Supplementary Methods

To generate target arrays, an imaginary circle was described within a 640 x 480 pixel grid (at 20.2 pixels per cm). The center of the circle was offset randomly by up to 15 pixels in a randomly selected direction from the center of the screen, and the radius of the circle varied randomly from 75 to 150 pixels. Three locations on this circle were chosen randomly as target locations (Figure S1a).

To generate the locations of test stimuli in the Move-3/Preserved Configuration condition, the target array was rotated about the center of the imaginary circle in either a clockwise or counterclockwise direction (Figure S1b), resulting in the test array (Figure S1c). Varying degrees of rotation resulted in a linear displacement of test locations from target locations of 1, 1.5, 2, or 2.5 degrees visual angle. (A pilot study with 5 participants employed linear displacements of 0.5 to 4.5 degrees visual angle, at 1-degree intervals. That study revealed a negatively accelerating, increasing function of accuracy (proportion of correct rejections) by degree of linear displacement for all Non-match probe types. Below-chance accuracy (mean = 20%) was observed for all Non-match probe types with a displacement of 0.5 degrees visual angle, whereas accuracy was near ceiling (mean = 96%) with a displacement of 3.5 degrees visual angle.)

To generate the locations of test stimuli in the Move-3/Distorted Configuration condition, one of the probe items from the Move-3/Preserved Configuration test array (see above) was selected randomly and moved to a location that, relative to its original location, both was equidistant from the corresponding target location and equidistant from the fixation point (Figure S1d). This method resulted in a distortion of the target configuration (Figure S1e), whereas both

stimulus eccentricity and stimulus displacements were equated between the Move-3/Preserved Configuration and Move-3/Distorted Configuration conditions.

To generate the locations of test stimuli in the Move-2/Preserved Configuration condition, one of the three target locations generated above (Figure S2a) was chosen randomly as the center of rotation. Centered on the selected target location, two imaginary concentric circles were described, each passing through one of the two remaining target locations, which were then rotated along the circles through the same angle (Figure S2b), resulting in the test array (Figure S2c). Because the two rotated items were positioned at different distances from the center of rotation, this rotation resulted in different linear displacements of those two probe items. However, the mean displacement of the two stimuli was constrained to 1, 1.5, 2, or 2.5 degrees visual angle.

To generate the locations of test stimuli in the Move-2/Distorted Configuration condition, one of the displaced probe items from the Move-2/Preserved Configuration test array (see above) was chosen randomly and moved to a location that, relative to its original location, both was equidistant from the corresponding target location and equidistant from the fixation point (Figure S2d). This method resulted in a distortion of the target configuration (Figure S2e), whereas both stimulus eccentricity and stimulus displacements were equated between the Move-2/Preserved Configuration and Move-2/Distorted Configuration conditions.

Many more target arrays, and corresponding test arrays, than needed were initially generated. To control for the eccentricity of stimulus arrays selected for presentation, first, the eccentricities of all three stimuli in each array were summed. Then, only test arrays with summed eccentricities that did not differ by more than 5% from the summed eccentricity of the corresponding target array were selected for presentation. Also, the deviation of each test array's

summed eccentricity from the overall mean summed eccentricity across the four test arrays was not allowed to exceed 5%. Only arrays that met both of these criteria were considered for inclusion in this study. All candidate arrays were visually examined, and we excluded test arrays that had either (1) near-linear stimulus configurations, or (2) overlapping or abutting probe circles. For test arrays included in Experiments 2-3, the relevant target item and the relevant probe item appeared within the same visual quadrant.

For Experiment 1, each target array appeared in eight trials (four Match trials and one trial for each of the Non-match probe types) randomly presented throughout the course of the 384 trials of this experiment. For Experiments 2-3, the two Move-3 probe types were omitted, and each target array therefore appeared in four trials (two Match trials and one trial for each of the two Move-2 Non-match probe types).

Supplementary Figure Captions

Figure S1. Illustration of the procedure for generating test arrays in which all three probe stimuli were displaced from the locations of corresponding target stimuli (Move-3 Non-match conditions). Target configurations (Figure S1a) were either preserved (Figure S1b, S1c) or distorted (Figure S1d, S1e). Dots represent target locations and circles represent probe locations. Stimuli are not drawn to scale.

Figure S2. Illustration of the procedure for generating test arrays in which two probe stimuli were displaced from the locations of corresponding target stimuli (Move-2 Non-match conditions). Target configurations (Figure S2a) were either preserved (Figure S2b, S2c) or distorted (Figure S2d, S2e). Dots represent target locations and circles represent probe locations. Stimuli are not drawn to scale.

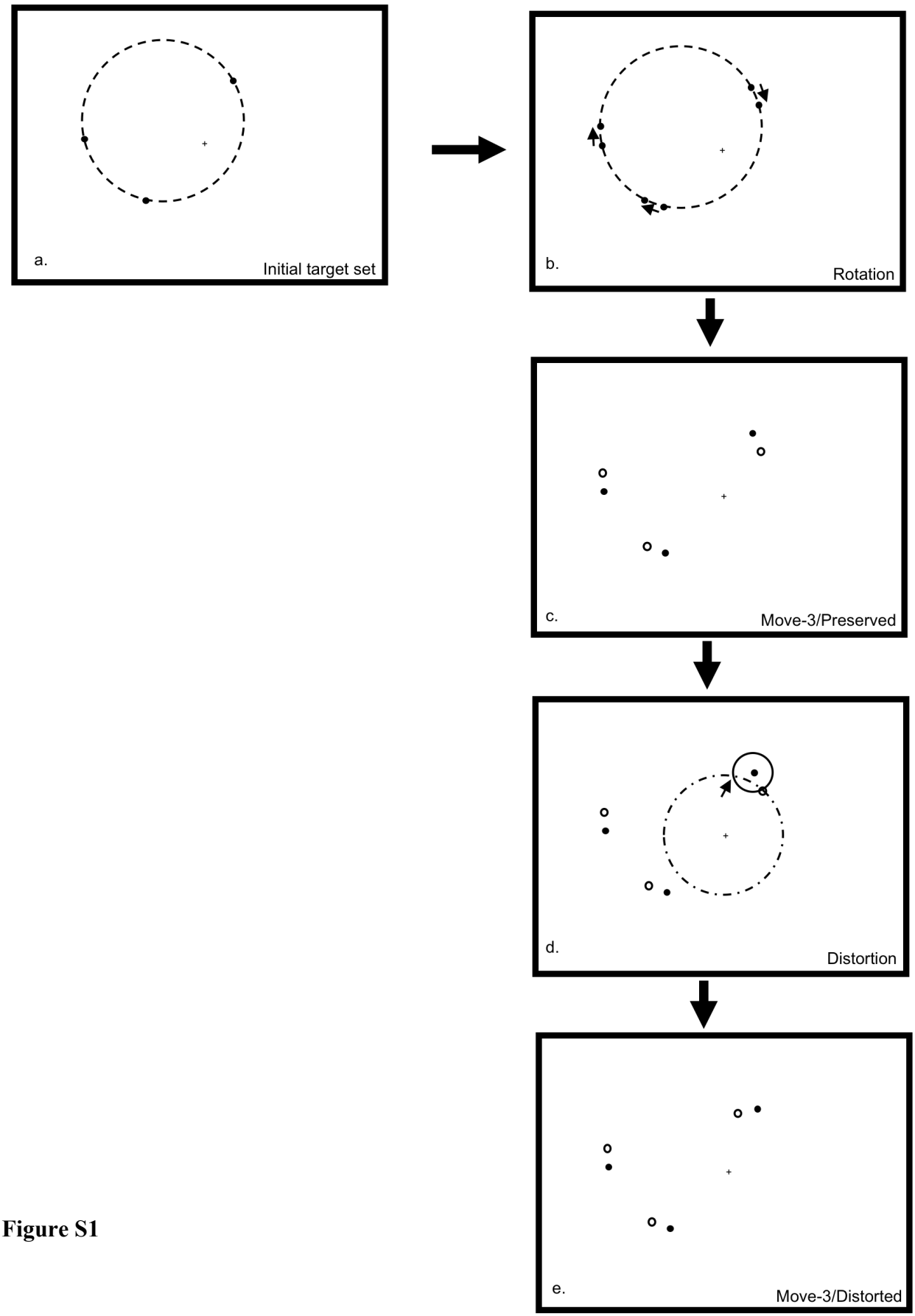
a.
Initial target set
b.
Rotation
c.
Move-3/Preserved
d.
Distortion
e.
Move-3/Distorted

Figure S1

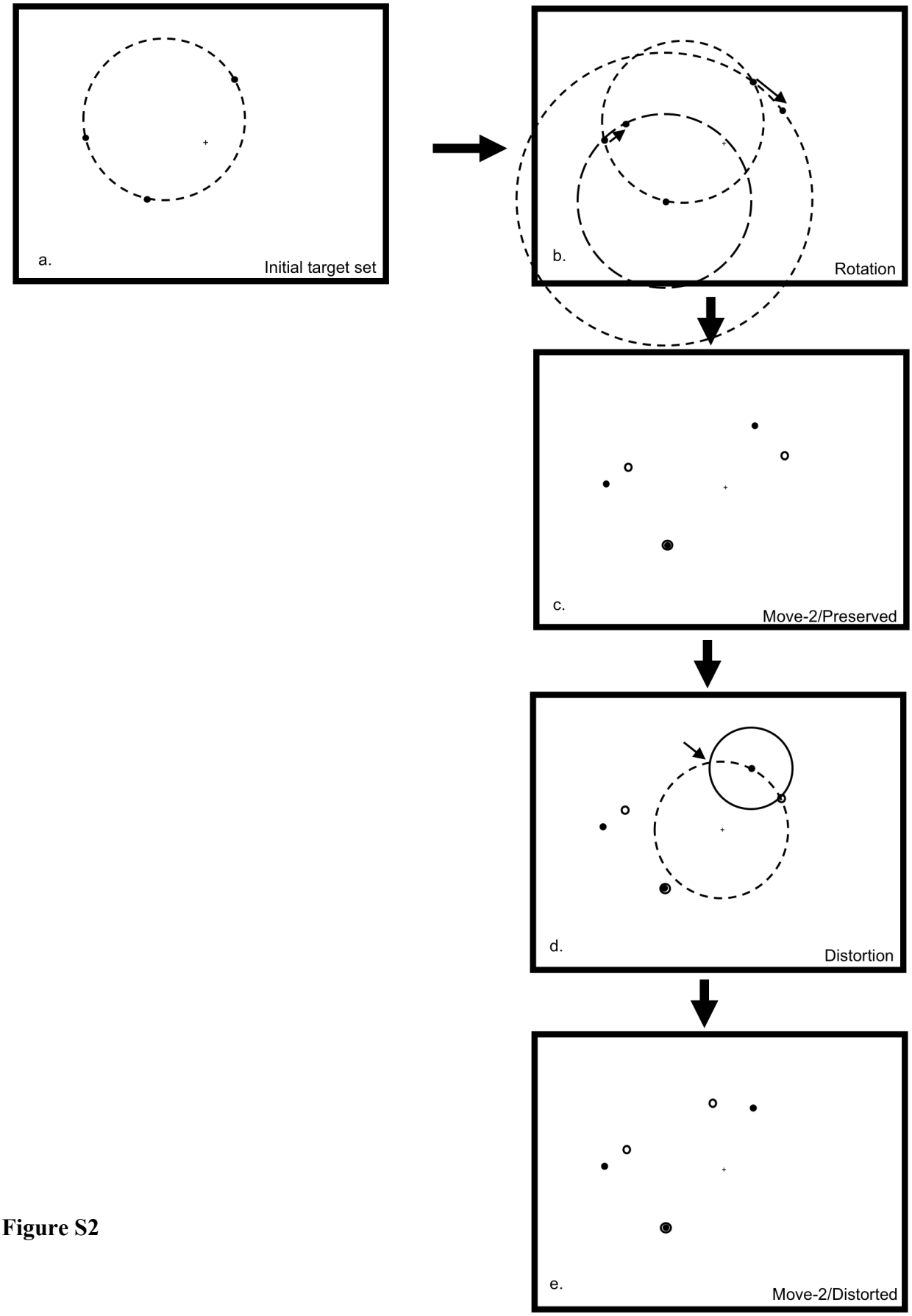
a.
Initial target set
b.
Rotation
c.
Move-2/Preserved
d.
Distortion
e.
Move-2/Distorted

Figure S2