Biological model of addiction

Initiation

Twins and families can be studied to determine how likely a person is to develop an addiction based on how genetically related they are to others with an addiction.

Support	Against
Agraval and Lynskey (2008): by comparing MZ and DZ twins it has been found that 30-70% of drug addiction can be explained by genetics.	Heritability estimates are always below 100% therefore environmental influences should be taken into account

By **genetically analysing** individuals with addictions and comparing them to those without addictions it is possible to determine what specific genes make a person more likely to start an addiction. Specifically, addicts with an A1 variant of the dopamine receptor gene have fewer dopamine receptors in the pleasure centres of their brains. Therefore, they are more likely to become addicted to drugs/behaviour that increase dopamine levels, as this compensates for the deficiency by stimulating the few dopamine receptors they have.

Support	Against
Volkow et al. (2000): participants with fewer dopamine receptors enjoyed the feeling of Ritalin releasing dopamine in their brain compared to those with more dopamine receptors. Those with less dopamine receptors are more vulnerable to drug stimulation which is why some people continue to take drugs after first trying them, whereas others do not have more than one experience.	**Comings et al. (1991):** the A1 gene variant occurs in patients with disorders other than addiction, such as autism and Tourette's, indicating that the gene variant may not be specifically related to addiction.
Comings et al. (1996): nearly 50% of smokers and ex-smokers have the A1 variant.	**Volkow (2003):** just because a person has fewer dopamine receptors and may be more vulnerable, this doesn't mean that they will definitely develop an addiction, because they may be brought up in surroundings that are stimulating enough to protect against addiction e.g. if their parents encourage them to engage in many sports and activities.
Genetic explanations help us to understand individual differences concerning how some people become addicted because they are genetically vulnerable, compared to others who do not develop an addiction despite having the same environmental experiences.	

Maintenance

Repeated exposure to alcohol/drugs results in downregulation, which is the reduction in activity of the reward circuit in the brain. This reduced activity causes an ongoing stressful situation for the addict involving withdrawal symptoms and anxiety. This stress motivates them to seek more drugs, therefore they are no longer taking drugs because they enjoy them, but instead because they are trying to avoid their unpleasurable state of anxiety. Because the reward circuit becomes gradually less able to respond, the addict has to consume more and more drugs to activate it.

Relapse

Drugs can affect the addict's brain by impairing their frontal cortex. This makes it more difficult for them to make good decisions and to show self-control over their behaviour, which increases the risk that the addict will relapse.

Cognitive models of addiction

Initiation

Self-medication model

Individuals intentionally use drugs to treat psychological symptoms from which they suffer. The particular drug an addict uses is one that is perceived as helping with a particular problem. Initiation of drug use, and the choice of drug, depends on the specific effect that an individual desires. Some drugs may be chosen because they help the individual overcome anxiety, others because they control aggressive urges. The drug may not actually improve their life, but for the individual to become addicted it is more important that they think the drugs are relieving their symptoms.

Support	Against
Sanjuan et al. (2009): sexually abused women were more likely to turn to alcohol to remove sexual inhibitions.	There are many cases of addiction where there are no major psychological problems to be overcome.

Expectancy theories : drug use escalates into addiction because of the expectations that an individual has about the benefits and costs of the addictive substance. Alcohol consumption is said to be directly related to how much an individual believes it will deliver a positive effect.

Support	Against
Southwick et al. (1981): heavier drinkers have more positive expectations about the effects of alcohol compared to light drinkers.	Expectancy theory concerns the consumption of alcohol which may not reflect addiction, where there is a loss of control for addiction.
Brown (1985): heavier drinkers expect alcohol to provide social and physical pleasure, reduce tension and lead to greater sociability.	**Sher et al. (1996):** gender differences should be taken into consideration: men are more likely than women to report positive expectations for alcohol as a way of reducing tension and easing social interactions.
Leigh (1987): people are more likely to abuse more alcohol if they have a favourable evaluation of it	

Maintenance

Self-medication model

When the person is addicted to the drug, the psychological symptoms they are trying to treat become the withdrawal symptoms which are the result of not consuming the drug for a certain time.

Parrott (1998): in the short-term a cigarette relieves the stress from withdrawal symptoms, however in the long-term, smoking increases stress so the addict needs to smoke more often. For alcohol, it may help an individual put aside their worries and problems, however, when they develop an addiction they will become more anxious and have more problems because of it which they require even more alcohol to handle.

Expectancy

As an addiction develops, the activity is influenced less by conscious expectations and more by unconscious expectations involving automatic processing, which results in the loss of control that addicts have.

Learning model of addiction

Initiation

Operant conditioning

Any behaviour producing a consequence that the individual finds rewarding is likely to lead to the behaviour becoming more frequent. All positive reinforcers have the same physiological effect in that they increase the release of dopamine in the mesolimbic reward circuit. Addictive drugs produce this biological effect. Gamblers playing slot machines become addicted because of the physiological, psychological, social and financial rewards.

Support	Against
Operant conditioning explains how an addiction can develop without conscious awareness, which makes it clearer how an addict may consciously want to stop their addiction but their unconscious impulsive desire causes them to continue.	**Robinson and Berridge (1993):** many people try addictive drugs but only a few become addicts which means that there have to be other factors apart from reward which result in the change from consumption to addiction.

Classical conditioning

Alcohol related stimuli elicit many of the same physiological responses as alcohol itself, such as increased heart rate and arousal.

Social learning theory

Learning of addictions can take place through observation and communication. Observing others having positive experiences of drugs will increase repeated drug use. However observing adverse drug taking experiences decreases the likelihood of the experience being imitated. The individual observes the different effects drugs may have on people, which in turn may trigger them to take certain drugs e.g. someone might smoke cannabis if they see that other users are relaxed by it.

Maintenance and relapse

Operant conditioning

After repeated exposure to drugs, withdrawal symptoms appear if the drug is discontinued. These withdrawal symptoms can be reduced by using the drug again. The reduction of the unpleasant withdrawal symptoms is **negative reinforcement**, so addicts constantly seek the drug to reduce such symptoms.

Classical conditioning

The drug effect is an **unconditioned stimulus** which changes the biological balance inside the body. In response to this change, there is an **unconditioned response** from the body as it tries to restore balance. Any stimulus that comes before the drug is a **conditioned stimulus** resulting in the body showing a **conditioned response** in anticipation of the effects of the drug. Conditioned responses that occur in the absence of the anticipated drug put the body into a state of imbalance which involves withdrawal symptoms. The individual is then motivated to continue taking the drug as a way of reducing the symptoms from bodily imbalance which are caused by the conditioned stimulus.

Support
Robins et al. (1975): Soldiers who became addicted to heroin while in Vietnam and then returned home to a completely different environment were less likely to relapse than those returning to an environment similar to Vietnam which provided cues causing them to relapse.
Drummond et al. (1990): by understanding how classical conditioning leads to addiction it is possible to apply the research to treat addiction by using cue exposure, which involves presenting the cues associated with a drug (e.g. the sounds and smells of a night club) while preventing the opportunity to consume drugs. Without reinforcement from the actual drug, the association between the cues and the drug-taking is reduced (extinguished) which reduces the future cravings for the drug that arise when exposed to the cues.

Social learning theory

Being surrounded by other drug-users who always seem to be enjoying themselves and having positive experiences from drugs may encourage an individual to maintain their addiction.

Support
DiBlasio and Benda (1993): peer group influences are the primary influence for adolescents who smoke or use drugs.
Botvin (2000): the social learning theory explanation of addiction can be applied to develop drug prevention programmes. Training adolescents to refuse drugs and helping them to understand how they are influenced by peers and adults helps adolescents to protect themselves against the drug-taking influences in their environment.

Smoking

Initiation of smoking addiction

Learning model

Brynner (1969): the start of a smoking addiction can be explained by classical conditioning, through which a person associates smoking with maturity and popularity. The strong association with such benefits is enough for them to want to continue smoking more cigarettes even after the unpleasantness of the first cigarette.

Social learning theory can also explain the initiation of smoking addiction, where children are twice as likely to smoke if they have parents who also smoke. Their parents are a powerful influence on them so the child may model their smoking behaviour. According to social learning theory, peers are also important: 90% of US smokers claimed that they began smoking because they watched their friends smoking (NIDA, 2000).

Jarvis (2004): children who view smoking as beneficial are more likely to come from backgrounds that approve of smoking or from areas where smoking is common.

Maintenance of smoking addiction

Biological model: genetics of smoking addiction

Support	Against
Stefansson et al. (2010): from studying over 140,000 participants it was found that there were genetic mutations which increased the number of cigarettes smokers had daily and these genes were related to nicotine dependence.	**Charlesworth et al. (2010):** rather than genes changing smoking behaviour, it could be that smoking changes genes, where many genes have been found to be affected by nicotine.

Biological model : Effects of nicotine on the brain

Nicotine activates receptors which cause the release of dopamine in the brain's reward circuit. This release results in temporary feelings of pleasure, however such feelings fade quickly and within hours of their last cigarette nicotine levels start to drop which result in lower mood and anxiety. The smoker then reduces such anxiety by smoking another cigarette. Therefore the smoker has to keep on smoking in order to reduce the withdrawal symptoms of not smoking.

Support
Khaled et al. (2009): long-term smoking can have a harmful effect on mood by changing the chemistry of the brain, where smokers are more likely to be depressed. Their depression may make them want to smoke more to make them feel less depressed.

Gambling addiction

Initiation of gambling addiction

Biological model: genetics of gambling addiction

Support	Against
Black et al. (2006): first-degree relatives (brothers, mothers etc.) of pathological gamblers are more likely to suffer from pathological gambling than more distant relatives (e.g. cousins). This indicates a genetic influence on gambling because first degree relatives share more genes in common than distant relatives.	**Coventry and Brown (1993):** genetics may influence addiction through personality, however gamblers who betted on horse racing were found to be lower on sensation seeking than non-gamblers.
Slutske (2010): in a study of almost 5000 male and female twins it was found that identical twins (who share 100% genes) were twice as likely to develop a gambling addiction as non-identical twins (who share 50% genes)	
Alessi and Petry (2003): genetics may work indirectly and result in impulsivity which can increase the likelihood of developing pathological gambling.	

Learning model

According to social learning theory the desire to begin gambling can be triggered by seeing others being rewarded for their gambling behaviour. Classical conditioning explains that the gambling activity is associated with positive experiences.

Maintenance and relapse

Biological model

Winning in gambling triggers the release of dopamine in the brain's reward circuit. Pathological gamblers have increased activity in the reward circuit when they are gambling and even when they anticipate gambling compared to social gamblers who tend to only have low activity in the reward circuit while they are actually gambling.

Support
Chase and Clark (2010): pathological gamblers have more reward circuit activity while they are gambling compared to casual gamblers.

Cognitive model

Gamblers often have biases, which are shortcuts in thinking that can lead to bad decisions. The availability bias involves the belief that something is more likely to happen because it has occurred in the past e.g. someone playing a slot machine may only remember the previous times they have won, ignoring the times they have lost, which makes them want to play more. Gamblers also often have an illusion of control, incorrectly believing that they can influence the outcomes of the gambling activity.

Support	Against
Griffiths (1994): Regular gamblers and occasional gamblers expressed out loud what they were thinking while gambling. It was found that regular gamblers were more likely to express irrational thoughts, such as believing that they had skill or control over the gambling machines.	**Dickenson and Baron (2000)**: the increased irrational talking could be due to demand characteristics where the participants are trying to explain their behaviour to the researcher who is clearly observing them.

Learning model

Maintenance of gambling addiction can be explained by operant conditioning, specifically involving a **variable ratio of reinforcement**. This is a predictable pattern of reinforcement, where for example the gambler playing a slot machine may be reward after playing 10 times, then rewarded after 100 plays, 50 plays, 100 plays etc. The lack of predictability for when the reward may occur makes such reward feel more intense and encourages the gambling behaviour to continue.

Risk factors

Stress

Everyday stress

Addiction is generally associated with relieving anxiety. People report that they drink, smoke, use drugs, gamble etc. as a means of coping with daily hassles such as relationship problems, money worries and workplace stress. Such daily stressors may contribute to initiation and continuation of addictions, as well as to relapse after periods of abstinence.

Cloninger (1987): individual differences for reacting to stress have to be taken into consideration, because stress can result in vulnerability to addiction for Type 1 alcoholics who drink because they are trying to reduce worry, but not for Type 2 alcoholics who drink only to relieve boredom.

Traumatic stress

People exposed to severe stress are more vulnerable to addictions, especially children who have experienced parental loss or child abuse.

Driessen et al. (2008): 30% of drug addicts and 15% of alcoholics also suffer from post-traumatic stress disorder.

Peers

McAlister et al. (1984): a person may feel the need to smoke because of **peer pressure**, specifically because of peer encouragement and approval of smoking as well as the belief that smoking will make them more popular.

Eiser et al. (1991): those who give in to the peer pressure of friends who smoke are more likely to have mostly friends that smoke, whereas those who do not smoke are more likely to be friends with other non-smokers.

Social learning theory (Bandura, 1977): behaviours are learned through the observation of others and subsequent modelling of this behaviour. Young people are most likely to imitate the behaviour of those with whom they have the most social contact. After they have started smoking, whether they continue to smoke depends on if they have good (e.g. meet new people who smoke) or bad experiences (end up smoking outside on their own) with it.

Support
Duncan et al. (1995): exposure to peer models who smoke increases the likelihood that teenagers will begin smoking.
Eiser et al. (1989): adolescents who perceive rewards such as higher social status and popularity from smoking are more likely to smoke.

Social identity theory (Abrams and Hogg, 1990): group members adopt the norms and behaviours that are central to the social identity of the group to which they belong. In peer groups where status as smoker is central to the social identity of the group, individuals are more likely to be smokers. If non-smoking status is central to the social identity of the group, they are more likely to be non-smokers.

Support
Mitchell (1997): adolescents are motivated to begin smoking if they hold positive stereotypes about what groups of smokers are like.

Age

Brown et al. (1997): peer influence on smoking and drug abuse becomes less powerful as the adolescent grows up, where eventually the strongest influence is from only their close friends or their romantic partner.

Personality

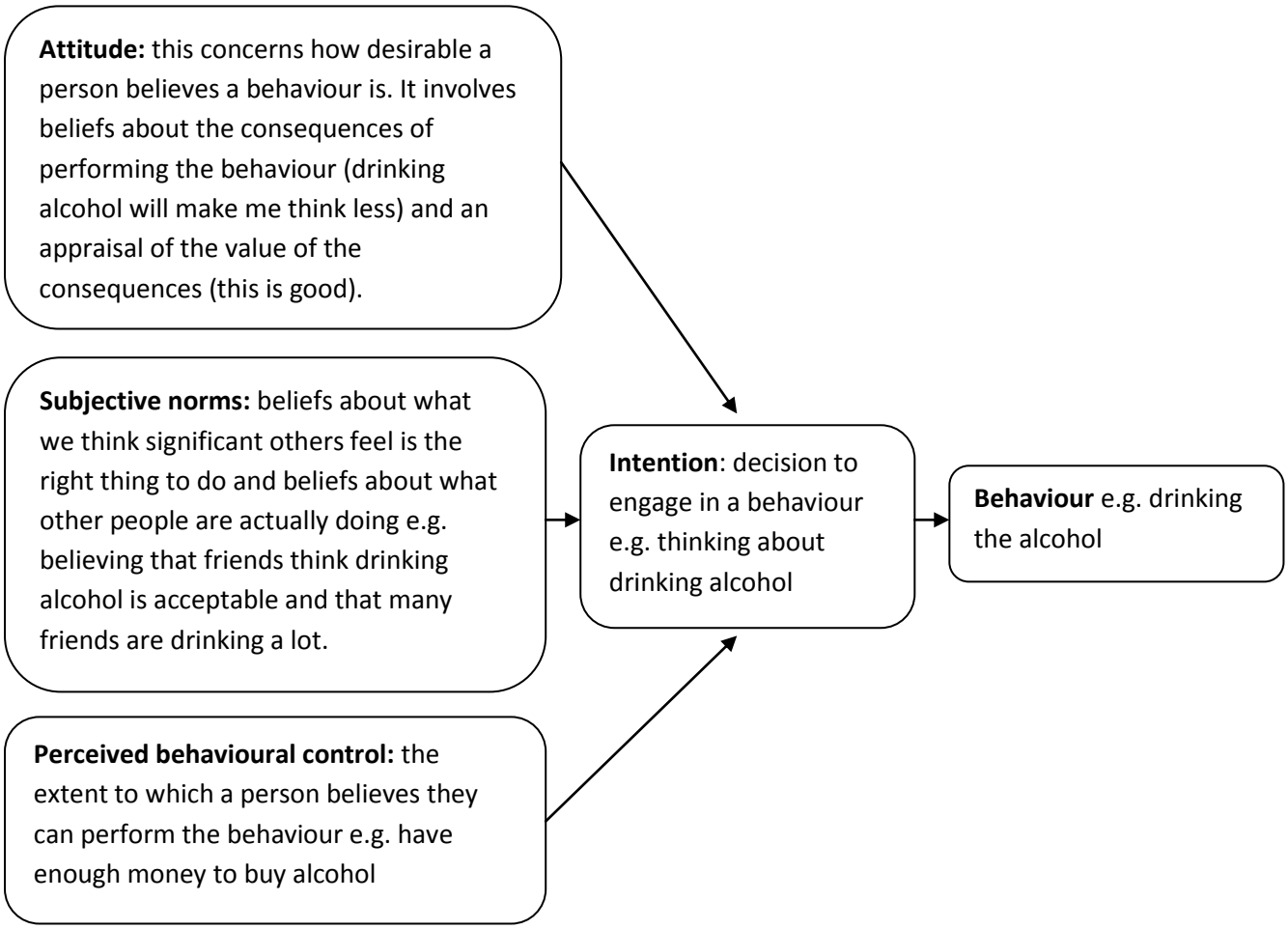
The way a person behaves can change from situation to situation, for example, you are unlikely to behave in the same way with a teacher as you are at a party with friends. However, there is likely to be some consistency in the way a person behaves in different situations and this is reflected by the personality they have. To measure what kind of personality a person has, psychologists typically use questionnaires and many have found that people with certain personalities are more likely to become addicts.

Support	Against
Francis (1996): addicts are more likely to score highly on neuroticism (experience a lot of anxiety and depression) and psychoticism (hostile and impulsive).	**Teeson et al. (2002)**: It is difficult to determine whether personality increases the likelihood of addiction or alternatively, that addictive behaviour causes changes in personality.
Zuckerman (1983): high extraversion (often bored and seeking arousal) makes a person more likely to seek drugs or alcohol.	
Cloninger (1987): a person is more likely to become an addict if they have high scores on novelty seeking (want new experiences), harm avoidance (worry and fear of uncertainty) and reward dependence (repeat behaviour which provides reward).	
Weintraub et al. (2010): People who are naturally higher in impulsivity because of increased dopamine levels are more likely to become addicted.	

Media influences on addictive behaviour

Support	Against
Gunasekera et al. (2005): reviewed 87 of the most popular films over the past 20 years found that 1/3 of the movies portrayed alcohol use and around 2/3 showed smoking. Only the positive consequences of drug use were shown and not the negative effects.	**Boyd (2008):** films frequently do present the negative consequences of alcohol and drug dependence such as physical problems, experience of sexual abuse, and violence.
Sulkunen (2007): analysis of 47 films found that many of the scenes presented drug competence as a way of reducing particular life problems as well as scenes involving enjoyment of the drug effects in contrast with the apparent dullness of daily life.	**Bennett et al. (1991):** viewers watching a TV series for problem drinking had improved knowledge concerning alcohol, however, the series was ineffective because it did not change their attitude or actual alcohol consumption. This is evidence against media having a role in changing addictions.
Sargent and Hanewinkel (2009): more than 4000 teenagers were surveyed and it was found that for those who were non-smokers, exposure to movie smoking over a year was a strong predictor of whether they had begun smoking a year later.	**Hornik et al. (2008):** an anti-drug media campaign in the US used TV, radio and the internet to spread messages concerning the negative consequences of drug use. This campaign was unsuccessful and may have increased marijuana use, possibly because it included portrayals of groups of teenagers consuming marijuana together, accidentally emphasising the social benefits of marijuana use to make teenagers more likely to consume it.
Kramer et al. (2009): a 5 week TV self-help intervention for problem drinking was effective in reducing alcohol intake. This shows that media does have an influence on addictive behaviour and that such influence can be positive.	

Theory of planned behaviour



Strengths	Weaknesses
Slater et al. (2011): attitudes can be effectively targeted to reduce cannabis use by emphasising that a positive attitude towards cannabis is inconsistent with being independent and achieving aspirations.	**Armitage et al. (1999**): too rational and doesn't take into account emotions which drive their behaviour in real life situations.
Wilson and Kolander (2003): adolescents often have inaccurate **subjective norms** and believe that more people smoke than is true, therefore smoking can be reduced by providing accurate statistics about how few people actually smoke	**Klag (2006)** motivation is not considered, however it has been found that individuals who were self-motivated were more likely to be successful in giving up their addiction compared to others who were forced into giving up.
Godin et al. (2006): from interviews and surveys of adults it was found that **perceived behavioural control** was the most important predictor of giving up smoking. Anti-smoking interventions should emphasise that giving up smoking is not easy as it requires a lot of willpower and effort. For example, Nicorette adverts may be effective because at the end they express 'Willpower required'.	**MacDonald et al. (1996):** intentions are measured when sober, however intentions can change because of alcohol. It was found that being drunk led to intentions of having risky unprotected sex.

Types of intervention

Biological interventions

Methadone provides similar effects to heroin but is less harmful and less addictive therefore it can be used to treat heroin addiction. A drug user can be prescribed methadone and the dose is gradually reduced over time so that they can give up heroin without experiencing acute withdrawal symptoms. **SSRI's** may be used as well: these increase the amounts of certain chemicals in the brain which addicts have low levels of, such as serotonin.

Support	Against
Hollander et al. (2000): 10 gamblers treated with SSRIs (drugs which increase serotonin levels) became less addicted to gambling.	Some addicts can become as addicted to methadone as they were to heroin.
Blanco et al. (2002): for 32 gamblers over 6 months SSRIs were not found to be effective	
Kim and Grant (2001): naltrexone can reduce gambling thoughts and behaviour by reducing the amount of dopamine in the brain which makes gambling feel less rewarding.	

Psychological interventions

Reinforcement

Addicts can be encouraged to stop consuming drugs if they are reinforced for not taking drugs.

Support	Against
Sindelar et al. (2007): heroin addicts had lower drug use if they were rewarded with prize money each time they tested negative for drugs.	Reinforcement does not solve the problem that caused the addiction in the first place. It is possible that they may develop an addiction to something else instead. For example, a cocaine addict may give up their addiction, but they may still experience a lot of distress in their life and so they could develop an addiction to alcohol instead.

Cognitive behavioural therapy

CBT can reduce pathological gambling by helping addicts to correct their errors in thinking, where for example they may incorrectly believe that they can control the outcomes of gambling.

Support
Ladouceur et al. (2001): after gambling addicts received cognitive therapy the majority of them were no longer addicted to gambling. The therapy improved their belief that they could handle their addiction.
Sylvain et al. (1997): cognitive therapy reduced gambling behaviour in a group of males even a year after therapy was complete.

Public health interventions

Crits-Christoph et al. (2003): interventions were provided to almost 500 cocaine addicts and it was found that individual and group drug counselling was the most effective intervention at reducing weekly cocaine consumption.

Stead et al. (2006): this meta-analysis found that smokers who received repeated telephone calls from a counsellor as part of an intervention, were 50% more likely to stop smoking than smokers who were only provided with self-help materials e.g. books with advice on quitting.

Beckham et al. (2008): from a group of 24 US military veterans provided with telephone calls from counsellors (as well as medication) almost half had stopped smoking by their agreed quit date.