# Crossmodal Texture Perception Is Illumination-Dependent 

Karina Kangur ${ }^{1}$, Martin Giesel ${ }^{1}$, Julie M. Harris ${ }^{2}$ and Constanze Hesse ${ }^{1, *}$<br>${ }^{1}$ The School of Psychology, University of Aberdeen, Aberdeen, AB24 3FX, UK<br>${ }^{2}$ School of Psychology \& Neuroscience, University of St Andrews, St Andrews, KY16 9JP, UK<br>*Corresponding author; e-mail: c.hesse@abdn.ac.uk

ORCID iDs: Giesel: 0000-0002-3832-7442; Harris: 0000-0002-3497-4503; Hesse: 0000-0002-4395-0781

## Supplementary Material

## A Intramodal Matching

Supplementary analysis of the data shown in Fig. 2A. ${ }^{1}$

The count data was subjected to a 3 (matching condition: VV top, VV obl, TT) $\times 7$ (grit rank: 1 to 7) repeated-measures analysis. The analysis revealed a main effect of grit rank, $F_{6,186}=$ 117.35, $p<0.001, \eta_{\mathrm{p}}^{2}=0.79$, but no main effect of condition, $F_{2,62}=0.216, p=0.81, \eta_{\mathrm{p}}{ }^{2}=0.007$, or interaction effect, $F_{12,372}=1.21, p=0.30, \eta_{\mathrm{p}}{ }^{2}=0.038$.

Post-hoc analysis comparing match counts for the seven grit ranks are shown in Supplementary Table S1.

Table S1. Pairwise comparisons for grit rank data. Note that the Bonferroni-corrected alpha level is 0.0024 .

| Grit $(i)$ | Grit $(j)$ | Mean difference | SE | Sig. |
| :--- | :--- | :--- | :--- | :--- |
| 1 | 2 | -0.125 | 0.09 | 0.0161 |
|  | 3 | -2.583 | 0.22 | $<0.001^{* *}$ |
|  | 4 | -2.698 | 0.22 | $<0.001^{* *}$ |
|  | 5 | -0.521 | 0.18 | 0.006 |
|  | 6 | 0.344 | 0.12 | 0.007 |
|  | 7 | 0.427 | 0.12 | $=0.001^{*}$ |
|  | 3 | -2.458 |  |  |
| 2 | 4 | -2.573 | 0.22 | $<0.001^{* *}$ |
|  | 5 | -0.396 | 0.22 | $<0.001^{* *}$ |
|  |  |  | 0.16 | 0.016 |

[^0]$$
<0.001^{* *}
$$

6
2.927
0.21
$<0.001^{* *}$
$7 \quad 3.010$
0.20
$<0.001^{* *}$

4
5
2.177
0.21
$<0.001^{* *}$
$6 \quad 3.042$
0.21
$<0.001^{* *}$

7
3.125
0.21
$<0.001^{* *}$

5
6
0.865
0.14
$<0.001^{* *}$

7
0.948
0.15
$<0.001^{* *}$

6
7
0.083
0.06
0.199

SE, standard error.

## B Crossmodal Matching

Supplementary analysis for data shown in Fig. 3A, B.

The count data was subjected to a 2 (matching condition: VT vs TV) $\times 2$ (illumination condition: top vs oblique) $\times 7$ (grit rank: 1 to 7 ) repeated-measures analysis. The analysis revealed no main effect of matching condition, $F_{1,31}=0.810, p=0.38, \eta_{\mathrm{p}}^{2}=0.025$, no main effect of illumination condition, $F_{1,31}=3.702, p=0.064, \eta_{\mathrm{p}}^{2}=0.107$, but a significant main effect of grit rank, $F_{6,186}=113.67, p<0.001, \eta_{\mathrm{p}}^{2}=0.79$. There were no two-way interaction effects between
matching condition and illumination, $F_{1,31}=1.46, p=0.24, \eta_{\mathrm{p}}{ }^{2}=0.045$, or illumination condition and grit value, $F_{6,186}=2.04, p=0.088, \eta_{\mathrm{p}}{ }^{2}=0.062$, but a significant two-way interaction between matching condition and grit value, $F_{6,186}=10.37, p<0.001, \eta_{\mathrm{p}}{ }^{2}=0.25$. Importantly, the two-way interaction cannot be meaningfully interpreted as there was a three-way interaction effect, $F_{6,186}$ $=7.36, p<0.001, \eta_{\mathrm{p}}{ }^{2}=0.192$. This three-way interaction indicates that, as expected, the number of good matches identified for the different grit values changed differently in the two matching conditions depending on illumination (as confirmed by the two-way interaction on the mean matching ranks presented in the MS).

Post-hoc analysis on the main effect of grit rank comparing match counts for the seven grit ranks.

Table S2. Pairwise comparisons for grit rank data. Note that the Bonferroni-corrected alpha level is 0.0024 .

| Grit $(i)$ | Grit $(j)$ | Mean difference | SE | Sig. |
| :--- | :--- | :--- | :--- | :--- |
| 1 | 2 | -0.164 | 0.10 | 0.122 |
|  | 3 | -2.383 | 0.20 | $<0.001^{* *}$ |
|  | 4 | -2.617 | 0.21 | $<0.001^{* *}$ |
|  | 5 | -1.234 | 0.17 | $<0.001^{* *}$ |
|  | 6 | 0.63 | 0.14 | 0.650 |
|  | 7 | 0.352 | 0.11 | 0.004 |
|  | 3 | -2.219 | 0.20 | $<0.001^{* *}$ |
|  | 4 | -2.453 | 0.20 | $<0.001^{* *}$ |
|  | 5 | -1.070 | 0.17 | $<0.001^{* *}$ |
|  | 6 | 0.227 | 0.17 | 0.184 |
|  |  |  |  |  |
|  |  |  |  |  |


|  | 7 | 0.516 | 0.15 | $=0.001^{*}$ |
| :---: | :---: | :---: | :---: | :---: |
| 3 | 4 | $-0.234$ | 0.10 | 0.032 |
|  | 5 | 1.148 | 0.18 | $<0.001^{* *}$ |
|  | 6 | 2.445 | 0.21 | $<0.001^{* *}$ |
|  | 7 | 2.734 | 0.18 | $<0.001^{* *}$ |
| 4 | 5 | 1.383 | 0.16 | $<0.001^{* *}$ |
|  | 6 | 2.680 | 0.18 | $<0.001^{* *}$ |
|  | 7 | 2.969 | 0.15 | $<0.001^{* *}$ |
| 5 | 6 | 1.297 | 0.14 | $<0.001^{* *}$ |
|  | 7 | 1.586 | 0.14 | $<0.001^{* *}$ |
| 6 | 7 | 0.289 | 0.08 | $<0.001^{* *}$ |

SE, standard error.


[^0]:    ${ }^{1}$ Note that for very high and very low grit values, very few participants ever identified those stimuli as being a good match (i.e., five or six out of 32 ) meaning that many cells contain a 0 count.

