

## MATHS, STATS AND RESEARCH METHODS FOR THE NEW SPECIFICATIONS

### Number 3: Learning not to be prejudiced

Lebrecht et al (2009) investigated 'implicit racial biases', unconscious attitudes towards other-race groups and the related idea that it is harder to distinguish between other-race faces than own-race faces - the 'Other-Race Effect' (ORE). Caucasian participants were trained either to differentiate between individual other-race faces (individuation) or to categorise them. Their implicit racial bias was measured before and after training using an 'Affective Lexical Priming Score'(ALPS).

Figure 1 shows the relationship between the ORE (how much more they were able to distinguish between faces from another race) and the ALPS (the improvement in attitude towards other races). For both, a bigger score is better in terms of reducing prejudice.

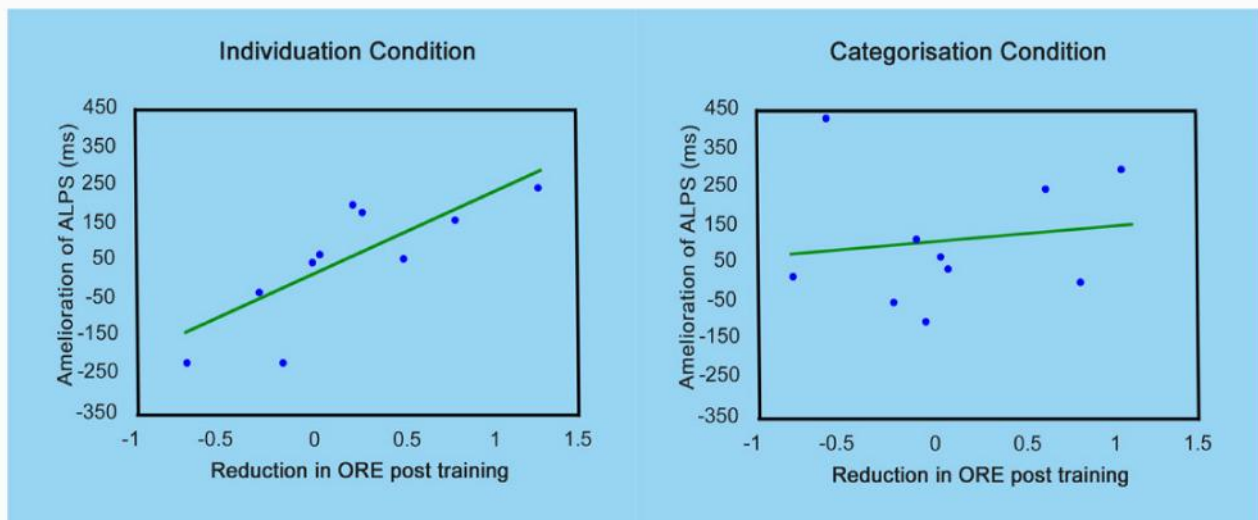
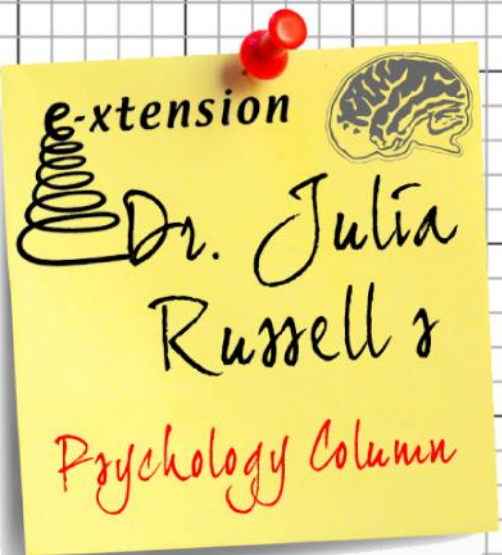


Figure 1

1. Was the **experimental design** for the comparison between individuation and categorisation repeated or independent measures? Explain your choice. (2)
2. The pre- and post-training scores for the individuation and categorisation groups were compared using a statistical test (a t-test). There was no significant difference in ORE prior to training, but there was afterwards.
  - a) The results analysis was '**two-tailed**'. Explain when a 'two-tailed' test is used. (1)



2. continued ...

	Value for the pre-training t-test	Value for the post-training t-test
Significance level		
Number of participants		
Observed value		

b) Individuation training 'improved' the ORE, ie made the participants better at telling faces apart (but categorisation did not).

i) The t-test result for the pre-training comparison was  $t(38)=0.54$ ,  $p \leq 0.59$  and for post-training was  $t(38)=2.18$ ,  $p \leq 0.03$ .  
Fill in the table using these numbers. (3)

ii) Explain how you can tell that the post-training comparison was **significant** but the pre-training difference was not. (1)

iii) The t-test is a **parametric test**. What criteria are required for data in parametric tests? (3)

3. Using ALPS, an improvement in attitude was found with training in the individuation but not the categorisation group. The measure was a reaction time to words. For variables such as this, measured in fractions of seconds, what would be the most appropriate:

- a) **Measure of central tendency** and why? (2)
- b) **Measure of spread**. (1)

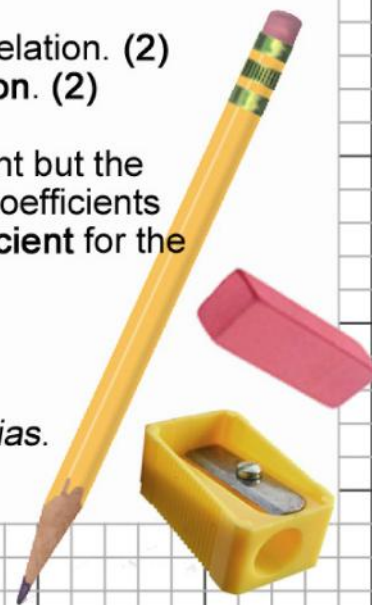
4. The relationship between improvement in ORE and in ALPS was analysed using a **correlation**, see Figures 1a and b.

- a) Explain which **scatter diagram** shows the stronger correlation. (2)
- b) Explain whether this is a **positive** or **negative correlation**. (2)

5. The correlation for the identification group was significant but the correlation for the categorisation group was not. The two coefficients were  $r=0.55$  and  $r=0.05$ . Which was the **correlation coefficient** for the identification group? (1)

### Reference

Lebrecht S, Pierce LJ, Tarr MJ & Tanaka JW (2009)  
*Perceptual Other-Race Training Reduces Implicit Racial Bias.*





## Suggested Answers

1. independent measures; because the individuation and categorisation groups contained different people; otherwise the training sessions could have an order effect, making the participants appear more accepting / less prejudiced than they really were.

2. a) Two-tailed tests are used with non-directional hypotheses; that is when the direction of the experimental effect (eg the effect of the IV on the DV, or whether a correlation will be positive or negative) is unknown.

b) i)

	Value for the pre-training t-test	Value for the post-training t-test
Significance level	0.59	0.03
Number of participants	38	38
Observed value	0.54	2.18

ii) The post-training comparison is the one that was significant because its significance level is  $p \leq 0.03$  (whereas the one for pre-training is  $p \leq 0.59$ ).

iii) The parametric criteria are: must come from a normally distributed population; must have even distribution; and at least interval data.

3. a) The measure of central tendency should be the mean, because the level of measurement of the data is equal interval /ratio.

b) The measure of spread should be the variance/standard deviation.

4. a) The top/a/individuation scatter diagram is the stronger correlation; because the points are closer to the line.

b) It is a positive correlation; because as one variable increases the other one does/ as ALPS goes up so does ORE/as the slope goes up from the origin/ it slopes up from bottom left to top right. (NB Answers suggesting one variable causes or makes the other variable rise are incorrect).

5. The correlation coefficient for the identification group is  $r=0.55$  (because it is closer to  $r=1$  than  $r=0.05$ , so it is a stronger correlation).

## Extension

1. The authors conclude that 'These findings suggest that implicit racial biases are multifaceted, and include malleable perceptual skills that can be modified with relatively little training.' Use the results to justify this conclusion.

