

Experiment 1: US revaluation

The experiment investigated the mechanisms of vicarious fear-related learning in children and had four main objectives. To establish whether:

- a) Observing short video clips of female adults interacting fearfully with animals could lead to changes in children's fear beliefs and avoidance of the animals
- b) Providing US inflation in the form of an increased heart rate (indicating the females in the film were particularly scared) increases children's fear beliefs and avoidance of the animals
- c) Providing US devaluation in the form of a normal heart rate (indicating the females in the film were not very scared) decreases children's fear beliefs and avoidance of the animals.
- d) Vicarious learning is a form of stimulus-stimulus (CS-US) learning or stimulus-response (S-R) learning – if revaluation has an influence on the response to the animal, we can conclude that stimulus-stimulus learning underpins vicarious learning

Procedure and measures:

Children filled in two computer-based questionnaires, watched a short film clip in which three female adults responded either fearfully or positively when asked to place their hand in a box apparently containing a novel animal (a quokka or a cuscus). Children then watched another short film clip of the same content but with audio sound of a heart beat and a small video image of a heart beating on a monitor screen. Fear-related beliefs and approach/avoidance behavior for the animals were measured using a series of measures.

1. Nature Reserve Task (NRT)

Children were 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.

2. Fear Beliefs Questionnaire1 (FBQ1)

Children fill in a computer-based fear beliefs questionnaire for two animals to measure their fear-related beliefs for the animals containing 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.

3. Vicarious learning (VL)

Children were shown one of two short (approx. 45s) video clips, either fear or neutral modelling, on a computer screen. The video showed three female adults being asked to approach a box apparently containing a quokka or a cuscus and place their hand in the box to touch the animal. The fear modelling video showed the adults acting fearfully, and hesitant about placing their hand in the box. A second video clip (the “neutral film”) was similar but showed the adults walking up to the box, showing no fear, and happily place their hand in the box. There were four videos in total: a fear and neutral quokka film and a fear and neutral cuscus film.

4. US Revaluation

Control group children moved straight on to 5. FBQ2 and missed this phase. Children in the inflation and deflation groups saw an 8s video clip (with audio) of a heart rate monitor displaying an accelerated heart beat (approx. 100 bpm) and were informed when someone is scared their heart rate looks like this. They were also shown an 8s video clip of a normal heart beat (approx. 68-72 bpm) and informed that a relaxed person’s heart beat looks like this. Next children were informed that they would see a video of the heart rate of the female model when they were putting their hands in the boxes to touch the animal (during vicarious learning). Children saw a still image of each of the three females in the video together with an 8s video clip of a heart rate. In the case of inflation group children, the heart rate was very fast (approx. 142-150 bpm) and the sentence, ‘Wow, look how fast their heart rate is, they must have been really scared’ appeared at the bottom of the screen. Children in the deflation group saw the normal relaxed heart rate (approx. 68-72 bpm) and the sentence, ‘Their heart isn’t beating very fast, they couldn’t have been very scared’ at the bottom of the screen.

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. FBQ2

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

7. Behavioral Avoidance Task.

Finally, children were shown two animal boxes and told there was a quokka in one and a cuscus in the other. They were asked to stand on a line positioned 1m from the boxes and were given verbal instructions to approach the quokka. 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.