17.2 Explanations for Nicotine and Gambling Addiction, and Reducing Addiction

AQA 7182 · about 55 minutes · Write-in edition

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer the short questions in clear sentences for full credit. Spend about 60 minutes on the short and applied questions, and 30 minutes on the 16-mark essay. At least three answers should be written in full sentences.

1 Outline the role of dopamine in the brain reward pathway as it relates to nicotine addiction, in the context of neurochemistry.

(Total for Question 1 is 2 marks)

2 Explain covert sensitisation as a cognitive-behavioural method for reducing addictive behaviours, and outline how it differs from overt aversion therapy.

(Total for Question 2 is 6 marks)

3 Outline learning theory as applied to smoking behaviour, including the role of classical conditioning in cue reactivity for a smoker in everyday settings.

(Total for Question 3 is 4 marks)

4 Outline the gambler's fallacy as a cognitive explanation for errors in gamblers' thinking.

(Total for Question 4 is 2 marks)

5 Outline the illusion of control as a cognitive bias relevant to gambling addiction.

(Total for Question 5 is 3 marks)

6 Outline Nicotine Replacement Therapy (NRT) as a drug-based method for reducing nicotine addiction, naming two common delivery forms.

(Total for Question 6 is 3 marks)

7 Discuss explanations for gambling addiction. In your answer, consider learning theory and cognitive explanations, refer to empirical evidence where relevant, and evaluate how well these accounts explain the development and persistence of gambling addiction.

(Total for Question 7 is 16 marks)

8 Outline how partial or variable reinforcement schedules explain persistent gambling behaviour, naming the schedule most relevant to gambling machines.

(Total for Question 8 is 3 marks)

9 Case scenario for application. Callum is a 45 year old who smokes 20 cigarettes per day and has tried quitting several times but relapses when stressed. He reports that having a coffee and stepping outside with colleagues is an automatic trigger to smoke. The clinic offers a combined programme of nicotine replacement therapy delivered by patch and weekly group sessions teaching coping strategies for cue exposure and stress management.

Explain how this combined programme aims to reduce Callum's smoking. Refer to both the pharmacological and behavioural components and link each to mechanisms discussed in the specification.

(Total for Question 9 is 6 marks)

Mark scheme · 17.2 Explanations for Nicotine and Gambling Addiction, and Reducing Addiction

Question 1

states that nicotine increases dopamine release in the mesolimbic reward pathway, including the nucleus accumbens oe — **B1**

links increased dopamine to reinforcing pleasurable effects that encourage continued smoking oe — **B1**

Answer: Nicotine stimulates dopamine release in the mesolimbic reward pathway, including the nucleus accumbens, producing pleasurable reinforcement that increases the likelihood of continued smoking.

Question 2

defines covert sensitisation: a therapy where the client imagines unpleasant consequences of the addictive behaviour to create negative associations oe — **M1**

explains the process: guided imagery is used to pair the behaviour with adverse imagined outcomes until the urge decreases oe — **A1**

compares with overt aversion: covert sensitisation uses imagination rather than actual physical aversive stimuli oe — **M1**

explains a benefit: it avoids physical harm and ethical issues associated with inducing real discomfort, and may be more acceptable oe — **A1**

identifies a limitation: relies on vivid imagination and client motivation, so may be less effective for some individuals oe — **M1**

explains why this matters: those unable to engage with imagery may not form strong aversive associations, reducing treatment efficacy oe — **A1**

Answer: Covert sensitisation uses guided imagery to have clients imagine unpleasant consequences of the addictive behaviour, creating negative associations and reducing urges; unlike overt aversion it does not use real physical aversive stimuli, which reduces ethical concerns, but it depends on the client's ability to vividly imagine and engage, which limits effectiveness for some people.

Question 3

states that learning theory includes classical and operant conditioning explanations for smoking behaviour oe — **M1**

explains classical conditioning: neutral cues (e.g. coffee, social situations) become associated with smoking and elicit craving as conditioned responses oe — **A1**

explains operant reinforcement: nicotine's rewarding effects positively reinforce smoking and negative reinforcement occurs when smoking relieves withdrawal symptoms oe — **A1**

mentions cue reactivity as a practical consequence: cues trigger craving and increase relapse risk oe — **B1**

Answer: Learning theory explains smoking by classical conditioning, where neutral cues like coffee or social settings become linked to smoking and trigger cravings, and by operant reinforcement, where nicotine rewards and relief from withdrawal reinforce smoking; cue reactivity means environmental triggers provoke craving and relapse.

Question 4

states that the gambler's fallacy is the belief that past random events affect the probability of future independent events oe — **B1**

gives an example: believing a roulette wheel is 'due' to land on red after a run of blacks oe — **B1**

Answer: The gambler's fallacy is the mistaken belief that past random outcomes change the chances of future independent events, for example thinking a roulette wheel is 'due' to land on red after several blacks.

Question 5

identifies illusion of control as the belief that one can influence or control chance outcomes more than is realistic oe — **M1**

explains how this bias can lead gamblers to overestimate their skill or influence, for example throwing dice 'harder' to get a certain outcome oe — **A1**

links this to persistence of gambling behaviour despite low probabilities of winning oe — **B1**

Answer: The illusion of control is the biased belief that one can influence chance outcomes, leading gamblers to overestimate their skill or influence and to persist in gambling despite low probabilities of winning.

Question 6

states that NRT supplies controlled doses of nicotine to reduce withdrawal symptoms and cravings oe — **M1**

names two common delivery forms, for example nicotine gum, patches, lozenges, inhalators or nasal spray oe — **A1**

explains that NRT aims to reduce dependence by easing withdrawal while behavioural support helps cessation oe — **B1**

Answer: NRT provides controlled nicotine doses to reduce withdrawal and cravings; common forms include nicotine patches and gum, and NRT is used alongside behavioural support to help people stop smoking.

Question 7

Level 4 Knowledge of learning and cognitive explanations for gambling addiction is accurate, detailed and well organised. Evaluation is thorough, balanced and explicit, considering empirical support, methodological issues and real-world applicability. Material from both explanations is used interactively to develop a coherent judgement about their explanatory power. Specialist terminology is used effectively. — **13-16**

Level 3 Knowledge of the explanations is sound with reasonable detail. Evaluation is present and relevant, with some balance between supporting and challenging evidence. There is some integration of material and a conclusion, though treatment of competing explanations or methodological issues may be limited. Terminology is used, mostly appropriately. — **9-12**

Level 2 Basic knowledge of learning and cognitive explanations is present but limited or partially inaccurate. Evaluation is superficial or one sided. Application to empirical evidence or real-world implications is limited. The answer may lack coherence and specialist terms are used inconsistently. **5-8**

Level 1 Very limited content, mostly descriptive or irrelevant. Little or no evaluation. Little evidence of understanding of gambling addiction. Specialist terminology is largely absent or misused. **1-4**

Level 0 No creditable content. **0**

Indicative content:

- AO1: Learning theory explanations include operant conditioning with partial and variable reinforcement schedules, especially variable ratio schedules used by gambling machines that produce high response rates and resistance to extinction; classical conditioning explains cue reactivity when environmental cues become associated with wins and trigger gambling urges.
- AO1: Cognitive explanations focus on biased thinking in gamblers, including the gambler's fallacy, the illusion of control and selective recall of wins, and erroneous beliefs about randomness and probability that sustain persistence despite losses.
- AO1: Learning theory mechanisms: positive reinforcement from wins, negative reinforcement through escape from negative feelings, and the role of intermittent reward in maintaining behaviour.
- AO3: Empirical support for learning theory includes laboratory studies showing variable ratio schedules produce persistent responding, and cue-reactivity studies where cues elicit physiological arousal and craving; however many lab tasks lack external validity compared with real gambling environments.
- AO3: Support for cognitive accounts includes research showing problem gamblers display stronger cognitive biases on tasks and in self-report, and that cognitive interventions such as cognitive restructuring can reduce gambling behaviour, suggesting causal relevance of distorted cognitions.
- AO3: Limitations of learning theory: does not easily explain the initial development of biased cognitions or why some people exposed to the same reinforcement schedules do not develop addiction; individual differences and genetic or neurobiological vulnerability also matter.
- AO3: Limitations of cognitive theory: cognitive distortions may be partly rationalisations after losses rather than primary causes; some evidence is correlational and reverse causality is possible, for example repeated losses could increase biased thinking.
- AO3: Integrative perspectives and real-world application: combined models drawing on learning and cognitive factors explain complementary aspects, and effective interventions often combine behavioural measures (limits, removal of cues), cognitive therapy, and self-exclusion or financial controls.
- AO3: Consideration of methodology: many studies are correlational or use self-report, samples often clinical or help-seeking so generalisability is limited; experimental manipulations can show causal effects for certain mechanisms but often in artificial settings.
- AO3: Conclusion might argue that learning and cognitive explanations together provide a powerful account of maintenance and persistence of gambling addiction, while neurobiological and individual-difference factors explain vulnerability, so a multi-factorial model is most convincing.

Question 8

states that partial reinforcement delivers rewards only some of the time rather than every time oe **M1**

explains that a variable ratio schedule, where reward follows an unpredictable number of responses, produces high response rates and resistance to extinction oe **A1**

identifies variable ratio reinforcement as typical of slot machines and other gambling devices oe **B1**

Answer: Partial reinforcement gives rewards only sometimes; a variable ratio schedule, where wins occur unpredictably after a varying number of plays, produces persistent high rates of play and resistance to extinction and is typical of slot machines.

Question 9

explains the pharmacological component: patch provides steady nicotine to reduce withdrawal and cravings, lowering physiological drive to smoke oe **M1**

links this to receptor-level effects/tolerance withdrawal, e.g. reducing withdrawal symptoms that would otherwise motivate smoking oe **A1**

explains the behavioural component: group sessions teach coping strategies such as cue exposure, avoidance, or stress management and coping skills oe **M1**

links cue exposure/management to breaking conditioned associations between cues like coffee and smoking, reducing cue reactivity oe **A1**

explains how combining approaches addresses both physiological and learned/psychological triggers, reducing relapse risk oe **M1**

applies this to Callum specifically, e.g. patch reduces urges when stressed and sessions teach him to cope with coffee/colleague cues so he is less likely to relapse in those situations oe **A1**

Answer: The nicotine patch provides steady nicotine to reduce withdrawal symptoms and physiological craving, addressing receptor-level dependence and tolerance, while weekly group sessions teach coping strategies and cue-exposure or avoidance to weaken the conditioned association between coffee/colleague breaks and smoking; together the pharmacological and behavioural elements reduce both the biological drive and the learned triggers that cause Callum to relapse when stressed.