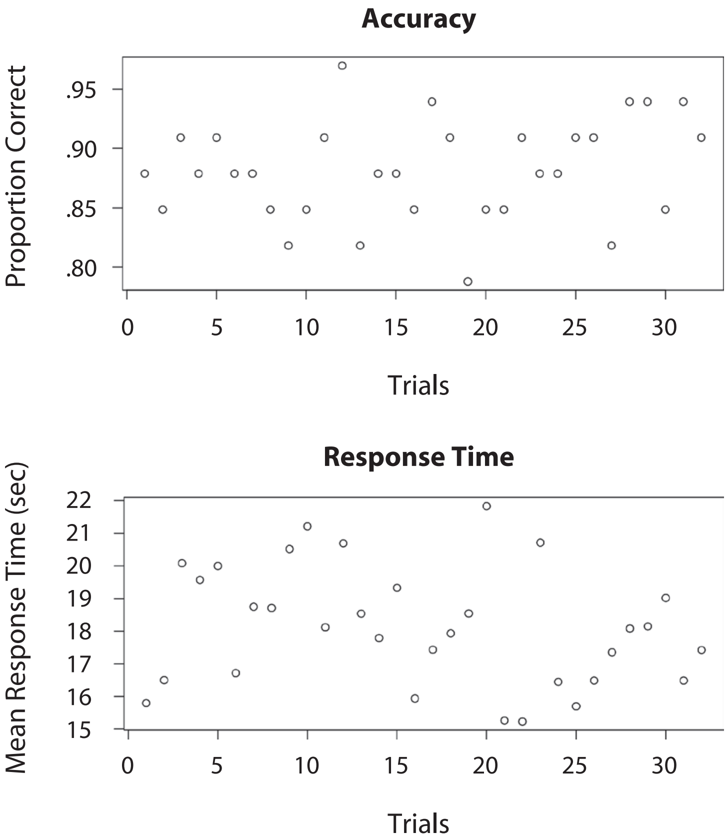

Figure 7. The top panel shows the mean proportions correct as a function of trials. The lower panel shows the mean response times as a function of trials.

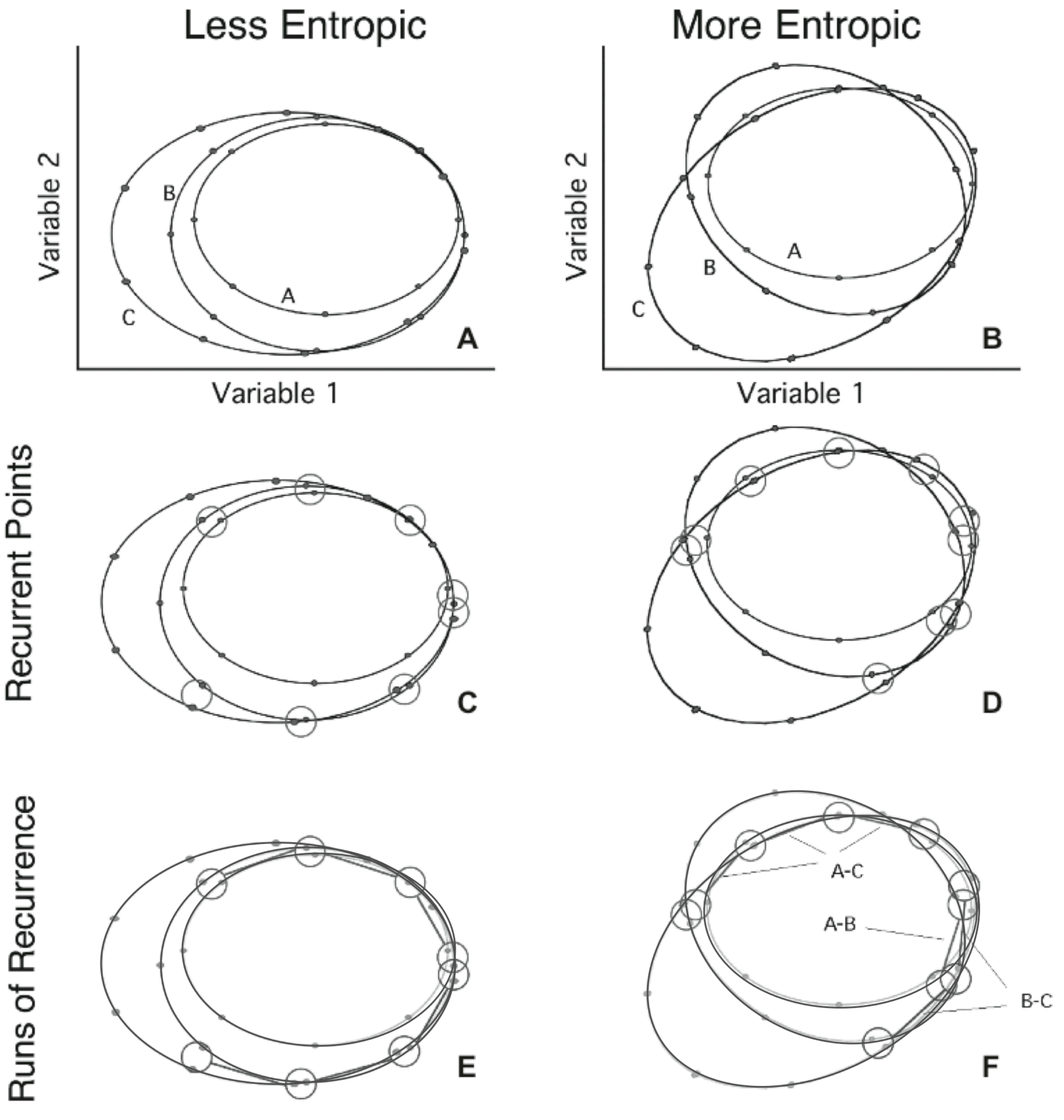

Figure 6. (A) A hypothetical trajectory projected onto a two-dimensional space. The state of the system at any moment in time is given by the values on the two variables. As the system changes, it creates trajectories through the space. The continuous behavior of the system cycles through three loops in the following order: Loop A, Loop B, Loop C, Loop A, Loop B, and so forth. The dots indicate points that were sampled during one complete circuit through the trajectory. (B) An analogous but more disordered trajectory. (C, D) The concept of recurrence. Some points in each panel fall within a specified distance of each other, as is indicated by the diameter of the circles. Each pair of points within a circle is thus considered recurrent. (E, F) Runs of recurrent points. In panel E, there are two such runs. One run, shown in the top half, consists of four recurrent pairs of points from the convergence of Loops A and B. The second run, shown in the bottom half, also consists of four recurrent pairs; here, Loops B and C are converging. Panel F also shows runs of recurrent pairs as Loops A and B are converging and as Loops B and C are converging. This trajectory also has another run of recurrent pairs as Loops A and C converge. All three runs are of different lengths; this variability is indexed by the entropy measure. Panel F also contains a recurrent pair of points that is not part of a run of recurrences: Two trajectories intersect but are not aligned for any length of time.

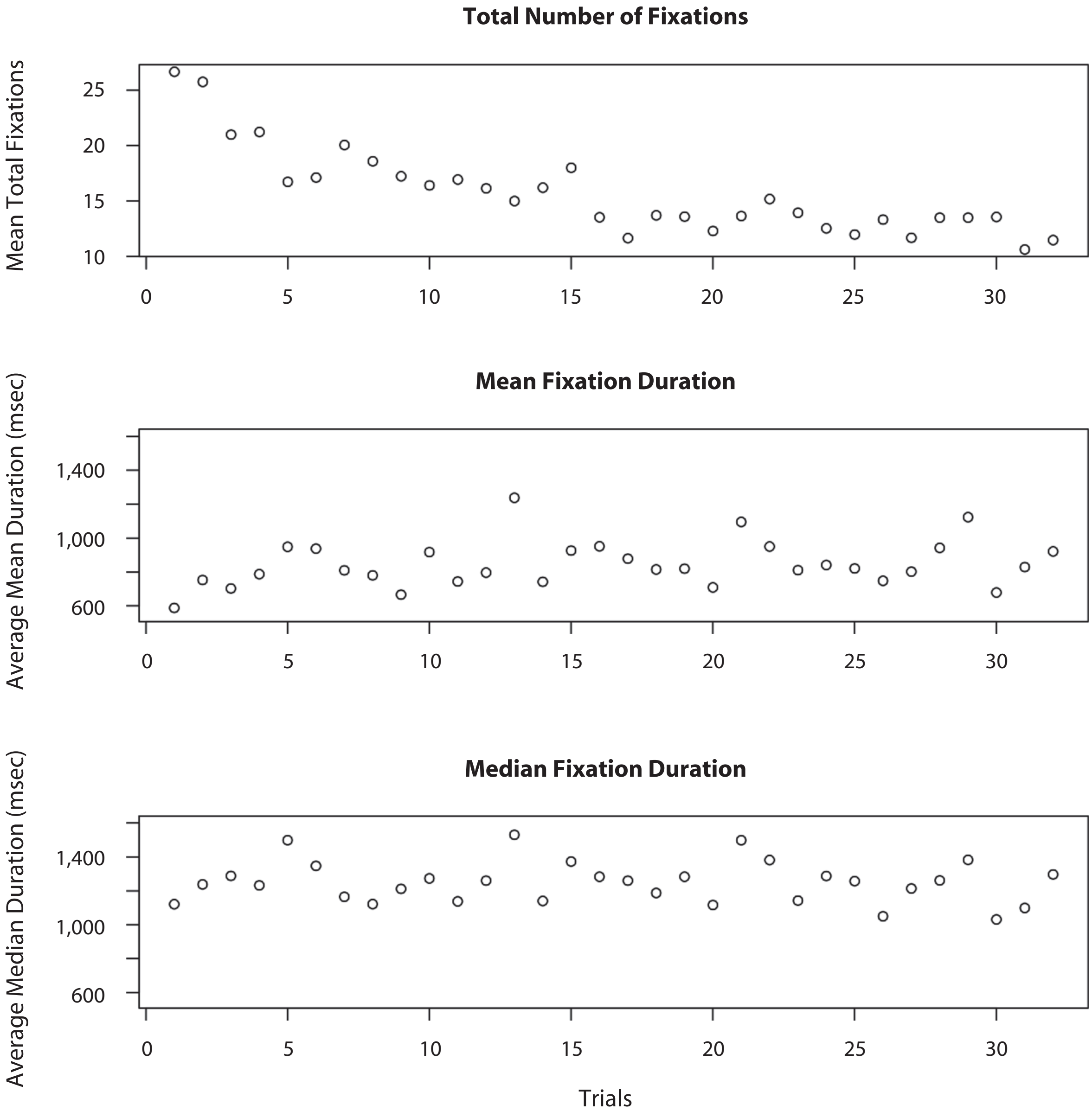

Figure 8. The top panel shows the number of fixations within each trial, averaged over participants. The middle panel shows the mean duration of fixations within each trial, averaged over participants. The bottom panel shows the median fixation duration within each trial, again averaged over participants.

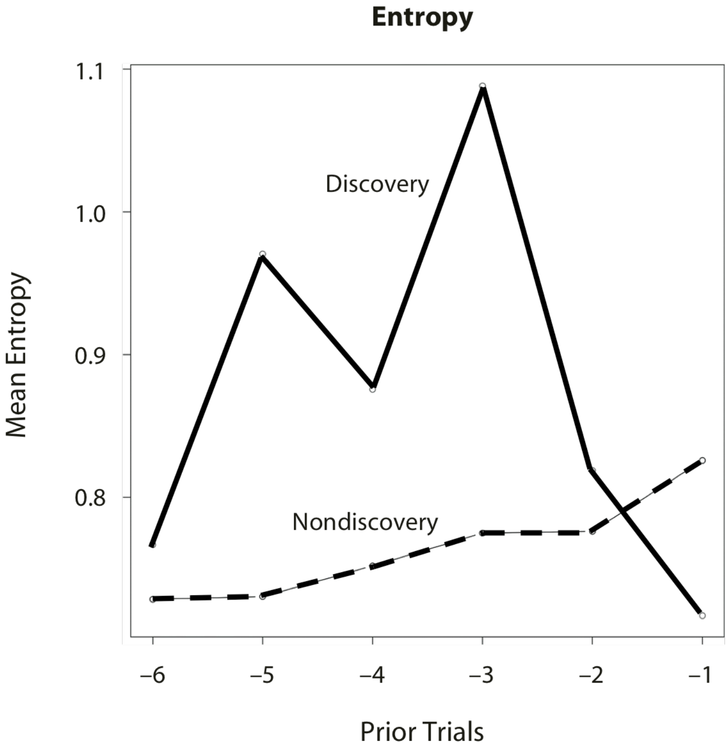

Figure 9. The peaked gray curve shows the mean entropy values on the five trials leading up to discovery (i.e., the trial on which a participant first used parity). The darker curve shows the mean entropy values on trials preceding all other trials (i.e., those on which a discovery did not occur). The trial just prior to the current target trial is labeled −1; two trials prior is labeled −2; and so on. Entropy indexes the variability in the phase-space trajectory on each trial.

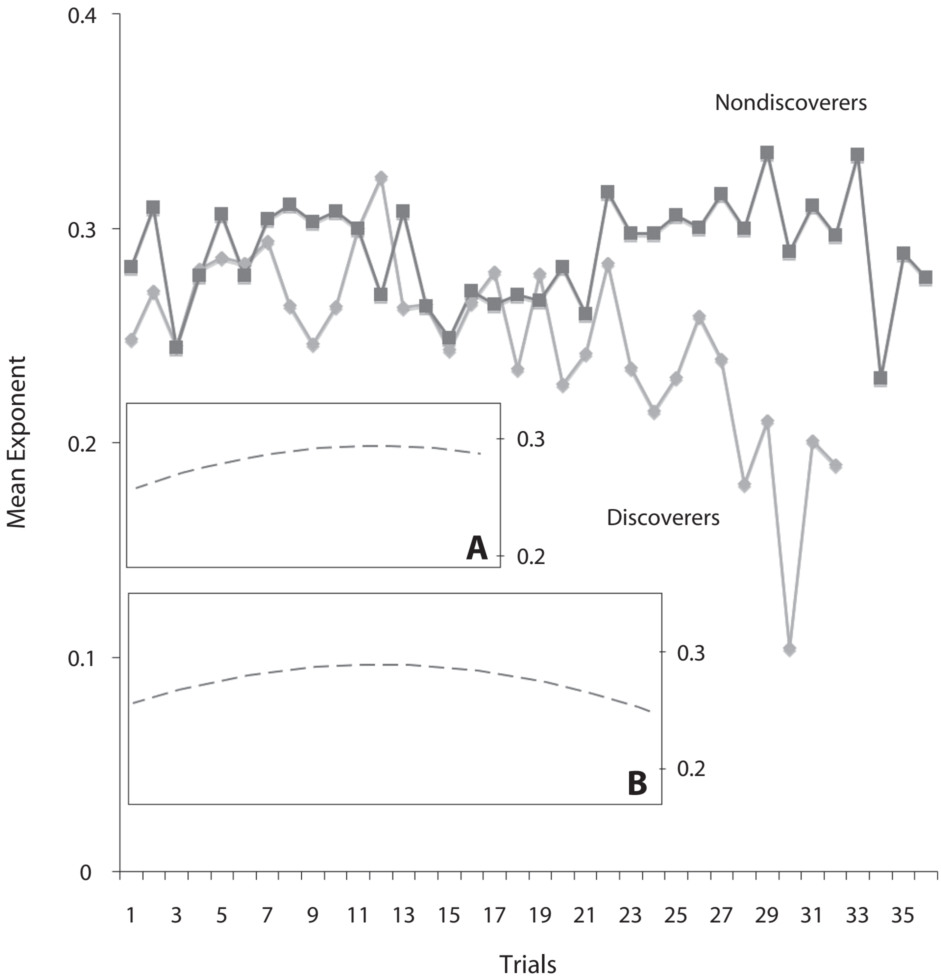

Figure 10. The main figure shows the mean power-law exponent for all trials prior to discovery, with separate curves for the participants who discovered parity (light gray line) and for those who did not (dark gray line). The participants who discovered parity contribute to the means represented by the light gray up to the trial on which they discovered parity. The participants who did not discover parity contribute to the means represented by the dark gray line on all trials. The insets illustrate the effect of timing of discovery (i.e., discovery trial) on the quadratic term. (A) An example of the predictions for relatively early discovery; discovery occurs on Trial 17. (B) Predictions for later discovery, on Trial 24.