Attention Network Test

The Attention Network Test (ANT; Fan et al., 2002) is a computerized neurocognitive task that assesses three areas of attention: alerting, orienting, and executive control. In this computerized task, participants are presented with a string of arrows on different locations on a computer screen. The participants must press the arrow key on their keyboards to select which direction the central arrow is pointing, and their response times are recorded. There are three flanker conditions that participants will see throughout the experiment. In the first type of flanker condition, a neutral trial, the only arrow is flanked by two squares, as pictured below.

A black background with a black square

Description automatically generated with medium confidence

In congruent trials, all arrows are pointing the same direction, as seen below.

A black background with a black square

Description automatically generated with medium confidence

In incongruent trials, the central arrow is facing the opposite direction of the flanker arrows.

A black background with a black square

Description automatically generated with medium confidence

Throughout the task, the string of arrows will appear at the top or bottom of the screen. Participants may be primed to look towards the location the arrows will appear with the image of a square. There are four types of priming throughout the experiment: central cue, spatial cue, no cue, and dual cue. In central cue trials, a square briefly appears in the center of the screen before the arrows are presented. In spatial cue trials, the square will flash in the location the arrows will next appear (either the top or bottom of the screen). In no cue trials, no square will appear before the arrows. In dual cue trials, a square will appear at both the top and bottom locations, regardless of where the arrows will appear next. Altogether, there are 48 combinations of stimuli (3 flanker conditions x 2 arrow directions x 4 cue conditions x 2 screen locations).

After reading the instructions, participants complete 24 trials with feedback on their speed and accuracy. The participants then begin a series of 3 experimental blocks, separated by periods of rest. Each experimental block contains 96 trials, with each combination occurring twice, in a random order. No feedback is provided during the experimental trials.

Evaluating the differences in response times between the stimuli combinations provides a measure for the three domains of attention. The alerting effect is calculated by subtracting the response time mean for dual cue trials from the mean for no cue trials. The orienting effect is calculated by subtracting the mean for spatial cue trials from the mean for central cue trials. Executive function is calculated by subtracting the mean for congruent trials from the mean for incongruent trials. When designing the attention network test, the creators reported moderate test-retest reliability for all three measures of attention (Fan et al., 2002). Executive control had the highest correlation (0.77), followed by orienting (0.61), with alerting having the lowest correlation (0.52).

Note: Some components of this assessment have been updated for ease of use and visibility since the ANT version created by Fan et al. (2002), but the experimental design remains the same.

Fan, J., McCandliss, B. D., Sommer, T., Raz, A., & Posner, M. I. (2002). Testing the efficiency and independence of attentional networks. *Journal of Cognitive Neuroscience*, *14*(3), 340-347. https://doi.org/10.1162/089892902317361886