

Data analysis assignment

Extending the Cross Race Effect to a Cross Age Effect

A common finding in the face recognition literature is the “cross race effect”. People are better at face recognition when they are tested on faces from their own racial group rather than faces from another racial group (Meissner & Brigham, 2001; Sporer, 2001). For example, white Americans do better at recognizing faces and emotional facial expressions of other white Americans rather than faces of black Americans. In contrast, black Americans do better on the test comprising black American faces. As such, this can be called an *own-race bias* in face recognition. This has also been replicated using white Americans and Asian Americans.

One of the arguments suggests that a causal mechanism is *familiarity*. That is, we are better at recognising familiar faces and that, for most people, they are most familiar with people from their own racial group. A second argument suggests that *social identity* is the mechanism. That is, we identify more strongly with people of our in-group (i.e., those we think we are more similar to), and stronger identification makes us pay more attention to characteristics of the people (such as their faces) and so we are better at remembering those features.

The aim of this study is to see if this is a general face recognition effect and not just specific to race. That is, does it generalise to factors other than race. In the present study, we looked at whether the same type of effect was evident using age rather than race as a distinguishing feature.

In order to do this, a study was undertaken sampling young adults (18 - 25) and old adults (65 – 80). Participants were randomly allocated to one of two face recognition tests; each comprising 30 faces. One test included only young faces whereas the other test comprised only old faces. Each test began with a study phase where the participant is shown 15 test faces (randomly selected from the 30 faces) which he or she was asked to learn. After doing several unrelated tasks, the participants were tested on their learning. They were then shown, one at a time, all 30 faces (either old or young, depending on experimental condition); each face was either one that they saw previously or was a new face that they hadn’t seen previously. For each trial (i.e., for each trial of the 30 trials), they were asked to try indicate if the face was one that they had learnt previously in the study phase.

There are three main research questions¹:

(1) Is there any evidence of a cross-age effect? In other words, do different ages show a bias towards faces from their own age group?

(2) Is there support for the theory that familiarity mediates the effect of the age similarity of the face recognition test on face recognition test performance? Think of this as two separate but related questions: (a) Does the age similarity of the face recognition test affect judgements of the familiarity of the faces, and (b) Do familiarity judgements then affect face recognition test performance?

(3) Is there support for the theory that social identity mediates the effect of the age similarity of the face recognition test on face recognition test performance? Again, think of this as two separate but related questions: (a) Does the age similarity of the face recognition test affect your judgement of identification, and (b) Do identification judgements then affect face recognition test performance?

¹ See the end of this document for hints on how to look at these three questions.

METHOD

Participants

Volunteer first year psychology students between the ages of 17 and 25 were recruited for this study to form the younger adult group and volunteers from several community groups interested in aging who were at least 65 years of age were recruited to form the older adult group.

Design

A 2 (age group: younger, older) $\times$ 2 (face recognition test similarity: test with same age faces, test with different age faces) between-subjects² factorial design was utilised whereby participants were randomly allocated to either face recognition test condition. Percentage accuracy on the face recognition test was the key dependent variable.

Materials.

Face recognition test. Two different face recognition tests were constructed. All tests were developed to be presented on a computer display. Thirty young faces (i.e., faces of people aged between 17 and 25) and 30 old faces ((i.e., faces of people aged over 65) were selected from a database of faces used in face recognition studies that is available on the internet. All faces are cropped similarly, show people looking directly at the camera, and are identical in size (in mm dimensions and number of pixels).

Each test comprised two phases: A learning phase and a testing phase. Of the thirty faces selected for each test, 15 faces were used in the learning phase and all 30 faces were used in the testing phase. To ensure that differences between tests was not due to the particular faces used in the learning phase, counterbalancing was undertaken by randomly selecting and ordering 15 faces from the 30 faces for each participant. This meant that participants in the same condition all saw 15 different faces in different orders during the learning phase.

Measures of identity and familiarity. The first measure, called *identity*, had participants consider the faces they had just been tested on and they were asked to choose between whether or not they felt that they identified with that group of people. This was a dichotomous variable with two response options (Yes, I identify with them or No, I don't identify with them).

The second measure, called *familiarity*, had participants rate the degree to which they felt that the faces they had just been tested on were familiar to them. Specifically, they were asked: "Do the faces you were tested on look like people you are familiar with? They don't have to be people you know just similar to the people you know." This was rated on a 9-point Likert scale as follows: 1 = extremely unfamiliar, 2 = very unfamiliar, 3 = quite unfamiliar, 4 = a bit unfamiliar, 5 = neither unfamiliar nor familiar, 6 = a bit familiar, 7 = quite familiar, 8 = very familiar, and 9 = extremely familiar.

Procedure

All participants were tested individually. They initially filled out a questionnaire to obtain demographic details and tested for eyesight. All participants retained in the study had good eyesight and had no evidence of memory based illnesses.

Participants then undertook the assigned face recognition test. In the first phase, the learning phase, they were presented with a series of 15 faces that they were instructed to memorise this they would be asked to recognise these at a later time. The initial screen was a blank screen with a bar on the bottom which had "Click here to start" written across it. When the participant was ready to start, they clicked on this button.

² In reality, a more sensible design is to have the face-recognition test varied within-subjects. In this case, I have done it between-subjects because then you can analyse this problem since you have been taught the appropriate analysis.

The screen changed to a black screen with a cross in the centre of the screen to orient the participant to this part of the screen where faces would subsequently appear. After three seconds, the first face was shown in the centre of the computer screen and appeared for 10 seconds. The face then disappeared and was replaced by the black screen with a cross in the centre of the screen. After three seconds, the second face was shown for 10 seconds. This pattern continued until all 15 faces in the learning phase had been viewed.

At the completion of the learning phase, participants engaged in a filler task for five minutes. This test was a spatial learning task where participants were shown a figure comprising many squares (e.g., a rectangle with 5 rows and 4 columns) with each square either black or white. They were then shown the same figure with the colour of just one of the squares changed from white to black (or vice versa). The participant had to select which square had changed colour.

After the filler task, participants completed the testing phase of the face recognition test they were assigned to. This consisted of each face from the 30 faces in the testing phase being shown to the participant *one at a time*. The 30 faces consisted of the 15 previously seen faces as well as 15 new faces (i.e., those from the original 30 of the same age that they did not see in the learning phase). As each face was presented, the participant was asked to indicate whether or not they had seen the face before in the earlier learning phase; that is, they indicated whether it was a “previously seen” face or a “new” face. Accuracy was calculated by recording the number of correct responses - faces actually presented in the learning phase being classified as “previously seen” and faces *not* presented in the learning phase being classified as “new” and transforming this to a percentage (i.e., percentage of correct responses out of 30).

After completing their face recognition test, all participants then answered the two questions measuring identity and familiarity.

Data Sets

Data set files for this problem are called CrossAgeEffect #.sav, where # is a number between 0 and 9. You are to use the data set that corresponds with the last digit in your student id number. For example, if your student identification number is 2046487, then you would use CrossAgeEffect 7.sav because 7 is the last digit in your student identification number. Note: Do not get this confused with your FAN!

References (you don't necessarily have to consult these)

Meissner, C. A., & Brigham, J. C. (2001). Thirty years of investigating the own-race bias in memory for faces: A meta-analytic review. *Psychology, Public Policy, & Law*, 7, 3-35.

Sporer, S.L. (2001). The Cross-Race Effect. *Psychology, Public Policy, and Law*, 7, 170-200

The Assignment – what you need to do

You will need to produce a limited practical report. You will need the following sections:

- Hypotheses
 - Read the Introduction carefully and write hypotheses for each of the three questions (see below for some hints)
- Results
 - Follow the APA guidelines and look at relevant materials on FLO. If you have the Burton textbook on writing Research Reports, use that. It's highly recommended. However, for reporting results, look at the Statistics notes (particularly Section 3), the Interpreting the Output files in the SPSS Commands Manual, and solutions from the Practical sessions. The hints below on each research questions should guide you on what analyses are required.
- Discussion
 - Again, the Burton textbook will be very useful. Also see materials below (will be posted in late May) on research reports.
- Reference list
 - If required. It depends on what you cite in your Discussion. There are no marks for having a certain number of references. Look for some if they help you write your Discussion but you could get a HD without any (although you may want to refer to the two references I cited when talking about how the cross-race bias generalises to a cross-age bias (or doesn't, depending on what you find)

Some hints on how to tackle the assignment.

- The main aim is to run statistical analyses to try to answer your three main questions (as outlined in the Introduction).
- Research question 1
 - This involves the most complex analysis. This is the last analysis you will learn. For the rest of the assignment, you have to work out what you need to do but, for this one, I'll tell you. You will do to run a factorial ANOVA. Definitely, don't start this one until you get there although it is about comparing group means.
- Research question 2
 - Think of this as two sub-questions. So, write a separate hypothesis for each sub-question.
 - The first sub-question is whether face recognition test similarity affects familiarity rating.
 - The second sub-question is whether familiarity rating affects face recognition accuracy.
 - For your hypotheses, just state one hypothesis for each sub-question since you should make the same prediction for both young and old participants.
 - For the analysis (i.e., one for each sub-question³), run each analysis separately for young participants and old participants.

³ So, in the end you will run four analyses for research question 2: (a) analysis to answer the first sub-question for young participants only; (b) analysis to answer the first sub-question for old participants only; (c) analysis to answer the second sub-question for young participants only; and (d) analysis to answer the second sub-question for old participants only. The same applies for research question 3.

- Research question 3
 - Think of this as two sub-questions. So, write a separate hypothesis for each sub-question.
 - The first sub-question is whether face recognition test similarity affects identification judgement.
 - The second sub-question is whether identification judgement affects face recognition accuracy.
 - For your hypotheses, just state one hypothesis for each sub-question since you should make the same prediction for both young and old participants.
 - For the analysis (i.e., one for each sub-question), run each analysis separately for young participants and old participants.
- Note that I will provide an output that contains all possible analyses.
 - I am doing this because some of you may still have difficulty with running SPSS, due in part to the COVID-19 pandemic, and I don't want you to be disadvantaged. The main thing I want to test is your ability to interpret SPSS output. Nevertheless, I strongly encourage you to learn to use SPSS and generate your own output. You will need this skill in future topics.
 - So, for those who do run their own analyses, this is a way to check if you have done the right analyses (or if anything is missing). This will be more obvious, the better you understand what you are doing and, of course, that's what I am trying to assess.
 - Note that whilst it will contain all the required analyses, it will contain some extra analyses that are NOT required. The reason for this is that you still need to decide what analyses you are supposed to run to test your research questions. This is a crucial skill.
- Data sets for the assignment are now available on FLO.
- I will post more information later including some FAQs. In addition, I will hold consultations sessions (some on-campus, some using Collaborate) starting in early June. A schedule will be posted on FLO.
- Finally, read the general information document about the assignment as well. This is posted on FLO and comes from the Topic Handbook, so if you have read that already, you may not need to read it again now, although maybe read it when doing the assignment (just so you don't miss any important information).