

Supplementary Material 1

In our previous experiments participants only rated the faces after being exposed to the pupil size changes. Therefore the results could not address the direction of the pupil encoding effects. That is, does pupil dilation observed over multiple exposures to a face cause that face to be liked more than on first viewing, whilst pupil constriction has the opposite effect? Or does one kind of pupil size change elicit an effect where the other does not? And does this differ depending on the nature of the face – for example a male versus a female face? In this experiment we made three changes to the methodology used in Experiment 1.

First the rating scale was changed from a 7 point Likert scale to a visual analogue scale (VAS). The VAS was a white line, butted at each end, and running from the far left to far right of the screen. A ‘-’ symbol at the left end and a ‘+’ at the right end denoted which end of the scale related to low and high ratings. The VAS appeared in the same locations as the key scale had previously. The VAS was used in order to make it less likely that a participant’s later ratings would be affected by a memory of their first ratings.

The second change concerned the questions asked. In feedback provided by participants we observed different reactions to the two questions. When asked to assess friendliness of the viewed face, participants reported that this assessment was simple and straightforward. However, when asked to assess interest in themselves, this provoked confusion and questions about what was required. The interest question is clearly more personal, asking whether a stranger might be interested in them: this could range from interested in being friends, to likely to have similar interests, to sexual attraction. Although we employed this question in later studies, and indeed it does produce somewhat complex

and mixed results, in Experiment 2 we changed the question to the simpler assessment of attractiveness.

Finally, at the start of the experiment participants assessed the faces for friendliness and attractiveness, providing baseline scores. Then at the end of the experiment they again assessed the faces. By subtracting end from initial ratings we could assess the change in person perception due to the pupil size manipulation.

Experiment 2

Method

Participants

Thirty adult female participants recruited from the School of Psychology at *****. All participants gave informed consent and received course credit for their participation. The mean age of the sample was 21.3 years ($SD = 4.5$ years), and all participants had normal or corrected to normal colour vision.

Stimuli

All stimuli were identical to those used in Experiment 1.

Procedure

All procedural aspects were identical to those within Experiment 1, with the exception of those already noted. Namely, 1) changing from a Likert scale to a visual analogue scale; 2) changing the rating question from "How interested would this person be in you?" to "How attractive do you find this person?"; and 3) introducing an additional rating task at the start of the experiment in order to assess change scores. See Figure S1 for more detail.

Debriefing. At debriefing five participants reported noticing the pupil manipulation and were therefore removed from the analyses.

*****FigureS1 here*****

Results & Discussion

Friendliness

The change score ratings are shown in Figure S2. As in Experiment 1 the main effect of pupil was non-significant [$F(1,24) = 1.34, p = .26, \eta^2_p = .053$] and here the main effect of sex was also non-significant when analysing change scores [$F(1,24) = .019, p = .89, \eta^2_p = .001$]. The interaction between pupil and sex that was observed in Experiment 1 was again detected, though this was marginally significant [$F(1,24) = 3.30, p = .082, \eta^2_p = .121$]. However, in contrast to Experiment 1 the pupil effect in female faces was not significant [$t = .53, p = .60, d_z = .11$], whereas it was significant in male faces [$t = 2.1, p = .046, d_z = .42$].

Attractiveness

It is noteworthy that there is a general increase in attractiveness ratings from first to second rating. This might reflect mere exposure effects, where repeated exposure can result in greater liking of a stimulus (Zajonc, 1980). Analysis of the attractiveness question revealed no main effect of pupil size change [$F(1,24) = .001, p = .98, \eta^2_p < .001$], and no main effect of sex [$F(1,24) = .062, p = .81, \eta^2_p = .003$]. The interaction between pupil and sex was not significant [$F(1,24) = .624, ns$], although the trend was similar to that observed thus far with increased rating for dilated pupils in females and decreased ratings for dilated pupils in males.

*****FigureS2 here*****

The results in this experiment are somewhat mixed. Although the overall patterns were similar to those of Experiment 1, the effects were not so robust. The change in the procedure where participants rate the faces at the start of the study appears to have disrupted the learning of pupil dilation/constriction. Perhaps prior knowledge that the friendliness/attractiveness properties of the face are relevant interferes with the subsequent learning, whereas the other studies in this paper give no prior knowledge of the face properties relevance prior to the identity change detection task. Furthermore, it could also be the case that the initial rating phase (where the pupils don't change size) creates a first impression that the faces are indifferent towards the participants. The pupil dilation/constriction manipulation then has to work against this first impression.

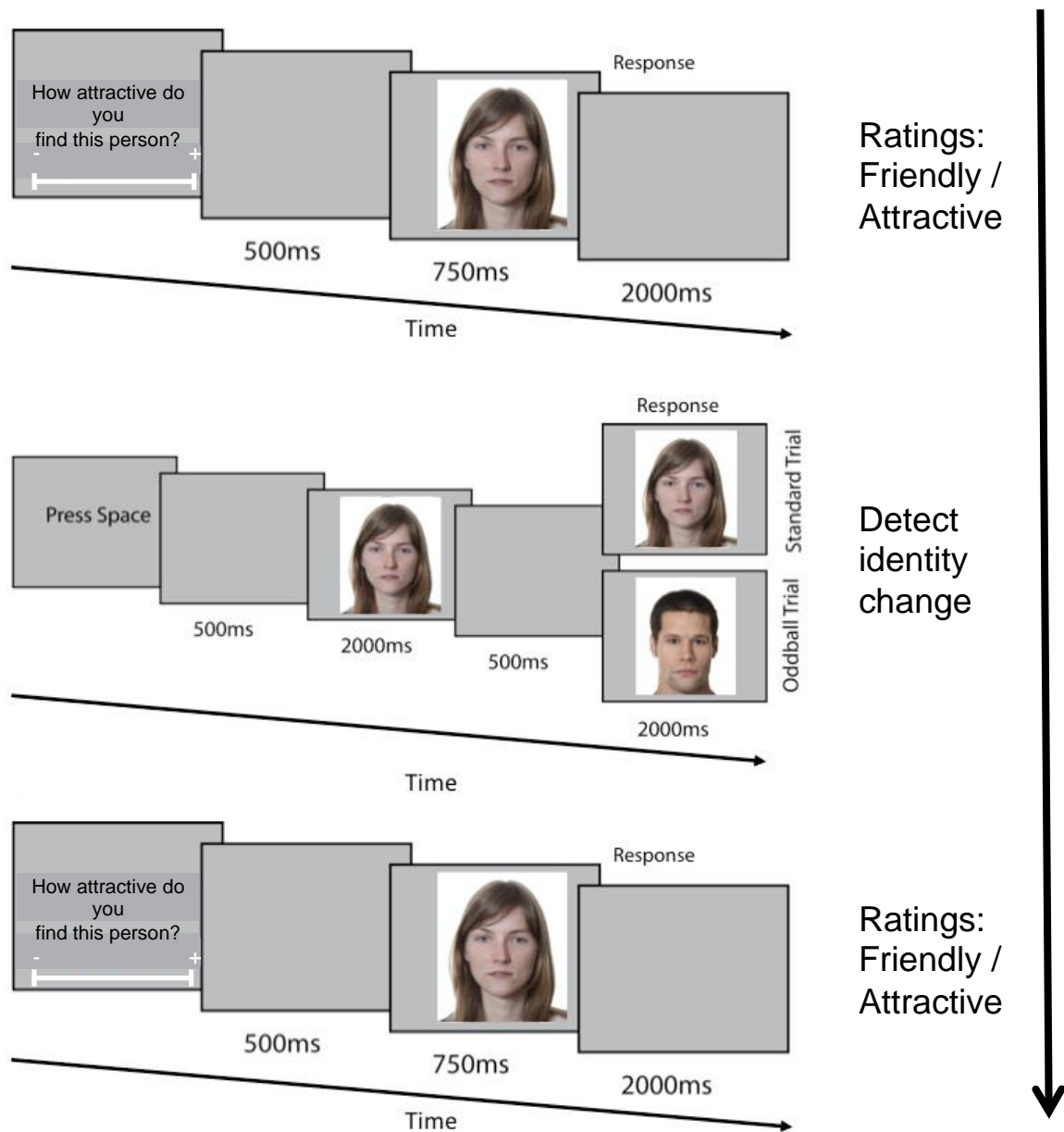


Figure S1. The three stages to Experiment 2 - Ratings are taken at the start and end of the experiment, and in an additional change to Experiment 1, the 'interest' question has been changed to assess attractiveness.

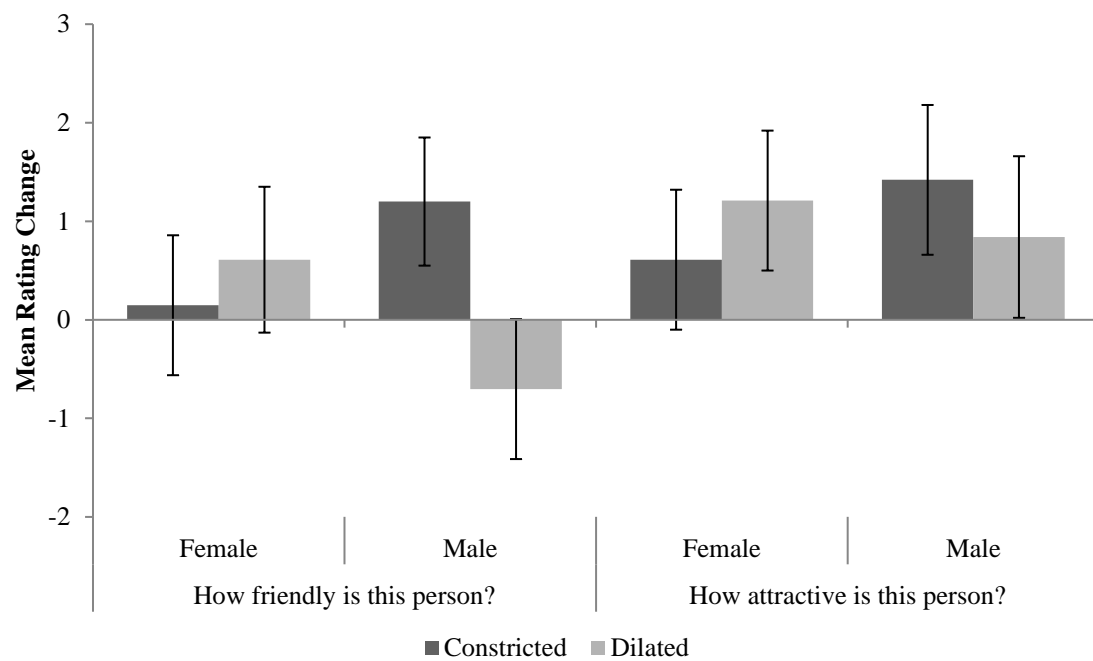


Figure S2. Experiment 2 rating change scores toward sex of face and question. Error bars denote standard error.