

# Supporting Information

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## SI Text

**Probe Stimuli Construction.** To avoid novelty effects in the responses of the birds due to the presence of new element type exemplars in the probe stimuli, the probes were constructed from the same set of exemplars as the birds heard in the previous phase. However, the combination of element type exemplars was new. For instance, whereas in the previous phase, the bird heard  $a_1b_1a_2b_2$  to  $a_4b_4a_5b_5$ , we included stimuli such as  $a_4a_1a_3b_5$  in “shuffle” play. Two .wav files are included as examples of the stimuli used in the experiment.

## Maximum Likelihoods for Individual Rules Used by the Zebra Finches.

To calculate the likelihoods, we did two analyses: one based on the fraction “go” in response to the training stimuli (the rein-

forced ones) and one based on the fraction “go” in response to the probe versions of the training stimuli. Both rendered similar outcomes. For each bird, we calculated the chance of responding to the probes according to a specific rule, by calculating the binomial chance given the number of responses to a certain probe. These chances were then log transformed and added for all probes. The rule that fitted the data best (highest LL score) was then taken as the most likely rule the bird used to discriminate between the stimuli sets (ABAB and AABB).

## Other Supporting Information Files

[SI Stimuli Set \(WAV\)](#)

[SI Stimuli Set \(WAV\)](#)