Supplementary Material:

The Orienting Network Score and the Interaction Score of Orienting by Executive

Control

Both the scores of the orienting attention network and the interaction of orienting by

executive control are calculated as differential scores derived from the reaction times on

the flanker conflict condition. However, the interaction score specify if the efficient

disengagement from invalid spatial cues is beneficial for the conflict detection (executive

control) in that the faster reaction times are observed on the incongruent conflict detection

(e.g. flanker arrows pointing in an opposite direction of the target arrow) and not on the

congruent conflict detection (e.g., flanker arrows pointing in an same direction as the target

arrow).

The orienting attention network score

The orienting attention network score is calculated with reaction times on detecting

congruent and incongruent flanker conflicts on trials with preceding invalid spatial cues

minus trials with preceding valid spatial cues (see Figure 1 and Table 1). Lower orienting

attention network scores show a small difference in detecting flanker conflicts between

trials with preceding invalid and valid spatial cues. This indicates a more efficient ability to

disengage from the invalid spatial cues and as such, a more efficient endogenous orienting

attention. In contrast, higher scores of the orienting attention network shows a bigger

difference in detecting flanker conflicts between trials with preceding invalid and valid

spatial cues. Thus, indicating less efficiency in the ability to disengage from invalid spatial

cues and therefore a poorer endogenous orienting attention.

The interaction score of orienting by executive control

The interaction scores of orienting by executive control measures specifically if the effect of such a spatial cue (invalid/valid) appeared on a congruent or an incongruent conflict condition. Lower scores on the executive control network (flanker conflict detection) show a small difference in detecting conflicts on incongruent flanker trials from congruent flanker trials. This indicates a high executive control ability. Further, a lower interaction score of orienting by executive control indicates smaller difference between detecting conflicts on invalid compared to valid spatial cues and between incongruent flanker conflicts compared to congruent. The orienting by executive control score are therefore hypothesized to reflect the relationship between the endogenous orienting attention and executive control, with lower scores indicating both a high ability of endogenous orienting attention and executive control (Fan et al., 2009). However, the attention network scores are complex and may be interpreted differently across different samples (Posner, 2008). We therefore tested the relationship between the orienting by executive control score and the different trial scores of spatial cue validity in combination with the congruency of the flanker conflict conditions.

Statistical analyses

To investigate that the orienting by executive control score reflects both better endogenous orienting and executive control, we conducted bivariate correlational analyses between the attention network scores and the different spatial cue and flanker conflict condition trials. We expected the orienting by executive control to specifically correlate

significantly with the trials of incongruent flanker conflict detection with preceding invalid spatial cues.

Results

The results showed that the orienting by executive control score only correlated positively with trial scores on the incongruent flanker conflict detection with preceding invalid spatial cues (see Supplemental Table 2). Further, the orienting by executive control was the only ANT-R score to show this specific positive correlation.

Discussion/Conclusion

In the current study, the interaction score of orienting by executive control was the only ANT-R score to correlate specifically with the incongruent conflict detection preceded by invalid spatial cues. Thus, showing that lower scores on this interaction reflect both a higher ability in endogenous and executive control regulation of attention as described in Fan et al. (2009).

Supplemental Table 3. The relationship between the Attention Network Scores and the

spatial cue condition trials (raw scores).

N = 48	Congruent Conflict Detection		Incongruent Conflict Detection	
	Valid cues	Invalid cues	Valid Cues	Invalid cues
Alerting	-0.7	0.17	0.19	0.14
Orienting	0.28	0.48**	-0.16	0.27
Executive control (flanker)	0.03	0.04	0.70**	0.44**
Alerting-executive	0.04	< 0.01	0.02	0.10
Orienting-executive	0.25	0.08	-0.01	0.33*

Note. ** = $p < .01$; * = $p < .05$; (*).

References

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