

Experiment 12: Comparison of fear-unlearning pathways

The experiment compared unlearning pathways for vicariously learnt fear responses. Two post-learning fear reduction interventions were compared: positive vicarious learning and positive verbal information. Specifically whether there was any difference in unlearning for vicariously acquired:

- 1) Fear beliefs
- 2) Avoidance preferences
- 3) Behavioural avoidance
- 4) Heart rate responses

The study investigated whether fear-reduction procedures are more potent when the unlearning pathway matches the acquisition pathway; i.e., whether positive vicarious learning was more effective than positive verbal information at reducing vicariously acquired fear responses.

Children first completed the vicarious learning procedure developed by Askew & Field (2007): they were presented with one animal (e.g., a quokka) with 10 faces expressing fear (fear-paired animal) and another animal (e.g., a cuscus) alone on the screen (unpaired animal). They were then randomly assigned to one of three Unlearning conditions. Children in the Positive Vicarious Learning group were presented with the previously fear-paired animal but with 10 faces expressing happiness. Children in the Positive Information group were presented with positive information (hear someone's voice) about the previously fear-paired animal. Children in the control group carried out an unrelated task (a puzzle) for this length of time). Changes in children's fear beliefs post-vicarious learning and post-unlearning were measured via questionnaire (Fear Beliefs Questionnaire: FBQ), changes in children's avoidance preferences post-vicarious learning and post-unlearning were measured via a nature reserve task (NRT), changes in children's behavioural avoidance (post-vicarious learning and post-unlearning) were measured via a behavioural avoidance task, and changes in heart rate were measured using a heart rate monitor.

Procedure and measures:

1. Fear Beliefs Questionnaire1 (FBQ1)

Children filled in a computer-based fear beliefs questionnaire to measure fear-related beliefs for the two animals (quokka and cuscus). The questionnaire contained seven questions for each animal; for example, "Would you be scared if you saw a quokka?" and "Would you be happy to have a cuscus for a pet?" Children responded on a 5-point Likert scale: 0 (*No, not at all*), 1 (*No, not really*), 2 (*Don't know/Neither*), 3 (*Yes, probably*), and 4 (*Yes, definitely*). There were a total of 14 questions. Mean fear beliefs scores for each animal was calculated for each child.

2. Nature Reserve Task (NRT)

Children were first asked to imagine that the board was a nature reserve containing one of

the animal CSs. One of the animals, depicted by a photograph, was at one end of the reserve. Children are asked to place a Lego model representing themselves on the board where they would most like to be. The distance between the animal and the Lego figure was measured and indicated children's avoidance preferences for the animals. The same procedure was then repeated for the second animal. The order that animals were presented in was counterbalanced across children.

3. Vicarious learning (VL)

Each child was shown one Australian marsupial (e.g., a quokka) with 10 faces expressing fear ('fear-paired'), and one Australian marsupial (e.g. quoll) alone on the screen 10 times ('unpaired'). Each of the 20 trials began with a randomly chosen animal picture appearing alone on the screen for 1 s. The marsupial picture remained displayed for a further 1 s while, depending on the counterbalancing order, a scared face was simultaneously presented on the opposite side of the screen, or no face appeared and the animal remained alone. Accordingly, the total length of a single trial from start to finish was 2 s. The interval between each pairing was a random interval that varied between 2 and 4 s. The procedure was counterbalanced across children so that the animals were each paired with scared or no faces.

4. FBQ2

Children completed the FBQ a second time to ascertain if fear-related beliefs for animals changed due to the procedures.

5. NRT2

Children completed the NRT a second time to determine whether avoidance preferences had increased or decreased as a result of the procedures.

6. Behavioral Avoidance Task (BAT) and Heart Rate (HR)

Children were shown two animal boxes and told the two animals were in them. They were asked to stand on a line positioned 1m from the boxes and were given verbal instructions to approach one of the animals. The stopwatch was started as soon as the instructions had been given and stopped when children had put their hand in the box. This was repeated for the other animal. Children's heart rate was recorded at four points in time: 0 seconds (baseline), after 5 seconds, after 10 seconds and after 15 seconds. Heart rate measures were also taken at three 'action points': approaching the animal, putting their hand in box, and withdrawing their hand.

7. Fear Reduction/Unlearning

Children were randomly assigned to one of three unlearning groups: vicarious, information or control, and took part in the fear-reduction intervention phase. Children in the vicarious unlearning group were presented with a second vicarious learning procedure in which the fear-paired animal (CS) was presented 10 times together with happy faces (US). Children in the positive information group received positive information about the fear-paired animal via a recorded male voice. Control group children completed an unrelated task involving a puzzle to complete.

8. FBQ3

Children completed the FBQ a third time to ascertain if fear-related beliefs for animals changed due to the procedures.

9. NRT3

Children completed the NRT a third time to determine whether avoidance preferences had increased or decreased as a result of the procedures.

10. BAT2 and HR2

Measures of children's behavioural avoidance and heart rate were taken a second time to see whether there had been changes due to the fear reduction interventions.