Taken from: Introducing Psychological Research, by Philip Banyard and Andrew Grayson

DULL RATS AND BRIGHT RATS
ROSENTHAL, R. & FODE, K.L. (1963).
The effect of experimenter bias on the performance of the albino rat.
Behavioral Science, 8, 183-89.

INTRODUCTION

One of the most important effects to control against in psychological experimentation is the effect of experimenter bias. Experimenters can all too easily find what they are looking for (support for their own hypotheses) by inadvertently influencing the way in which their subjects behave. Quite how such bias happens is unclear, since the most troublesome forms of it happen outside of our awareness. But the chances are it has something to do with the experimenter's expectations of how the subjects in the different conditions will behave; people have a tendency to live up to (or down to) the standards that are expected of them (see Rosenthal & Jacobson, 1966, in the following study). Experimenter effects (another term for experimenter bias) are a source of *artefact* in behavioural research, meaning they can be the cause of artificial, non-valid findings.

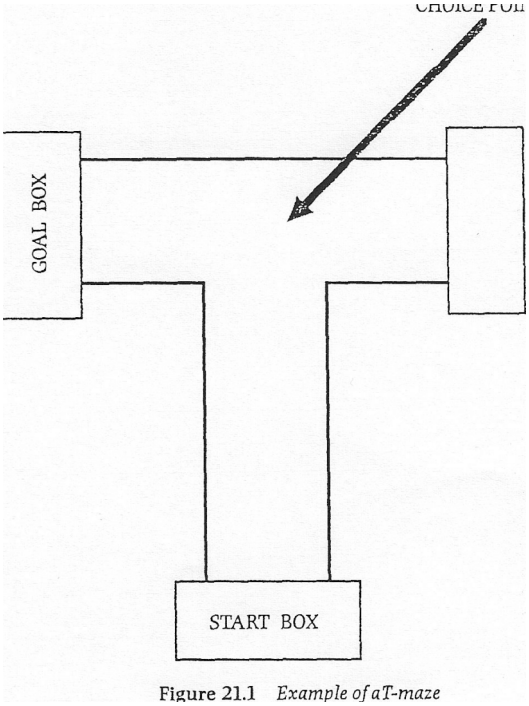

Figure 21.1 *Example of a T-maze*

THE STUDY

The authors of this study set out to examine whether or not experimenter effects can occur in studies of animal behaviour. They led their student subjects to believe that they were acting as experimenters and gave each one of them five rats which were to be trained over a period of days on a T-maze task (see Figure 21.1). In one

condition, a group of students were led to believe that their rats had been specially bred to be 'maze-bright'; in the other condition the students were informed that their rats were 'maze-dull'. In fact, there was no difference between the groups of rats which had all been randomly selected from the same stock. The only differences were in the minds of the student 'experimenters'. If any consistent differences in performance in the rats could be detected across the two conditions, those differences must have been caused by the expectations that the students had of their rats.

Participants

Twelve students taking a course in experimental psychology in a US University acted as participants in this experiment as part of their course requirements. None of them had any experience in working with animal subjects. In addition, 60 rats, aged between 64 and 105 days old and which had no experience of a T-maze, were used. Throughout the paper the authors refer to the human subjects as 'experimenters' (because that is what the subjects thought they were) and to the rats as 'subjects'. We, on the other hand, will refer to the students as the participants.

The rats were divided into 12 groups such that every group had a similar mean age. There were two males and three females in each group. 'Several days before the beginning of the experiment [the rats were] placed on a 23-hour food deprivation.'

Design

The study used a basic two-condition independent measures experimental design, with participants' beliefs about the relative ability of their group of rats as the independent variable. Participants were sorted into pairs according to their estimates of how much they expected to like working with the rats, and then each pair of participants was split at random across the two conditions. Participants in one condition believed they were working with maze-bright rats; in the other condition participants believed they were working with maze-dull rats. The dependent variable was the mean number of correct responses per rat per day over a five-day period. Other data were also collected, including mean response times for correct responses, and some self-assessment scores from questionnaires that the participants completed.

Procedure

Participants were told that the groups of rats with which they would be working had been bred over a series of generations to be either maze-bright or maze-dull. Maze-bright rats would show 'learning during the first day of running. Thereafter performance should rapidly increase' (p.184). Maze-dull rats should show 'very little evidence of learning' (Ibid). They were led to believe that the aim of the exercise was to give them experience in handling rats, and to give them experience in 'duplicating experimental findings' (Ibid). Each participant was given a group of five rats labelled either maze-bright or maze-dull according to which condition the participant had been assigned. Needless to say. the rats had actually been divided into maze-bright

and maze-dull groups at random. Participants were instructed to run their rats ten times for each of five days on a T-maze. The rats had to learn to discriminate between one arm of the maze which was painted white, and the other which was painted dark grey. Running to the darker arm was always reinforced; whilst running to the white arm was never reinforced. The arms were interchangeable, and swapped round at random, so that the rats could not just learn to run in a given direction. The participants (believing they were experimenters!) recorded success rates per rat per day, time taken for every correct response, and also some post-experimental data on their feelings about their rats and how they had interacted with them.

RESULTS

The data show that the rats which were believed to be maze-bright made, on average, more correct responses each day than the rats which were believed to be maze-dull (Table 21.1 and Figure 21.2). The correct responses of the maze-bright rats were on average quicker than the maze-dull rats on each of the five days (Table 21.2).

Table 21.1 Number of correct responses per rat per day

Day	*Maze-bright*	*Maze-dull*	*t*	*p (one-tailed)*
1	1.33	0.73	2.54	.03
2	1.60	1.10	1.02	ns
3	2.60	2.23	0.29	ns
4	2.83	1.83	2.28	.05
5	3.26	1.83	2.37	.03
Mean	2.32	1.54	4.01	.01

ns = not significant
Source: Rosenthal & Fode (1963)

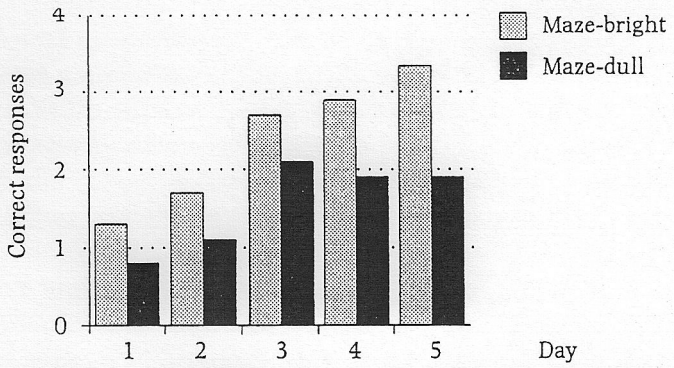

Figure 21.2 *Average number of correct responses per rat per day*

Furthermore, the rats in the maze-bright condition showed a consistent trend of improvement in terms of number of, and speed of correct responses over the five-day period. The performance of the maze-dull rats did not improve every day in this way. In the post-experimental questionnaire participants in the maze-bright condition reported higher levels of cleanliness, tameness, brightness and more pleasantness in

their rats than did participants in the maze-dull condition. The former also made higher estimates of how often they handled their rats, and how gentle they had been with them.

Table 21.2 Mean time in minutes required to make correct response

Day	Maze-bright	Maze-dull	t	p (one-taile
1	3.13	3.99		ns
2	2.75	4.76		ns
3	2.05	3.20		ns
4	2.09	2.18		ns
5	1.75	3.20		ns
Mean	2.35	3.47	3.50	.02

ns = not significant
Source: Rosenthal & Fode (1963)

DISCUSSION

The results certainly seem to indicate that the experimenter effect is alive and kicking in studies of animal behaviour. And if rats can be affected by human expectations, how much more powerful are experimenter effects likely to be in studies of human behaviour? Experimenter bias can have some very serious consequences in scientific tests such as drug trials. If the person administering the drug has an expectation of how it will work, the patient might well behave accordingly. One way of dealing with this is the double-blind design which conceals the experimental hypothesis from the person actually carrying out the experiment as well as from the participant. Alternatively, the person conducting the experiment is not permitted to know which conditions participants have been allocated to. In this way the experimenter cannot have relevant and biasing expectations. This technique is commonly seen when a new drug is being tested against a placebo. None of the people who administer the drugs or who assess the health of the people taking the drugs know at any stage who is receiving the real thing and who is receiving the placebo.

Questions

1. How do you think the experimenter effect worked in this case? If the experimenters' expectations really did lie behind the differences in performance in the two groups how might these expectations have been communicated to the rats?

2. Why were the participants led to believe that the point of the whole exercise was to give them practice in handling rats and in duplicating experimental findings?

3. What are your feelings about animal research? For example. how did you respond to reading about the' 23-hour food deprivation'?