#409 (VSS ’08)

Static and flicker MAE for global motion

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INTRODUCTION

VSS ’06: The slow and fast motion detectors isolated by an MAE procedure

High spatial frequency dominance of the static MAE
Low spatial frequency dominance of the flicker MAE

Adaptation
Observers see motion in the direction of the low spatial frequency grating.

Flicker test
They perceive MAE in the direction opposite to the high spatial frequency drifting grating.

Slow and fast motion detectors

After the exposure to overlapped sinusoidal gratings with different spatial frequencies moving in the opposite directions, motion aftereffect of the high spatial frequency grating was seen with a static test (high spatial frequency superiority) while that of the low spatial frequency was seen with a flicker test. Assuming two types of motion detectors with different spatiotemporal frequency tunings can explain the results.

The two types of motion detectors may have different functions.
Slow MD: sensitive to relative motion and selective to orientation.
Fast MD: not sensitive to relative motion nor selective to orientation.

VSS ’07: The slow motion detector contributes to global motion

The static MAE duration increases with the increase of the degree of global motion.
The flicker MAE duration is approximately constant across the all patch conditions.

The two types of motion detectors may have different functions.
Slow MD: sensitive to global motion
Fast MD: not sensitive to global motion
1) The results indicate that global motion signals enhance the static MAE, suggesting that the slow motion detector contribute to the perception of global motion.

2) Little influence of global motion was found on flicker MAE, suggesting that the fast motion detector does not contribute to the perception of global motion.

PURPOSE
To investigate the effect of the global motion component in the adaptation stimulus on motion aftereffect.

EXPERIMENT
Method. We measured MAE after the exposure to different degrees of global motion stimuli

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<th>Adaptation: alternating two displays</th>
<th>Test: Either static or 4Hz flicker (same in all the conditions)</th>
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<td>On/Off adaptation</td>
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<td>Off/On adaptation</td>
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Global adaptation

Local adaptation: Global motion is not seen during adaptation

Trial Sequence

Measure the MAE duration

Pressed one of two keys, which were assigned for each direction when the MAE disappeared

Effect of adaptation conditions

1) The MAE duration increased with the increase of adaptation duration in the all the conditions.
2) Longer static MAEs were found with than without global motion components in the adaptation stimulus.
   The effect was clearer when the adaptation duration was longer in both the rotation and expansion/contraction conditions.
3) Durations of the flicker MAE were similar irrespective to the adaptation conditions.

Difference between the expansion and contraction

Longer MAE was found when the MAE direction was in expansion.

Effect of on/off order

Little effect of alternation order was found. The motion just before the test was not crucial for the MAE duration.

CONCLUSIONS

1) The results indicate that global motion signals enhance the static MAE, suggesting that the slow motion detector contribute to the perception of global motion.
2) Little influence of global motion was found on flicker MAE, suggesting that the fast motion detector does not contribute to the perception of global motion.

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