

Assessing the abuse liability of olive oil in rodents

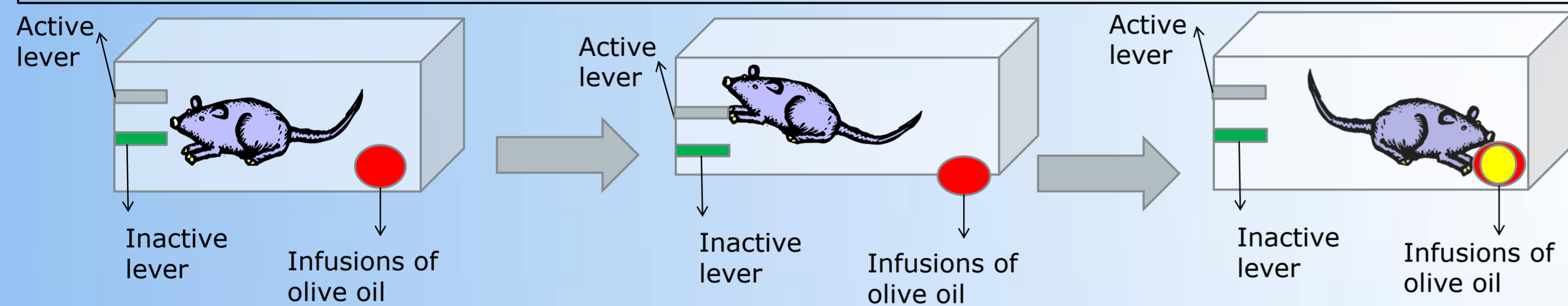
Laura Ridgley, l.a.ridgley@newcastle.ac.uk, Mohammed Shoaib, Institute of Neuroscience, Newcastle University

Introduction

Studies on drug dependence show that nicotine has reinforcing properties which support self-administration behaviour. Nicotine was given to rodents for oral consumption in a vehicle of olive oil however without the nicotine the vehicle of olive oil was seen to also support this self-administration behaviour which is indicative of abuse potential. **The aim of the project was to characterise further the reinforcing effects of olive oil and to examine the extinction behaviour by the removal of the olive oil. Tests with dopamine receptor antagonists will show if this is the same behaviour as with substrates of other abused substances.**

Methods

- Hodder Lister rats were trained daily in operant conditioning chambers in which a lever press delivered 100µl volume of olive oil for oral consumption. These sessions lasted for 1 hour.
- The number of responses were recorded for each animal and plotted onto a graph.
- During acquisition the number of responses required to obtain a delivery was increased progressively.
- Once the behaviour was stable at a fixed ratio of 5 (FR-5) extinction tests were performed where the olive oil was removed.
- Following the extinction test, tests were carried out with pre-treatments of dopamine receptor antagonist, SCH23390 and raclopride at various doses of 2, 6, 20 and 0µl. This test was run 5 times to examine the speed the rodents adapt to the blockade of dopamine receptors.



Results 1.

Figure 1.

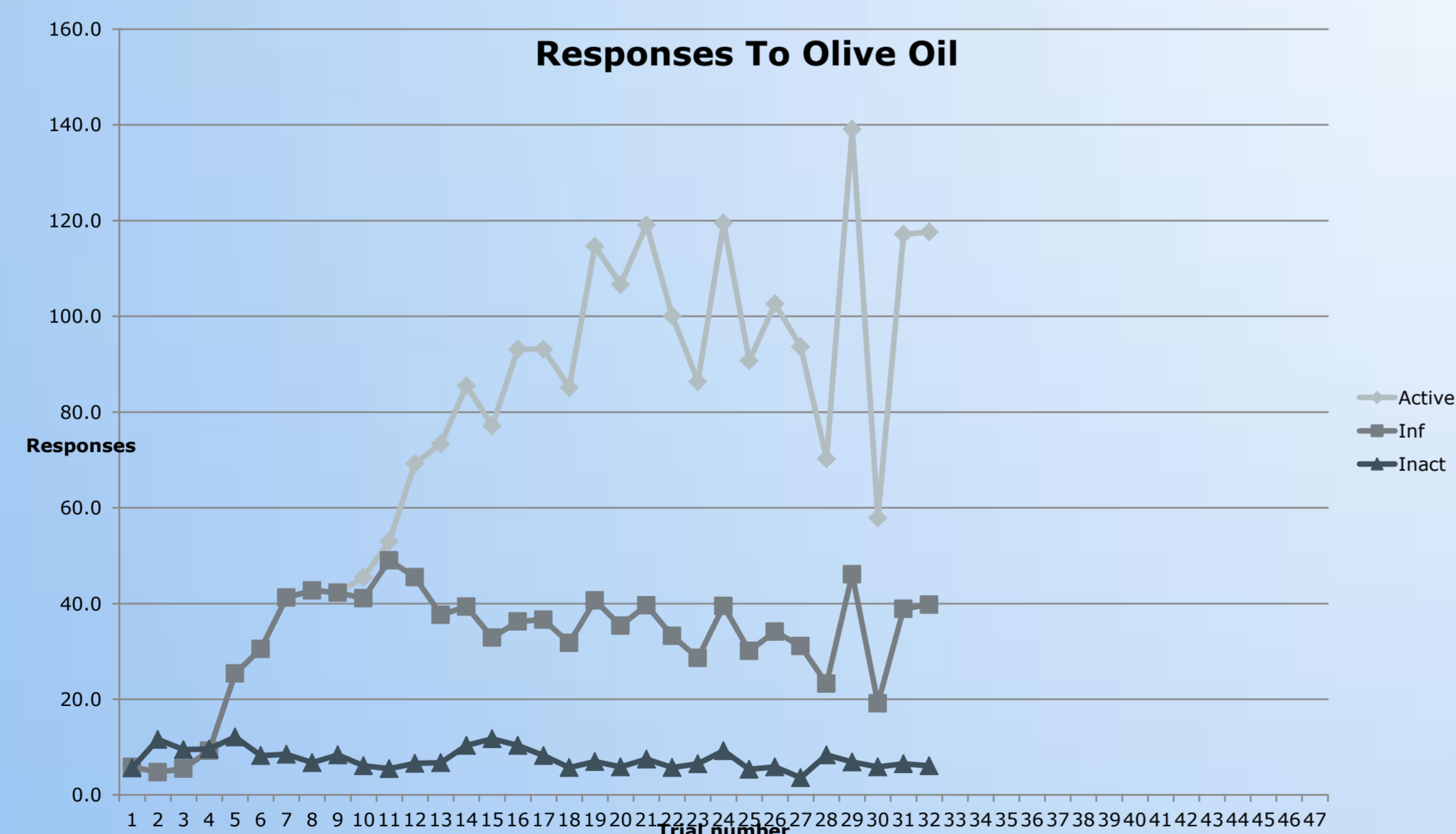


Figure 1. Acquisition of olive oil showed a gradual increase in responses during each session. The inactive lever which delivered no olive oil however was only pressed an average of 6 times showing that there was a clear preference for olive oil. Removal of olive oil where responses were reinforced with distilled water lead to a dramatic decline to only 70 responses within one session suggesting olive oil was serving as a reinforcer.

Results 2.

Figure 2.

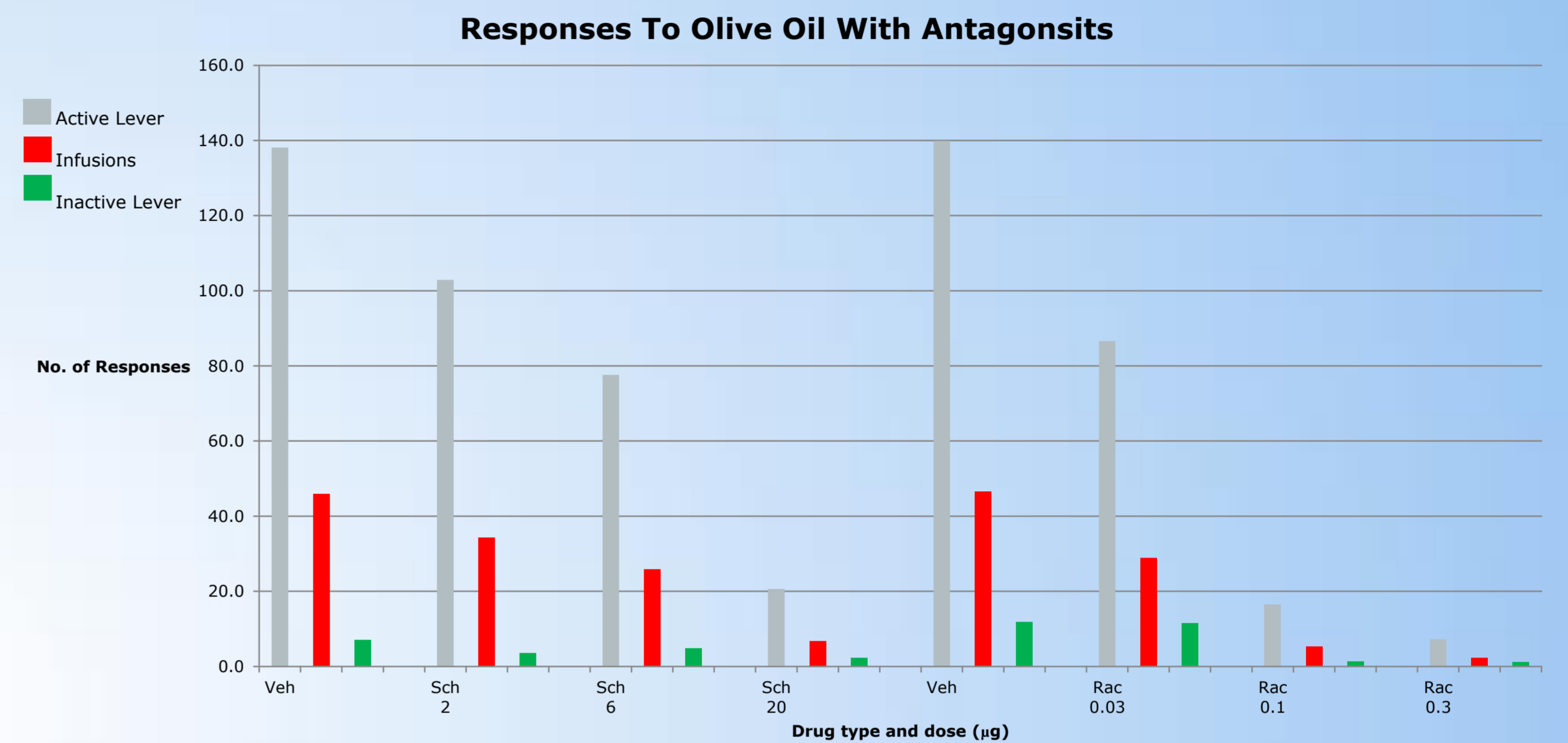


Figure 2. Pre-treatment tests with dopamine receptor antagonists yielded orderly dose-dependent reductions to olive-oil maintained responses. The specific dopamine D1 receptor subtype antagonist SCH23390 produced a decrease in olive oil intake in doses as low as 0.002mg/kg. Complete suppression of behaviour was evident with doses of 0.02mg/kg. A dose of 0.006mg/kg produced a 50% decrease in olive oil intake showing that as doses increased there was more suppression of behaviour with greater blockade of dopamine receptors.

Similarly, raclopride, a D2/3 receptor subtype antagonist was also effective in dose-dependently reducing olive oil consumption. Raclopride produced a decrease in olive oil intake in doses as low as 0.03mg/kg. This shows that raclopride can also potentially suppress olive oil consumption. For this antagonist complete suppression of behaviour was evident with doses of 0.3mg/kg.

Discussion & Conclusion

The data generated suggest that olive oil shares similar motivational properties as with other natural reinforcers such as sucrose and abused substances. Rats were able to acquire self-administration behaviour, exhibit extinction and were sensitive to blockade by dopamine receptor antagonists. All these observations suggest that olive oil could be used in behavioural studies as a comparative reinforcing substance.

This study was supported by The Wellcome Trust.