

**Supplementary material for: “Symbolic representation of numerosity by honeybees
(*Apis mellifera*): Matching characters to small quantities”**

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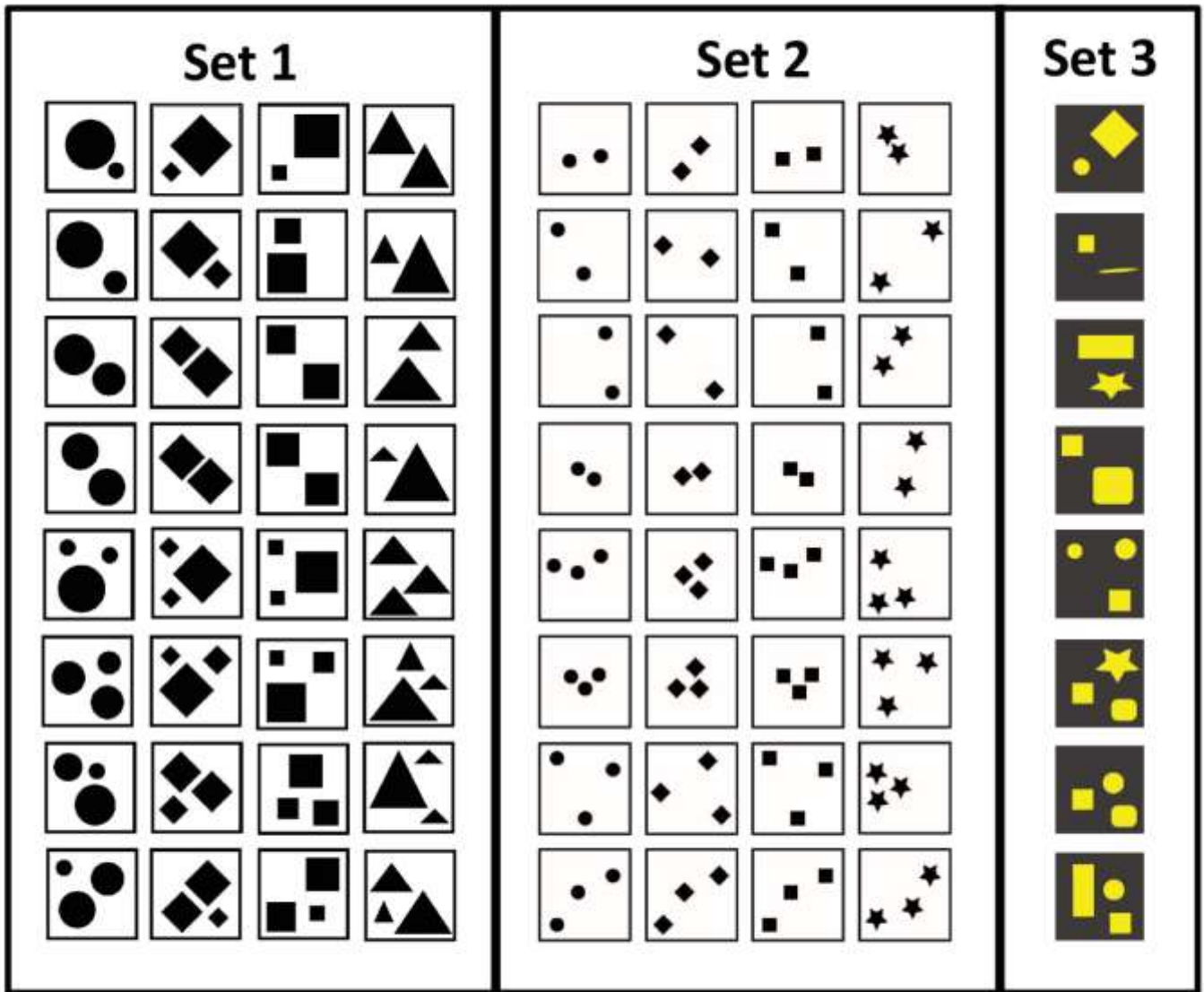


Figure S1: The stimuli used during training and testing phases grouped into the three sets: Set 1: equal black surface area ($n = 32$); Set 2: all elements of equal size ($n = 32$); Set 3: chromatically coloured randomised shapes ($n = 8$).

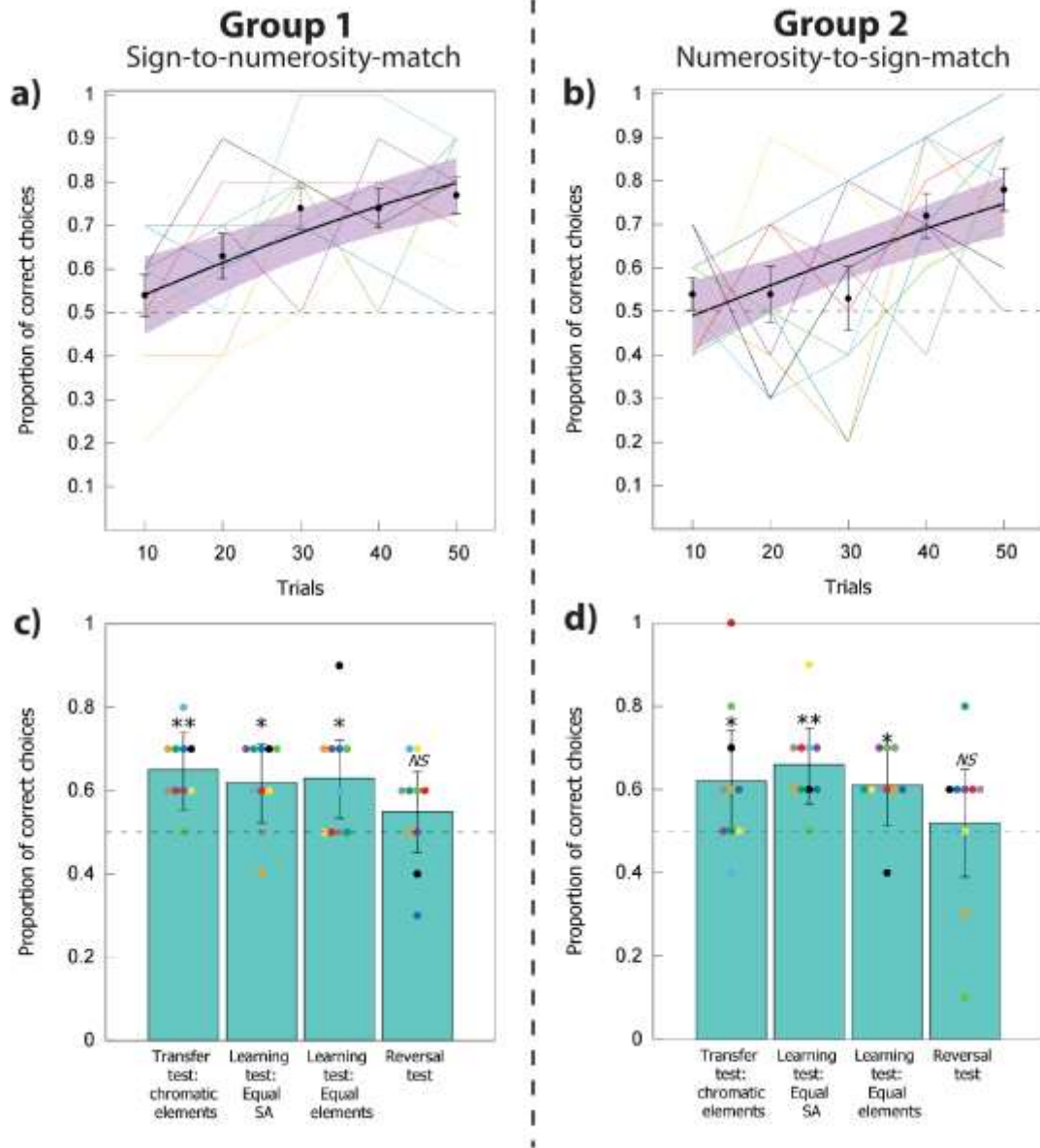


Figure S2: Results of the training and testing phases for the group of bees trained to match a sign with a quantity (Group 1; $n = 10$) and for the group of bees trained to match a quantity with a sign (Group 2; $n = 10$). a-b) Performance during the training phase for (a) Group 1 and (b) Group 2. Dashed line at 0.5 indicates chance level performance. Solid black line represents a function describing the training phase of $n = 10$ bees as modelled by a generalised linear mixed model (GLMM). Points (closed circles) along the curve indicate the observed mean \pm 95 % CIs (purple) of correct choices for the bees. Increase in performance during the training phase was significant. Individual performances of bees are shown as

coloured lines. Colours correspond to individuals in the same group in the test phase directly below. c-d) Performance during the testing phases for both (c) Group 1 and (d) Group 2. $N = 10$ for both test groups. Dashed line at 0.5 indicates chance level performance. Significance from chance level performance is indicated by * ≥ 0.05 , ** ≥ 0.01 , *** ≥ 0.001 , *NS* > 0.05 . Data shown are means \pm 95 % CI boundaries for all tests. Coloured dots represent proportion of correct choices during the test for each individual bee. Colour corresponds to the specific individual bee in each group for the training and test phases.