Case Study : Alternative rewards could help the battle against addiction

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Article

Researchers Magalie Lenoir and Serge Ahmed have discovered something surprising about heroin addiction, at least in rats. It's commonly believed that addiction makes people care less about things like food or relationships.

They conducted an experiment which aimed to examine whether providing an alternative, non-drug reward (food) could reduce drug-seeking behaviour in heroin-addicted rats. To assess whether addiction makes individuals less or more responsive to healthy rewards.

But their study showed that more addicted rats were actually more drawn to food than less addicted ones, suggesting that positive alternatives can still have value, even in deep addiction.

The experiment involved 24 rats, as participants, who were split into two groups. One group, the mildly addicted groups had access to heroin for one hour a day. The second group, strongly addicted, had five hours of access to heroin a day leading to an escalating intake. The strength of the addiction was measured by the number of times each rat pressed the lever to receive heroin. Food was also available at the same time to see if it changed the drug taking behaviour.

The researchers then tested what would happen if the rats could choose between heroin and food at the same time. Results found the rats that were more addicted worked less hard to get heroin when food was available, suggesting that the food acted as a strong alternative reward. In comparison, the less addicted rats showed little change in their behaviour when food was offered.

The results found that without food present, the strongly addicted rats pressed the lever far more than the weakly addicted rats, showing stronger drug motivation. When food was introduced the strongly addicted rats reduced their effort to obtain heroin, showing food acted as a potent alternative reward. The weakly addicted rats' drug-taking was not noticeably affected by food availability. This contradicted the common belief that addiction reduces the value of healthy rewards.

They concluded that food can act as an effective substitute reward for individuals with higher levels of heroin addiction, at least in rats. If similar results apply to humans, it suggests that providing appealing, non-drug alternatives could be a valuable strategy in addiction treatment. This finding challenges the assumption that addiction always dampens interest in healthy rewards, instead suggesting that in severe addiction, substitutes may be especially powerful.

But their study showed that more addicted rats were actually more drawn to food than less addicted ones, suggesting that positive alternatives can still have value, even in deep addiction.

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Links to Specification

4.1.3 The main feature of operant conditioning including: types of reinforcement and punishment (positive and negative).

4.2.2 Animal research.

- The use of animals in laboratory experiments where results can be generalised to humans.
- Ethical issues regarding the use of animals in laboratory experiments, including Scientific Procedures Act (1986) and Home Office Regulations.

8.1.4 Two treatments heroin addiction, including aversion therapy.

8.6 Issues and debates.

- Ethical (e.g. the use of animals when researching drugs and drug treatments.
- Practical issues in the design and implementation of research (e.g. generalising from findings from animal studies to human behaviour).
- Psychology as science (e.g. using animal experiments).
- Nature-nurture (addiction behaviour).

Recommended revision and research activities:

1. Define the terms positive reinforcement and negative reinforcement.
2. Describe the mode of action of heroin.
3. Research operant conditioning as a treatment for heroin addiction.

Challenge task:

How could the results of this study be used to create a treatment for humans that are addicted to heroin?

Exam style questions*

1. Describe **one** ethical issue with the use of animals for researching a treatment for heroin addiction. (2).
2. Explain **one** ethical strength of the use of rats in the Lenoir and Ahmed (2007) 'alternative rewards could help with the battle against addiction' study. (2).
3. Explain **two** weakness of the Lenoir and Ahmed (2007) 'alternative rewards could help with the battle against addiction' study. (4)

(Click here to view Model Response sections)

Additional questions for which the content of the article can be used as part of a response

Evaluate **one** treatment for heroin addiction. (8).

Assess how far human behaviour is a product of nature. (8).

*Exam style questions are not necessarily the exact format of those that will appear in the qualification examination papers but are written to elicit student responses that meet the assessment criteria, which are exemplified by the answers provided. The length of response in the answers is not indicative of expected student responses, and are provided to support centre teaching, student practice and self-assessment.

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Model Response - Click here to return to question page

Exam style questions:

1. Describe **one** ethical issue with the use of animals for researching a treatment for heroin addiction. (2).

One ethical issue is not fully applying the principle of Refinement. In this study, rats were given heroin, which can cause physical dependence and withdrawal symptoms (1) Refinements such as providing pain relief or enrichment could have reduced this suffering by making sure the rats are feeding well after receiving the treatment to ensure that they are back to original health (1).

2. Explain **one** ethical strength of the use of rats in the Lenoir and Ahmed (2007) 'alternative rewards could help with the battle against addiction' study. (2).

Using rats in heroin addiction allows scientists to study addiction and potential treatments without causing harm to humans. Rats are addicted to heroin before the study begins, which would be unethical to induce in human participants due to the harmful effects of addiction.(1) This approach enables researchers to gain valuable insights into heroin addiction and develop effective treatments benefiting society by improving addiction recovery methods (1).

3. Explain **two** weaknesses of the Lenoir and Ahmed (2007) 'alternative rewards could help with the battle against addiction' study. (4)

One weakness of the study is that the results show that food acts as a positive reinforcement and reduces heroin addiction in rats which may not be generalisable to humans, due to differences between rats and humans (1). Due to these differences, the effect of food as a substitute reinforcer in rats may not translate directly to humans, limiting the applicability of the results to real-world human addiction treatment (1).

Another weakness is other studies have found that food did not act as a substitute for opioids in monkeys that were addicted to opioids, this reduces the reliability of the findings of this study as the results have not been replicated in other studies.

Marks awarded and commentary

Q1. This answer gets both marks. Both points are clearly linked to the use of animals in treating heroin addiction. The first mark is for the point saying what the ethical issue is, in this case the care of the animals after the study has ended. (1) The second mark goes on to further describe this ethical issue in what it means in terms of the animals being kept in adequate conditions.

Q2. This answer gets both marks. It is clearly linked to details from the study so is not a generic answer. It gets the first mark for identifying that it allows the use of positive reinforcement to be studied in a more ethical way as it would not be possible to do on humans. This is then exemplified about why this is a strength, as it allow the use of ne knowledge that will help heroin addicts without causing harm to humans.

Q3. This answer gets all four marks. Both weaknesses have been linked to details from this study, so the answers are not generic. The first weakness is identified as the lack of generalisablity between rats and humans (1), which is then elaborated on in terms of reason why humans may take heroin, which are not applicable to the rats in this study (2). The second weakness is identified as the fact that other studies have found that food did not act as an alternative reinforcement to heroin (1), which is then exemplified by the reduced reliability as there has not been consistency in findings from similar studies (2).

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Model Responses - (Click here to return to question page)

Additional questions for which the content of the article can be used as part of a response

Evaluate **one** treatment for heroin addiction. (8).

The following paragraphs could form part of the answer to this question:

AO1. Systematic desensitisation is based on the principles of classical conditioning and pairs an aversive stimulus with heroin so that eventually the reflexive response to taking heroin will be unpleasant such as being sick.

AO3. There are alternative treatments to systematic desensitisation such as the use of positive reinforcement as found by Lenior and Ahmed (2008). They found that access to food reduced the escalation of heroin addiction, so operant conditioning could be used as an early intervention for those who have started to take heroin. This reduced the credibility of aversion therapy as a treatment for heroin addiction.

Assess how far human behaviour is a product of nature. (8).

The following paragraphs could form part of the answer to this question:

AO1. Nurture states that our behaviour is due to our environment. For example, operant conditioning would argue that we become addicted to drugs as it offers us a positive reinforcement such as the high, we get when taking heroin, and therefore the use of other positive reinforcers that reward us can be used to help stop heroin addiction.

AO3. Lenoir and Ahmed show that behaviour is due to nurture as they found that the use of food as an alternative positive reinforcement led to a reverse in the post escalation of heroin addiction, so if the environment provides us with alternative that affects our behaviour, then human behaviour is not just down to our nature.

Level awarded and commentary

Evaluate one treatment for heroin addiction. (8).
The first paragraph demonstrates accurate and thorough knowledge and understanding about aversion therapy as a treatment for heroin addiction (AO1)) Other similarly structured paragraphs may focus on the unconditioned stimulus and response, the neutral stimulus and what could be used, the conditioned stimulus and response, how the stimuli are associated with each other, and the need to top up sessions, The second paragraph displays a well-developed, logical evaluation using the results of this study to support an alternative treatment for heroin addiction, with a mini conclusion at the end of the paragraph (AO3). Other similarly structured paragraphs that use supporting studies, opposing studies and issues with the aversion therapy would lead to a level 4 response overall..

Assess whether human behaviour is due to nature. (8).
The first paragraph show accurate knowledge and understanding of nurture and operant conditioning in terms of nurture (AO1). Other similarly structured paragraphs could include a definition of nature, the use of theories that could apply to nature such as hormones, neurotransmitter and the use of theories that could apply to nurture such as agency theory. The second paragraph displays a well-developed, logical assessment with a judgement at the end of it (AO3). Other similarly structured paragraphs focussing on arguments about how both nature and nurture affect human behaviour that present a balanced assessment with judgements about both sides ot the issue/debate would lead to a level 4 response overall.