Appendix A

A Correlation of optophysiological correlation & behavioural distance (all odours)

R = 0.6793
n = 120
p << 0.001

B responses to aldehydes

R = 0.5719
n = 54
p < 0.001

C responses to 1-alcohols

R = 0.7480
n = 54
p < 0.001

D responses to ketones

R = 0.5823
n = 54
p = 0.001

E responses to 2-alcohols

R = 0.7572
n = 54
p < 0.001
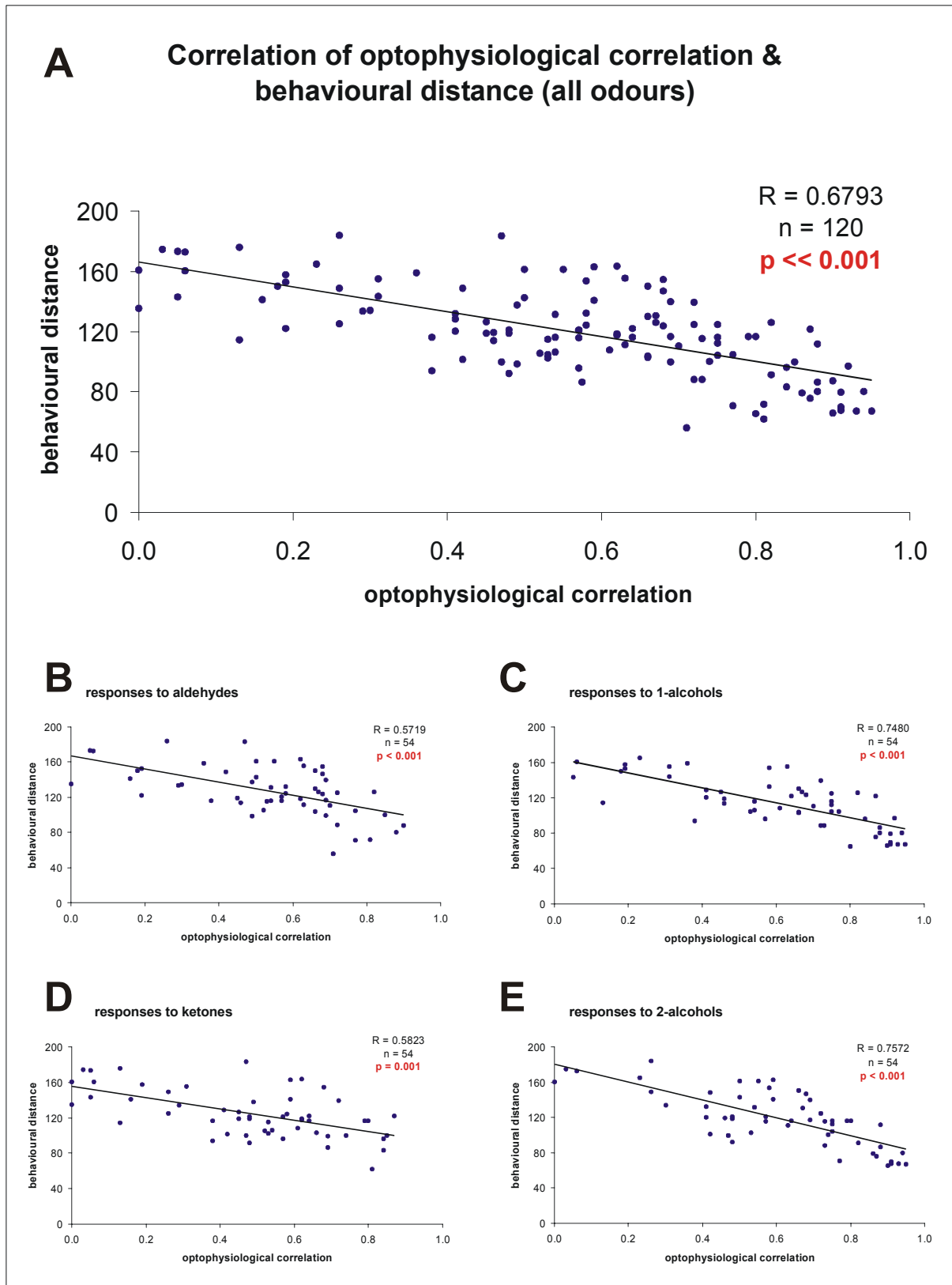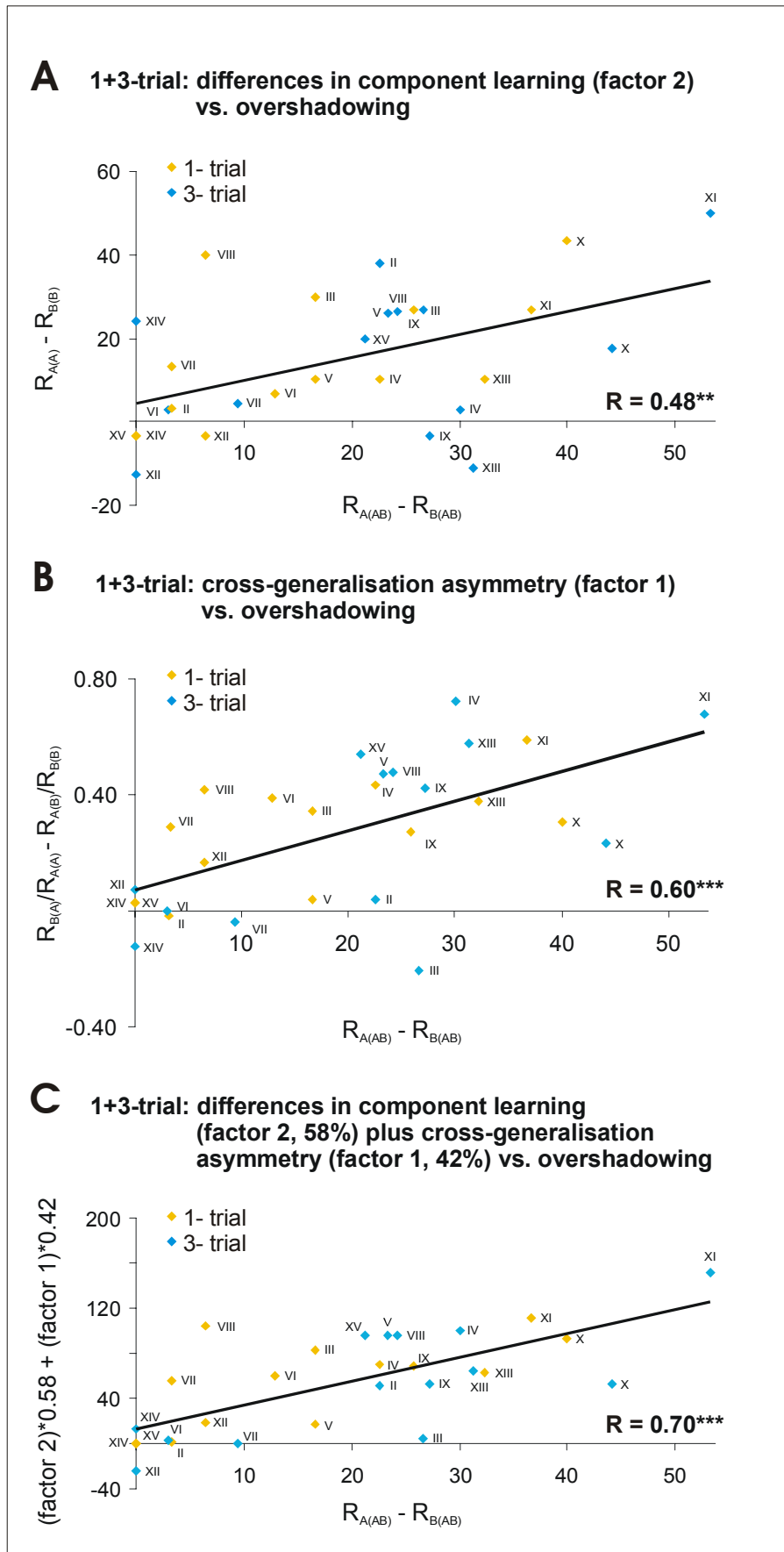
Correspondence between Perceptual and Physiological Odour Similarity

(A) Correlation between our behavioural measure of odour similarity and measures of optophysiological similarity carried out using the optical imaging technique. Euclidian distance between odour representations in our 16-dimension ''behavioural'' space for all odour pairs (120 pairs, y-axes) and the exact correlation of optophysiological distances between primary alcohols, secondary alcohols, aldehydes and ketones (kindly provided by Silke Sachse, also 120 pairs, x-axes) were calculated. Correlating of both data sets showed high significance ($r = 0.68$, $p << 0.001$). Odours found to correlate well in the optical imaging study were also similar in the behaviour.

 (B), (C), (D), (E) Correlation between our behavioural measure of odour similarity and measures of optophysiological similarity for all responses only to aldehydes **(B)**, 1-alcohols **(C),** ketones **(D)** and 2-alcohols **(E)**. Better correlations were found for 1-alcohols ($r = 0.75$, $p < 0.001$) and 2-alcohols ($r = 0.76$, $p < 0.001$) than for aldehydes ($r = 0.57$, $p < 0.001$) and ketones ($r = 0.58$, $p < 0.001$).

Appendix B

A 1+3-trial: differences in component learning (factor 2) vs. overshadowing

B 1+3-trial: cross-generalisation asymmetry (factor 1) vs. overshadowing

C 1+3-trial: differences in component learning (factor 2, 58%) plus cross-generalisation asymmetry (factor 1, 42%) vs. overshadowing

Conditioning independent correlation and multiple-regression analyses

A Correlation analyses for the odour combinations used in our work (I – XIV; see Table 2, supplementary information for more details) between (**A**) overshadowing ($R_{A(AB)} - R_{B(AB)}$) and differences in component learning ($R_{A(A)} - R_{B(B)}$), (**B**) overshadowing and differences in asymmetric cross-generalization ($R_{B(A)}/R_{A(A)} - R_{A(B)}/R_{B(B)}$) and a multiple-regression analyses between (**C**) overshadowing and a combination of both factors differentially weighted. Data points represent the pooled results from the 1-trial (yellow dots) and 3-trial (blue dots) experiment.