## Supplementary method 2: Multilevel regression analysis including intercepts from individual errors.

We modeled the response value of the a\*-axis for the associated colors by each odor as a normal distribution. The model included intercepts of individual errors as follows:

> 0

> 0

where *i* indicates the odor ID, *j* denotes the data index, and *k* denotes participant ID. In this model, the intercept term was + . The intercept , and each coefficient, , followed a normal distribution with mean coefficients as described in Manuscript.

The intercept followed a normal distribution as below:

where indicates the standard deviation of among all participants.

Regarding the model for a\* value estimation, we modeled the b\*-axis values as follows:

The intercept followed a normal distribution as below:

where indicates the standard deviation of among all participants.

Similar to the steps with a\* and b\* values, we model the L-axis values as follows:

The intercept followed a normal distribution as below:

where indicates the standard deviation of among all participants.