

The big picture

Subtopic question(s)

During this subtopic, you will be working towards answering the following subtopic questions:

- To what extent am I in control of my own health?
- Is addiction a function of biology or the mind?
- Can stress make us unwell?

The guiding question(s) in each section help to guide you towards answering the subtopic question(s) at the end of the subtopic. The subtopic question(s) require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

Think about this question. Is stress:

1. bad for you?
2. good for you?
3. in your control?
4. out of your control?
5. all the above?

Stress is a natural response to the challenging and threatening situations that most people will deal with at points in their lives. It can range from mild to chronic, long-term stress, affecting our health. However, the nature of health problems such as addiction and stress is highly complex. It is important to understand the connections between these problems and the physical, mental, social and economic impacts that such problems can have. Watch **Video 1**, featuring psychologist Kelly McGonigal, on how stress can be seen as a positive aspect of life.

Rethinking Stress: Why Stress Mindsets Matter - ft. Kelly M...



Video 1. Rethinking stress and why our mindsets matter.

Making connections

In previous sections, you learned about the various etiologies and treatments for depression. Health problems such as stress and addiction can be viewed through a similar lens: the explanations for and factors that lead to these problems help psychologists understand how to manage and prevent them. This subtopic links to the following subtopics and guiding questions:

- To what extent does the environment contribute to the development of mental health disorders? ([subtopic 2.1 ↗](https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49425/)
(<https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49425/>))
- What shapes your identity? ([subtopic 3.2 ↗](https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49519/)
(<https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49519/>))
- To what extent do environments dictate human behaviour? ([section 4.1.1 ↗](https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/can-your-environment-affect-your-behaviour-id-49127/)
(<https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/can-your-environment-affect-your-behaviour-id-49127/>))

How can the theory of planned behaviour explain health choices?

Guiding question(s)

In this subtopic, you will think about the question, 'To what extent am I in control of my own health?' This section will help you make an informed response by working through the following guiding question:

- How does the theory of planned behaviour inform our understanding of health-related behaviour?

This section will examine key theories that explain why an individual would or would not engage in a health-related behaviour, focusing on the role of motivation within each cognitive framework.

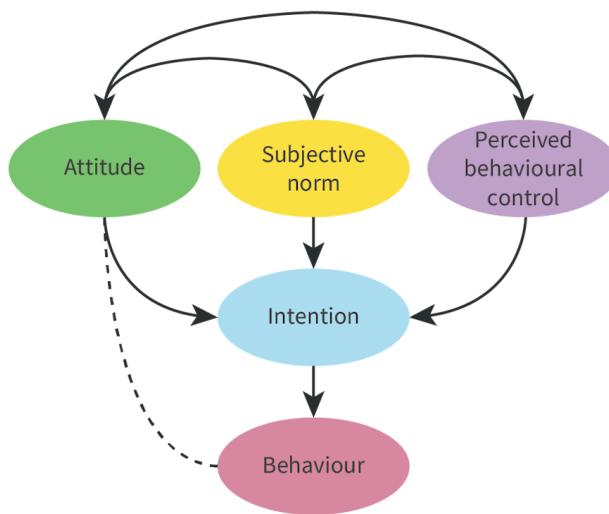
Keep the guiding question in mind as you progress through this section. The guiding questions build into the subtopic question(s). You will return to the subtopic question(s) at the end of each subtopic. The subtopic questions require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

The theory of planned behaviour

Someone is standing in the kitchen, looking for a sweet treat after dinner, but then remembers that they are trying to eat a more balanced diet with less sugar. What stops them from grabbing that cookie? Or what makes them eat it anyway? This decision-making process can be explained by the theory of planned behaviour (TPB), which describes how our attitudes, social influences and sense of control all work together to shape our choices. The theory of planned behaviour, developed in 1991 by Icek Ajzen [↗](https://doi.org/10.1016/0749-5978(91)90020-T) ([https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)), is based on the idea that three main factors shape our behavioural intentions:

- **Attitude:** This is how a person feels about the behaviour in question. For example, if a person believes exercising more (behaviour) will lead to positive outcomes and make them healthier (attitude), they are more likely to do it.
- **Subjective norms:** This is the perceived social pressure or influence from others to perform or not perform a behaviour. For example, if someone's parents (influence) think they should exercise more (behaviour), they are more likely to do it.
- **Perceived behavioural control (PBC):** This is the perception of how easy or difficult it is to perform the behaviour. Even if the person has a positive attitude and feels social pressure, if they do not believe they can perform the behaviour, they are less likely to engage in the behaviour. For example, a person might not know which exercises to do at the gym.

According to this theory, the above three factors determine an individual's behavioural intent. It is this intent that Ajzen and others believe is the most important predictor of whether or not the individual will perform the behaviour.

**Figure 1.** The theory of planned behaviour.

Source: Adapted from Robert Orzanna ↗

(https://commons.wikimedia.org/wiki/File:Theory_of_planned_behavior.png)¹

↗ [More information for figure 1](#)

Diagram showing three factors interlinked with two-way arrows: attitude, subjective norm, and perceived behavioural control. All of these factors also point to intention. Intention points to behaviour, which is also linked back to attitude by a dashed line.

The theory of planned behaviour was developed as an extension of the [theory of reasoned action \(TRA\)](#), developed by [Ajzen and Fishbein in 1975](#) ↗ (https://www.researchgate.net/publication/233897090_Belief_attitude_intention_and_behaviour_An_introduction_to). This model differs from the TPB in that it only looks at attitudes and subjective norms, and how these factors influence behavioural intentions. Similar to the TPB, this model also states that a person's intention to perform a behaviour is the most immediate predictor of the behaviour.

For example, if someone has a positive attitude towards a behaviour (such as exercising more) and believes that others approve of it, they are more likely to form an intention to exercise and hence engage in this behaviour. However, if a person has a positive attitude towards exercising but believes their friends do not value it (subjective norms), they may not form the intention to exercise more, even if they know it is good for their health.

The TPB is most commonly used to understand and treat health-related behaviours, as it focuses largely on behaviours that are not entirely under our control. The TRA, however, focuses mainly on behaviours that are within our control.

Both the TRA and the TPB have been utilised to understand health behaviours, such as condom use, exercise, addiction, binge-drinking behaviours and dietary choices. These theories have also been used to design health promotion programmes and prevention strategies.

[Hagger et al. \(2001\)](#) ↗ (<https://doi.org/10.1080/02640410152475847>) aimed to predict adolescents' intentions to participate in physical activity during their free time using the TPB. Using self-report questionnaires, they found that attitudes towards physical activity and perceived behavioural control were the strongest predictors of both intentions to be physically active and actual behaviour. Subjective norms (the perceived social pressure from peers and family) also played a role but had a weaker influence than attitudes and perceived behavioural control.

Whilst the TPB may be useful in understanding, promoting and preventing health-related behaviours, it does have several limitations. The decision to exercise can be influenced by attitudes, norms, and perceived behavioural control, but your emotions or past experiences can also influence it with a specific type of exercise. Added complexities like unconscious or implicit thought processes can affect behaviours, too. Thus, the TPB may not fully capture the complexity of human behaviour.

In addition, some people may be unable to plan and control their behaviours. The theory does not consider things like economic factors, which may influence intention to perform a behaviour. Someone may *want* to prepare more fresh meals, but the cost of fruit and vegetables in their area may be very high compared to packaged convenience foods.

Additionally, much of the research on the TPB has been gathered using self-reported data, which may influence the validity of the results. Self-report methods, such as interviews and surveys, can be prone to optimism bias. Optimism bias is a common tendency for individuals to underestimate their personal risk of experiencing negative health outcomes, and this can then reduce motivation to engage in preventative health behaviours.

Concept

Measurement

When studying health problems, accurate measurement is crucial. However, sometimes, there can be issues with measurement. Consider these questions.

1. How would you define exercise?
2. How would you measure exercise? Would you allow self-reporting or require external validation of exercise frequency, duration or intensity level?
3. Do you think that your decisions above would impact research findings and conclusions about health-related behaviour?
4. How might researchers overcome these issues?

Cognitive dissonance

Can you think of a time that your belief about something did not align with your behaviour? Maybe you believe that doing an assignment as soon as it is set is sensible, but always leave it until the last minute. This is what we call cognitive dissonance. Cognitive dissonance works by creating psychological discomfort when a person's behaviours do not align with their beliefs or values. For example, a person may know that smoking is harmful, but they continue to smoke. People may try to reduce cognitive dissonance in many ways, such as by quitting smoking or rationalising it. In relation to changing health behaviours, dissonance-based interventions work to introduce discomfort and hence motivate people to change their behaviours to reduce this. These interventions have been seen to be effective for various health behaviours, such as smoking cessation, exercise promotion and alcohol use reduction (Freijy & Kothe, 2013 ↗ (<https://doi.org/10.1111/bjhp.12035>)).

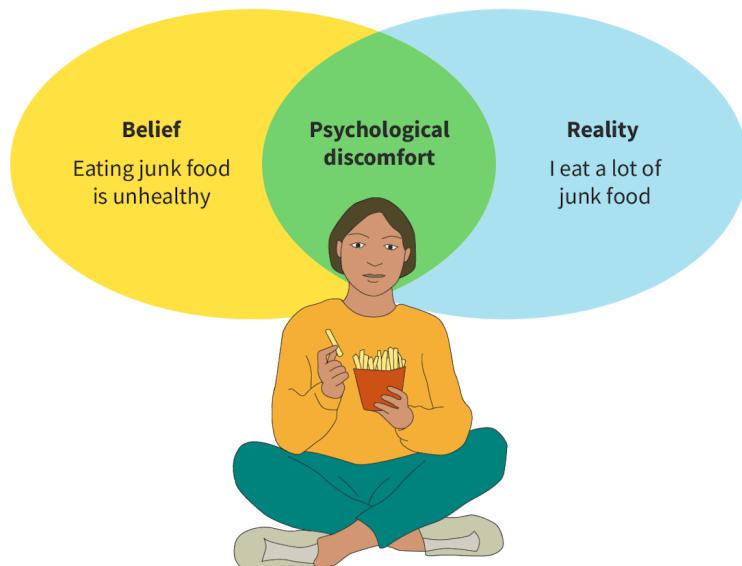


Figure 2. Cognitive dissonance refers to the psychological discomfort felt when a person's beliefs and behaviours do not align.

More information for figure 2

A sitting person eats fries. Behind the person are two overlapping circles. The first says Belief: Eating junk food is unhealthy. The second says Reality: I eat a lot of junk food. The overlap between the belief and reality circles is labelled Psychological discomfort.

One example of a dissonance-based intervention is the hypocrisy paradigm. Participants are usually asked to make a public commitment to a behaviour (such as quitting smoking), and then reflect on their past failures to do so. This creates tension between their current beliefs and past behaviours, motivating participants to change future behaviours. If someone cannot resolve their dissonance, it can lead to stress, guilt or even avoidance.

However, one limitation of using cognitive dissonance to explain and change health behaviours is that it does not consider factors such as gender and self-esteem. For example, if we affirm our self-worth in areas not related to the original source of cognitive dissonance, we may decrease the need for dissonance reduction (the process of reducing the psychological discomfort that results from conflicting beliefs or expectations) (Steele et al., 1993) (<https://doi.org/10.1037/0022-3514.64.6.885>). For example, someone might continue to smoke despite knowing it is bad for their health but might say that they are a wonderful, generous human.

HL Extension

Motivation

While the theory of planned behaviour is a motivational model that attempts to explain why individuals choose to engage (or otherwise) in a given behaviour, there are other motivational frameworks that psychologists use to analyse human behaviour, including self-determination theory. This theory has been developed by many psychologists and focuses on the motivation of an individual to satisfy three core needs:

- **Autonomy:** Humans want to feel in control over their lives and behaviours.
- **Competence:** Humans want to gain mastery in different realms of life and society, and feel that they are 'good' at something.
- **Relatedness:** Humans want to feel a connection to others and a sense of belonging via group membership.

This theory incorporates both internal and external motivational factors.

Reflection questions

1. Describe how internal motivation would function within each of the three core needs above.
2. Describe how external motivation would function within each of the three core needs above.

Satisfying these core needs is what ‘gets us up in the morning,’ so to speak. As you can imagine, if someone was not motivated to satisfy these needs, they would operate very differently in the world from someone who was. It is helpful to apply motivational theories to behaviour so that psychologists can begin to understand how to motivate healthy behaviours and demotivate unhealthy ones.

3. Explain how self-determination theory can be applied in conjunction with the TPB to explain one’s motivation to engage in a new exercise routine.

Activity

IB learner profile attribute: Thinker/Reflective/Risk-takers

Approaches to learning: Thinking

Time required to complete activity: 20 minutes

Activity type: Individual/Pairs

Applying the theory of planned behaviour

1. Choose one health-related behaviour you currently do (for example, physical activity) or a behaviour you would like to stop doing (for example, using social media during the day), and apply the theory of planned behaviour to this behavioural change.
2. On a large sheet of paper, Google Slide or Canva document, draw a diagram of the theory (similar to Figure 1).
3. Add in your beliefs (attitudes, subjective norms and perceived behavioural control) to the relevant boxes.
4. Title your page ‘Why I ...’ or ‘Why I do not ...’ (for example, ‘Why I exercise’).

Reflection questions

1. Reflect on your beliefs and how they affect whether or not you engage or do not engage in the behaviour you analysed in parts 1-4 above. What beliefs lead to you choosing to engage or not engage in that behaviour? How do you think you might change this?
2. How does your previous experience with this activity shape your current attitude towards it?
3. (Concept application: motivation) How do other people’s expectations influence your intention to engage in this behaviour?
4. Explain two limitations of using the theory of planned behaviour to explain your choice to engage or not engage in this specific behaviour.

Learning outcomes

By the end of this section, you should be able to:

- Explain the role and use of cognitive models in understanding mental health disorders.

- Identify the role of cognitive dissonance in understanding human behaviour.
- Discuss the role of perspective in influencing health-related behaviour.

HL Extension

- Discuss the different motivational theories underpinning the prevention or treatment of a health problem.
- Discuss the role of motivation in changing behaviour.

¹ Robert Orzanna (2015) ↗

(https://commons.wikimedia.org/wiki/File:Theory_of_planned_behavior.png)

'Theory of planned behavior'. Licensed under the Creative Commons Attribution-Share Alike 4.0 International licence

(<https://creativecommons.org/licenses/by-sa/4.0/deed.en>) ↗

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To what extent can culture explain the prevalence of health problems?

Guiding question(s)

In this subtopic, you are thinking about the question, ‘**To what extent am I in control of my own health?**’ This section will help you make an informed response by working through the following guiding question:

- How does viewing the prevalence of health problems through a cultural lens aide in understanding their origin?

Prevalence, the rate of a given disorder in a population, can be insightful when trying to understand and identify possible environmental etiologies of a health problem. This section will guide you through the question, ‘How does prevalence data support or refute the environmental etiology of a health problem?’

Keep the guiding question in mind as you progress through this section. The guiding questions build into the subtopic question(s). You will return to the subtopic question(s) at the end of each subtopic. The subtopic questions require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

Cultural factors and prevalence

How does your culture view certain health-related behaviours? Perhaps there is little emphasis on exercise, and behaviours like smoking are seen as relatively ‘normal’. In [subtopic 2.1](https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49425/) (<https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49425/>), you investigated the prevalence rates of mental health disorders and how culture can impact our understanding of these prevalence rates. Similar to mental health disorders, viewing the prevalence of health problems through a cultural lens can help us understand their origin, as well as learn more about preventing them.

Cultural beliefs and attitudes towards health problems can affect how people approach prevention and treatment.

International mindedness

Reflection questions

1. Why is it important for psychologists to understand how health problems differ between cultures?
2. What role do you think culture plays in understanding health-related behaviours?
3. In which ways do you think cultural stereotypes might play a role?

Some behaviours may be seen as lower risk in some cultures than others. For example, some cultures see drinking alcohol with meals as a healthy part of social life, whereas, in other cultures, it can be viewed as unhealthy or risky. In the latter cultures, alcohol abstinence may be encouraged, or even legislated. Cultural expectations around certain behaviours strongly influence personal choices due to social acceptance and even peer influence, which aligns with the subjective norms component of the theory of planned behaviour. In the TPB, the approval or disapproval of significant others (such as peers or cultural norms) play a critical role in shaping behaviour.

Cultural stigmatisation can also affect our understanding of prevalence rates of health-related behaviour. Individuals in cultures where problems like alcohol or drug addiction are highly stigmatised or illegal may hide their addiction or avoid seeking help, which could lead to under-reporting of these problems.

In addition, cultural norms around help-seeking behaviours differ. For example, some cultures may view seeking help as a sign of weakness and, hence, people may attempt to deal with the problem privately rather than seek diagnosis or treatment. Thus prevalence rates are affected.

Cultural beliefs and values can also be protective against health problems such as addiction and binge drinking. One study surveyed 6 713 adults in Washington, USA, including 1 690 individuals who identified as Hispanic ([Akins et al., 2008](#)) ↗ (<https://doi.org/10.1177/002204260803800105>). The findings were significant: Hispanic-identifying participants who had acculturated were nearly 13 times more likely to report using illegal drugs than those who had not. Acculturation refers to the process by which immigrant groups adopt new cultural knowledge and social practices, often replacing traditional values, customs, and social behaviours.

HL Extension

Culture

For some people in some cultures, the moderate use of alcohol can play a role in social engagement and bonding, which can be seen as cognitively healthy. However, for others, alcohol consumption can become problematic and result in a myriad of negative health outcomes, such as disease, crime, road accidents, reduced social integration and addiction.

Reflection questions

Examine the prevalence rate data sets for global alcohol consumption via the non-profit organisation Our World In Data  (<https://culturereinworkplace.com/country-comparison-dashboard/>) and consider the following:

1. What cultural similarities do you notice about countries/cultures that do not engage in high alcohol consumption?
2. What cultural similarities do you notice about countries/cultures that do engage in high alcohol consumption?
3. What cultural differences exist between countries/cultures that drink a lot of alcohol compared to those that drink much less?
4. Choose one country to focus on and provide a detailed breakdown of cultural elements that could possibly explain their prevalence rate of alcohol consumption.

Remember to consider cultural elements, such as:

- a. Hofstede's cultural dimensions, as used to compare the cultural profiles of different countries  (<https://www.theculturefactor.com/country-comparison-tool>)
- b. religion and corresponding religious norms
- c. economic factors
- d. legal factors
- e. values
- f. norms.

The cultural dimensions of individualism and collectivism can also affect the prevalence and experience of health problems such as addiction. For example, Zhang & Shrum (2009) ↗ (<https://doi.org/10.1086/593687>) found that individualism was positively correlated with impulsive consumption of alcohol, even when controlling for variables such as income, climate, gender and religion. Individualism may contribute to increased alcohol consumption because in collectivist cultures, a strong emphasis is placed on group harmony, community and family. These values may be protective against elevated and unhealthy alcohol consumption. For example, there may be family pressure to maintain a good reputation, which can reduce the likelihood of engaging in negative behaviours.

Making connections

Cultural dimensions

Gert Hofstede and others helped psychologists appreciate the fact that there are large-scale, macro causes of behaviour that occur on the cultural level and these differ from culture to culture.

There are also, of course, micro causes that occur on the individual level, which could include intrinsic motivational factors as well as an individual's unique social interactions.

It is crucial to appreciate that cultural factors influence individual factors. This is why psychologists must always consider culture when attempting to analyse or explain a given behaviour.

The major contribution of Hofstede and other's work on cultural dimensions is that it provides psychologists with a framework through which to analyse and then compare cultures. Conducting this type of analysis is incredibly useful for gaining a better understanding of the factors that contribute to human behaviour.

On the other hand, collectivist emphasis on familial harmony and pride could result in the avoidance of treatment or diagnosis that could be perceived to bring shame to the family. Deviance from social norms may be less tolerated in a collectivist culture, in comparison to an individualistic culture. This could result in lower prevalence rates of alcohol and drug-related health problems.

Individualistic cultures may be more tolerant towards deviation from norms and, hence, may have more open-minded attitudes towards substance-use disorders (SUD) or substance-based addictions. This, in turn, can result in higher prevalence rates for health problems as there may be less stigma surrounding treatment and diagnosis for these problems.

Individualist cultures may place a higher focus on personal achievement and independence, leading to stress and isolation. [Du et al. \(2014\) ↗](#) (<https://doi.org/10.1080/21642850.2014.888656>) put forth the claim that these cultures may experience increased substance-related health problems, because individuals in these cultures rely more on individual coping mechanisms (such as substance use), rather than seeking community support. This reduction in social support may lead to higher prevalence rates of substance-abuse-related health problems, as substance abuse may be a coping mechanism.

Perspective lens

Sociocultural approach

While acculturation is often seen as a positive thing, the study by [Akins et al. \(2008\) ↗](#) (<https://doi.org/10.1177/002204260803800105>) found that Hispanic-identifying participants who had acculturated to the United States were nearly 13 times more likely to report using illegal drugs than those who had not acculturated to the United States.

This shows that acculturation is not always positive. There are certainly instances where adopting the cultural norms, values and beliefs around certain behaviours could be detrimental to health and well-being.

This study also makes the point that culture can have a massive influence on health-related behaviour.

Reflection questions

1. Consider a time you have travelled outside of your 'home' culture.
 - Can you identify any values or norms around a health-related behaviour that differ from the values and norms of your own 'home' culture?
 - Identify the specific behaviour and list the norms, values or beliefs that differ.
2. Think about your own attitudes towards a specific health-related behaviour. Can you metacognitively analyse the impact of culture on your attitudes towards that behaviour?

Measurement and prevalence

Approaches to measurement can also affect our understanding of prevalence rates of health problems across and within cultures. The way that certain health problems are defined, diagnosed and reported can vary, and this in turn affects

the prevalence rates. Cultural interpretations of symptoms can influence whether something is considered a health problem.

Concept

Bias

Different tools are used to measure prevalence rates of health problems across the world. Given that research into health-related behaviour frequently uses self-reported data methods (such as surveys and interviews) for data collection, consider the following:

Reflection questions

1. How might a culture's willingness to discuss health-related behaviour impact data collection in that culture?
2. Do you think your home culture has become more open to talking about and reporting health problems? Why or why not?
3. How do you think self-reporting data could bias prevalence rates?
4. How can access to healthcare create differences (such as under- or over-reporting) in the prevalence rates of health problems in different populations?
5. How can researchers and psychologists reduce biases when investigating health problems in cultures other than their own?

Activity

IB learner profile attribute: Reflective/Open-minded/Communicator

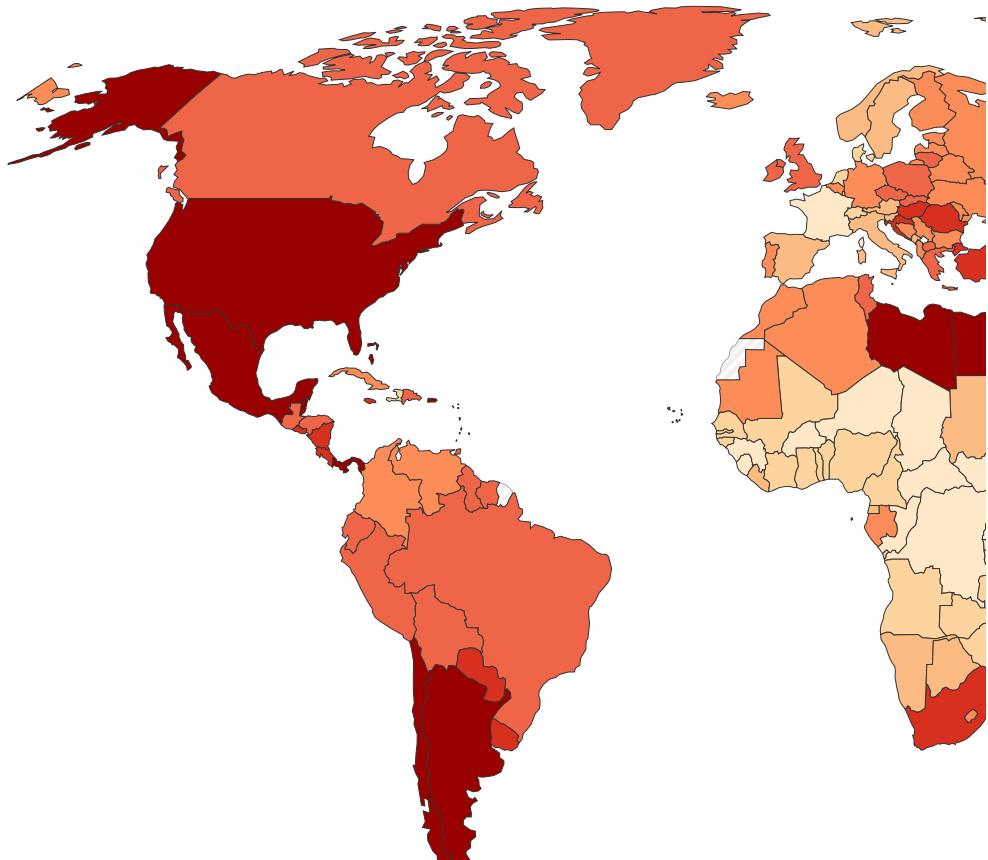
Approaches to learning: Researching/Thinking/Social

Time required to complete activity: 30 minutes

Activity type: Pairs

Critically thinking about prevalence rates

The graph depicts the prevalence rates of obesity across the world.



Interactive 1. Prevalence rates of obesity across the world.



[More information for interactive 1](#)

An interactive map illustrates the prevalence rate of obesity in adults in 2016. The rate is based on general population surveys and statistical modeling. A color gradient scale below the map ranges from 0% to 35% and the map also indicates regions with no data. Countries are shaded in different colors based on the rate of obesity, with darker shades indicating higher percentages and lighter shades indicating the lower percentages.

For example, countries such as the United States and Saudi Arabia show rates of 36.2% and 35.4%, respectively. Countries such as Ethiopia, India, Vietnam, Japan, and South Korea report 4.5%, 3.9%, 2.1%, 4.3%, and 4.7% respectively. South Sudan, Sudan, Greenland, and Western Sahara have no data.

Hovering the mouse on the colored legend highlights the related countries on the map. Further, when users hover the mouse over a specific country or region on a map, it shows information about the name of that region, from 1975 to 2016, and data in the form of a small chart.

Users can also explore the data in different formats, with options to view the information as a table or a chart in addition to the map. The interface includes a dropdown menu in the top right corner, allowing users to filter data by different regions of the world, namely, the world, Africa, North America, South America, Asia, Europe, and Oceania.

A timeline slider at the bottom enables users to examine the trends over time

with the ability to play a time-lapse animation that shows how obesity rate has evolved globally from 1975 to 2016.

Key Information:

Data source: World Health Organization

Year of data: 2016

Measure: Percentage of adult population (18+ years) with obesity

Global Overview:

The global prevalence of obesity varies widely, ranging from less than 5% to over 35% in different countries.

Generally, higher rates of obesity are observed in North America, parts of South America, Oceania, and some Middle Eastern countries.

Lower rates tend to be found in many Asian and African nations.

Source: World Health Organization: Global Health Observatory (2024)
1 processed by Our World in Data

Explore the table, map and graph of this data ([World Health Organization - Global Health Observatory \(2024\)](#) ↗
(<https://ourworldindata.org/grapher/obesity-prevalence-adults-who-gho>)) and discuss the following questions with a partner. (You can see the individual graphs of obesity rates against time by scrolling over the map and by clicking on different countries and regions in the chart too.)

1. Identify how the prevalence rates of health problems differ across regions, countries and over time.
2. What cultural factors do you think may contribute to the differences in prevalence of health problems?
 - a. From the list above, which two factors do you think have the most significant impact on these rates?
3. Do you think that these rates are accurate? Why or why not?
4. (Concept application: change) What cultural changes might contribute to the health problem of rising obesity rates? Make sure you use the data map to inform your answer.

Learning outcomes

By the end of this section, you should be able to:

- Identify and analyse factors impacting the prevalence of health problems in populations.
- Identify the role of one or more cultural dimensions in understanding group behaviour(s).

- Discuss how bias may possibly impact prevalence data.

HL Extension

- Discuss the role of culture in health and well-being.
- Discuss cross-cultural comparisons of the prevalence of mental health issues.

¹ World Health Organization – Global Health Observatory (2024) – processed by Our World in Data. ‘Prevalence rate of obesity in adults’ [data set]. World Health Organization, ‘Global Health Observatory’ [original data]. Retrieved 15th November 2024 from <https://ourworldindata.org/grapher/obesity-prevalence-adults-who-gho> ↗ (<https://ourworldindata.org/grapher/obesity-prevalence-adults-who-gho>)

What role does biology play in addiction?

Guiding question(s)

In this subtopic, you are thinking about the question, '**Is addiction a function of biology or the mind?**' This section will help you make an informed response by working through the following guiding question:

- What is the relationship between dopaminergic systems and addiction?

Recent research has provided a great deal of insight into biological factors that contribute to addictive behaviour.

The guiding questions in each section help to guide you towards answering the subtopic question(s) at the end of the subtopic. The subtopic questions require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

A person opens up their phone to check their social media apps. They intended to check one message, and suddenly one hour has passed. This drive to just keep going and get a little more stimulation can give us a small insight into how addiction works. A person with addiction goes through a similar experience, although on a much larger scale. Addiction is a complex disorder that is characterised by compulsive engagement in rewarding stimuli, despite undesirable consequences. A person can become dependent on a substance (for example, drugs, alcohol or nicotine) or a behaviour (for example, gambling, social media, gaming). Psychologists and neuroscientists have recently appreciated the extent to which an addictive disorder alters the reward system in the brain: a process which you will learn about in this section.

Addiction is characterised by these stages:

- persistent and intense urges to use a substance or engage in a behaviour
- loss of control

- preoccupation with the behaviour or substance.

People develop a tolerance over time, needing more of the stimulus to achieve the same effect. This can lead to an increase in both frequency and volume of use. Alcohol is considered the most common substance that causes detrimental health effects worldwide, whereas gambling is thought to be the most common non-substance-based detrimental addiction.

Dopamine is the key neurotransmitter involved in addiction. It is released during pleasurable activities, such as eating and exercising. This neurotransmitter creates feelings of pleasure and, hence, reinforces these behaviours. Addictive substances, such as cocaine, can cause the brain to release larger amounts of dopamine than usual. Over time, the brain becomes less sensitive to dopamine, leading to tolerance. The brain then needs more of the substance to achieve the same effect.

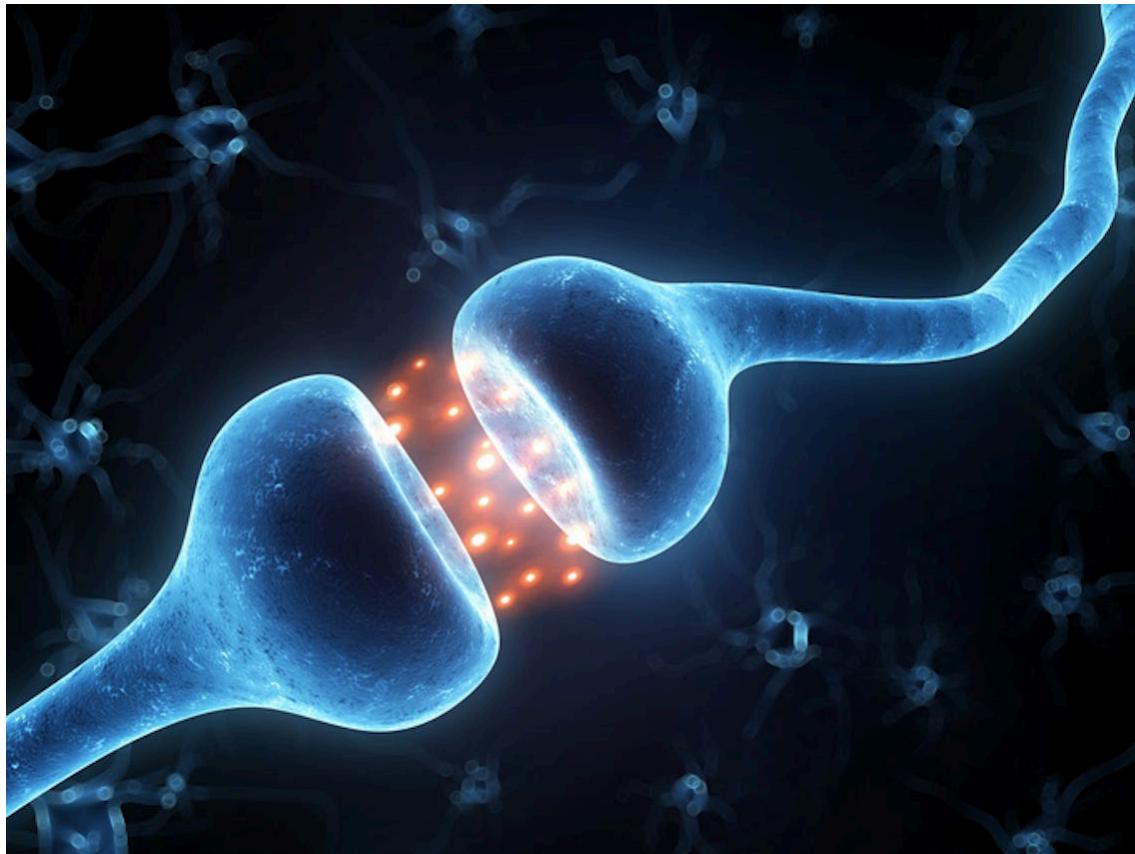


Figure 1. Dopamine is a key neurotransmitter involved in addiction.

Credit: Sebastian Kaulitzki, Getty Images

Addiction works by 'hijacking' the brain's neurobiological reward system. Dopamine plays a crucial role in modulating neural pathways and synaptic connections in the brain, particularly in the areas involved with reward and motivation. The reward system of the brain is made up of the following localised areas (also referred to as localisation of function):

- ventral tegmental area (VTA)
- nucleus accumbens
- prefrontal cortex
- amygdala and hippocampus.

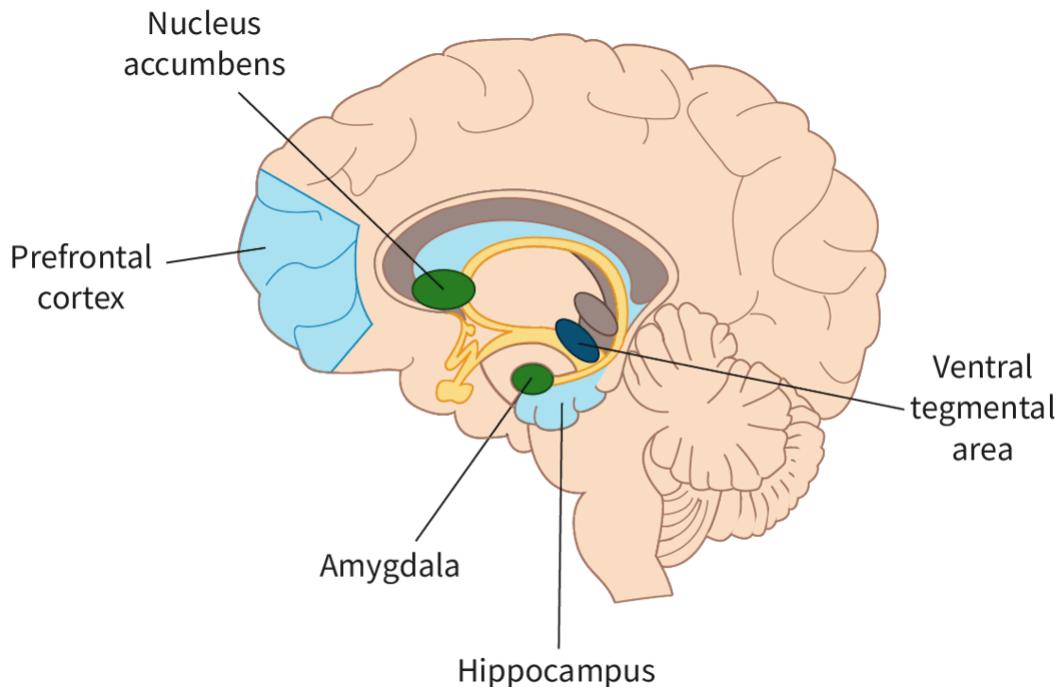


Figure 2. The brain's reward system.

 [More information for figure 2](#)

Annotated cross-sectional diagram of the human brain. The prefrontal cortex is the region of the brain behind the forehead. The nucleus accumbens is a structure behind the prefrontal cortex. The ventral tegmental area is further back in the midbrain. The amygdala is a small structure below it and next to the hippocampus.

This release of large amounts of dopamine affects the dopaminergic pathways in the brain.

Mesolimbic pathway

The main pathway is the mesolimbic pathway, which begins with the VTA. This region of the brain is where dopamine-producing neurons are primarily located. This area connects with the nucleus accumbens, via the mesolimbic pathway, which is known as the 'reward' or 'pleasure' centre of the brain.

- When dopamine is released into this area, feelings of pleasure and satisfaction occur. This results in a biologically based motivation for an individual to engage in behaviours such as eating or social interactions that are crucial for survival. From an evolutionary perspective, when food resources were scarce (particularly high-calorie foods), this system motivated humans to seek out and consume these foods when available.
- The dopaminergic systems then encouraged this behaviour by making this consumption rewarding. However, this same system that once helped our ancestors survive has led to overconsumption of high-sugar and high-fat foods in today's society, where high-calorie foods are readily available to many.

Mesocorticol pathway

Another dopaminergic pathway, known as the mesocortical pathway, also begins in the VTA. Dopamine from the VTA is released in the prefrontal cortex. The prefrontal cortex is an area of the brain responsible for decision-making, impulse control and self-regulation. Initially, drugs can increase dopamine release but, over time, the reduced dopamine signalling can negatively affect cognitive processes such as decision-making, and impulse control.

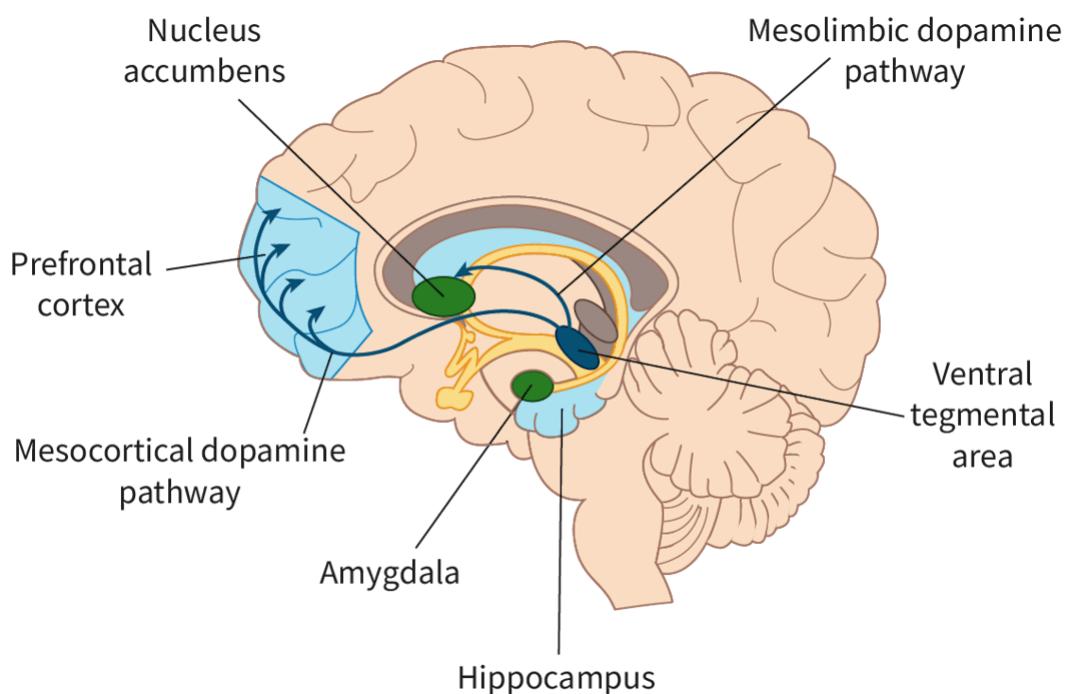


Figure 3. The mesolimbic and mesocortical dopamine pathways.

[More information for figure 3](#)

The mesolimbic dopamine pathway leads forwards from the ventral tegmental area to the nucleus accumbens. The mesocortical dopamine pathway leads forwards from the ventral tegmental area to the prefrontal cortex. The diagram also shows the hippocampus and amygdala below the ventral tegmental area.

For more on the role of dopamine systems in addiction, watch [this podcast – an interview with Ann Lembke, Head of Stanford's Addiction Center \(Lemke, 2024\)](#) ↗ (<https://peterattiamd.com/annalembke/>)¹.

Concept

Causality

Addiction is a complex phenomenon. It is often linked to biological mechanisms, such as dopaminergic systems, yet it is also influenced by psychological and social factors. Exploring the interplay between these elements raises important questions about the causal pathways underlying addictive behaviours.

Reflection questions

- Is addiction entirely biological? Are there other factors involved? (See [section 2.3.1](#) ↗ (<https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/how-can-the-theory-of-planned-behaviour-explain-health-choices-id-49451/>) for a reminder of the theory of planned behaviour.)
- Discuss the causal relationship between dopaminergic systems and addiction.

Several brain imaging studies of people with addiction have shown decreased activity in the frontal cortex, as well as impaired dopamine function. Using PET (positron-emission tomography) scans, [Volkow et al. \(2007\)](#) ↗ (<https://doi.org/10.1523/JNEUROSCI.3371-07.2007>) found that detoxified alcoholics showed significantly reduced dopamine release in the striatum (an area of the brain involved in motor control and reward processing) compared to healthy controls. This suggests that chronic alcohol use impairs the brain's reward system. Additionally, there was evidence of frontal cortex impairment in addiction, which may explain compulsive drinking behaviour and impaired decision-making in alcoholics.

The hippocampus is another brain region that is affected by addiction. This area of the brain is associated with the localised function of memory formation. In relation to addiction, when a person experiences something pleasurable, like using a drug, the hippocampus will create an association between specific cues and the pleasurable experience. Hence, when a person encounters those cues (for example, a location where drugs are regularly used) addictive cravings can be activated and strengthened. Additionally, long-term use of drugs can affect the brain's neuroplasticity. This occurs by altering neurogenesis (the formation of new neurons) and reducing grey matter volume in the hippocampus ([Peyton et al., 2021](#)) ↗ (<https://doi.org/10.1038/s12276-021-00587-x>), changing the structure and function of the brain. A person with addiction may struggle to form new memories and interpret information not related to their addiction.

Perspective lens

Biological and cognitive approaches

Research into addiction from the biological perspective, such as that conducted by [Volkow et al. \(2007\)](#) ↗ (<https://doi.org/10.1523/JNEUROSCI.3371-07.2007>), has greatly changed the way psychologists view addiction.

Before research such as that conducted by Volkow and others, which made the biological 'pull' of addictive behaviour clear, psychologists (and the average person) viewed addiction as a strictly cognitive act. In other words, the belief was that addiction was a weakness of self-control or willpower.

Insight into the extent to which biology plays a role in addictive behaviour has not only been beneficial from a treatment perspective, but has also helped to reduce negative feelings and beliefs about the 'cognitive weakness' of addicts.

Reflection questions

1. Explain how the failure to analyse addictive behaviour from the biological perspective may have led to misunderstandings or false beliefs within the psychological community.
2. Consider questions from the cognitive approach in regard to addiction.
What are some cognitive-focused questions the answers to which may be informed by biological insights?
3. Consider questions from the biological approach in regard to addiction.
What are some biological-focused questions the answers to which may be informed by cognitive insights?

The amygdala, an area responsible for processing emotions such as fear, plays a role in the development of addiction too. The amygdala interacts with the hippocampus to form strong emotional memory associations between drug use

and contexts, which may contribute to craving and even relapse (Luo et al., 2013) ↗ (<https://doi.org/10.1016/j.nlm.2013.06.017>). Interestingly, research studies on internet addiction have found decreased connectivity between the prefrontal cortex and the amygdala in people with addiction, indicating that this may influence emotional self-regulation (Cheng and Liu, 2020) ↗ (<https://doi.org/10.1038/s41598-020-59195-w>). This could contribute to the development and maintenance of addictions. Because of the widespread effects addictive behaviours have on the brain, addiction-related behaviours can become increasingly biologically and cognitively compulsory.

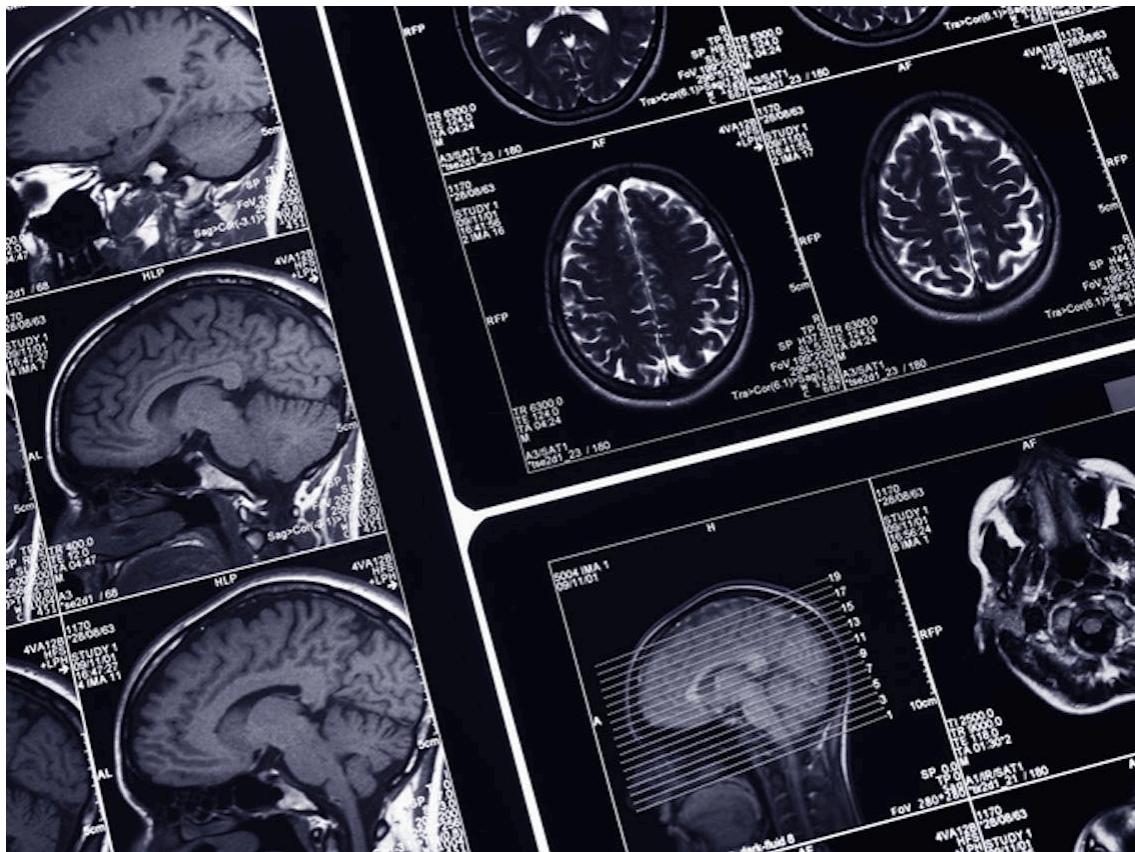


Figure 4. PET scans help us to understand the biological mechanisms of addiction.

Credit: Tek Image/Science Photo Library, Getty Images

While the biological explanation for addiction is grounded in neuroscience and objective evidence such as brain imaging techniques, this explanation may be considered reductionist. That is, addiction may be oversimplified by only looking at biological motivating factors, and ignoring social and psychological factors. Addiction is complex and multifaceted, so considering all influences is important for understanding and treating this health problem. However, understanding the biological mechanisms of addiction can help in creating pharmacological and psychological treatments for addiction that target specific brain regions and systems.

Activity

IB learner profile attribute: Inquirer/Thinker/Reflective

Approaches to learning: Thinking/Researching

Time required to complete activity: 30 minutes

Activity type: Individual/Pairs

Mouse party!

Go to the [Mouse party interactive](#)  (<https://learn.genetics.utah.edu/content/addiction/mouse/>) on the University of Utah Genetic Science learning website to explore how addictive substances affect the brain at the synaptic level.

Drag each mouse into the chair. Listen to the description of how the drug affects the brain and watch how it works at the synaptic level.

1. For alcohol, cocaine and one other drug, summarise the following:

- a. The neurotransmitter(s) affected by the drug
- b. How the drug works at a synaptic level (you could also include a sketch of the diagram presented)
- c. The similarities and differences between the different drugs, and the implications they could have for people with addiction

2. (Concept application: perspective)

- a. How does this activity demonstrate a reductionist approach to addiction?
- b. What are the strengths and limitations of a reductionist approach to addiction?

Learning outcomes

By the end of this section, you should be able to:

- Explain the process of neurotransmission and how an understanding of it allows psychologists to improve health and well-being.
- Describe the role of one or more chemical messengers in human behaviour.

- Describe the value of using one or more brain imaging techniques in investigating human behaviour.
- Explain the process of neuroplasticity and the role that environmental factors play on brain development.
- Evaluate the role of localisation of function in explaining human behaviour and cognition.
- Identify limitations of the argument that behaviour is localised.
- Identify the role of one or more biological factors in one or more cognitive processes.
- Discuss the strengths and limitations of a reductionist approach to the study of behaviour.
- Discuss the causal relationship between dopaminergic systems and addiction.

HL Extension

- Discuss the role of motivation in changing behaviour.

¹ Attia, P. & Lembke, A. (Hosts). 14 October 2024. #321 – Dopamine and addiction: navigating pleasure, pain, and the path to recovery [podcast episode]. In *The Drive*. <https://peterattiamd.com/annalembke/> ↗ (<https://peterattiamd.com/annalembke/>)

How can social psychology explain addiction?

Guiding question(s)

In this subtopic, you are thinking about the question, '**Is addiction a function of biology or the mind?**' This section will help you make an informed response by working through the following guiding question:

- How do social identity theory and social learning theory contribute to an explanation of addiction?

The previous section examined possible biological correlates of addictive behaviour. This section will examine the application of two influential theories of social psychology to addictive behaviour: social learning theory and social identity theory.

Keep the guiding question in mind as you progress through this section.

The guiding questions build into the subtopic question(s). You will return to the subtopic question(s) at the end of each subtopic. The subtopic questions require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

Social identity theory and addiction

When someone walks into a room, they may feel a subtle pressure to fit in with the people in that room. This is not just driven by their personality but also a human need to belong. Social identity theory (SIT), developed by Henri Tajfel and John Turner in the 1970s, explains how people derive their identity and self-worth from their groups. This guides many behaviours and choices, and can offer insights into understanding the onset, maintenance and recovery from addiction.

SIT suggests that we join or identify with social groups that we share specific behaviours or norms with. The groups that we identify as members of are known as our ingroups. For example, these could be our friends, work colleagues or teammates. Ingroup membership can cause individuals to feel pressure to engage in or adopt ingroup behaviours to maintain membership within that group.

Addictive behaviours may stem from belonging to groups that normalise or encourage substance use. For example, individuals may define themselves as a 'drinker'. How strongly one identifies with each of these groups can affect an individual's substance use.

For people who may be socially isolated, substance use can provide a new valued social identity by helping these individuals find a sense of acceptance and belonging through this behaviour. This may be their only source of social support or even social identity. [Ennett & Bauman \(1993\)](#)

(<https://doi.org/10.2307/2137204>) found that, among 1 092 adolescents at five high schools in the USA, students who had fewer than two connections to other adolescents in their school were significantly more likely to smoke, compared to students with two or more connections. However, this did not account for demographic variables or the number of friends who smoke.

[Dingle et al. \(2015\)](#) (<https://doi.org/10.3389/fpsyg.2015.01795>) explored the role of social identities in the development of, and recovery from, addiction. Semi-structured interviews were conducted with 21 adults in a drug and alcohol therapeutic community. From these interviews, some individuals experienced a loss of valued identities during addiction onset (identity loss pathway), which were later renewed during recovery. Socially isolated individuals described addiction onset as providing a new, valued social identity (identity gain pathway). Post treatment, those on the identity loss pathway aimed to renew their pre-addiction identities, whereas those on the identity gain pathway aimed to build new aspirational identities involving study, work or family roles. This study demonstrates the role of addiction-related identities in influencing substance use behaviours, either by contributing to addiction or helping individuals recover from addiction. Shifting from an addiction-related identity to a recovery-based identity can be a significant factor in overcoming addiction.

Theory of knowledge

As you have explored in this subtopic, the human sciences examine how beliefs and identities can influence behaviours such as smoking or exercise.

Reflection question

1. What can other areas of knowledge tell us about health-related behaviour?

Recovery and social identity

While SIT can explain how addiction develops and persists through belonging to social groups, it can also be used to explain recovery. When recovering from addiction, individuals may undergo a process of social identity change.

Identification with substance-using groups may decrease, and individuals may often develop stronger identification with recovery groups or non-user groups.

Group-based interventions such as Alcoholics Anonymous can foster new identities, focused on supporting recovery. Many treatment options are targeted at understanding a person's positive identities and roles in society. This can then help motivate them to change. Buckingham et al. (2013)

(<https://doi.org/10.1037/a0032480>) found that participants in mutual support groups, who identified more favourably with their recovery identity than their addiction identity, had higher success rates in overcoming addiction.

However, social identities are likely to be culturally bound and specific to time periods. Changing understandings and definitions of addiction can mean that these identities change over time. The stigmatisation of addiction can vary across cultures and over time, which in turn can affect identities.

Social learning theory and addiction

Young children often learn behaviours from close family members, such as older siblings, parents or guardians. Social learning theory (SLT), proposed by Albert Bandura, suggests that observation, reinforcement and modelling play important roles in the learning process. These concepts can be applied to addiction to help us to understand it better. Observational learning is a core component of social learning theory and holds that individuals can learn behaviours by observing their demonstration in others. These behaviours can be acquired through direct models such as family members, or indirectly through other means such as the media. According to the theory, our behaviour is determined not just by observing, but by the reciprocal interactions between personal factors (genetics, personality, cognitive processes, etc.), the external environment and the behaviour itself. Behaviours that are rewarded are more likely to be imitated, and those that are punished are less likely to be imitated. For example, someone who grows up surrounded by people who drink alcohol and are 'rewarded' for this, will be more likely to imitate that behaviour. We call this vicarious reinforcement, where we may see someone rewarded for a behaviour and hence are more likely to try it ourselves.

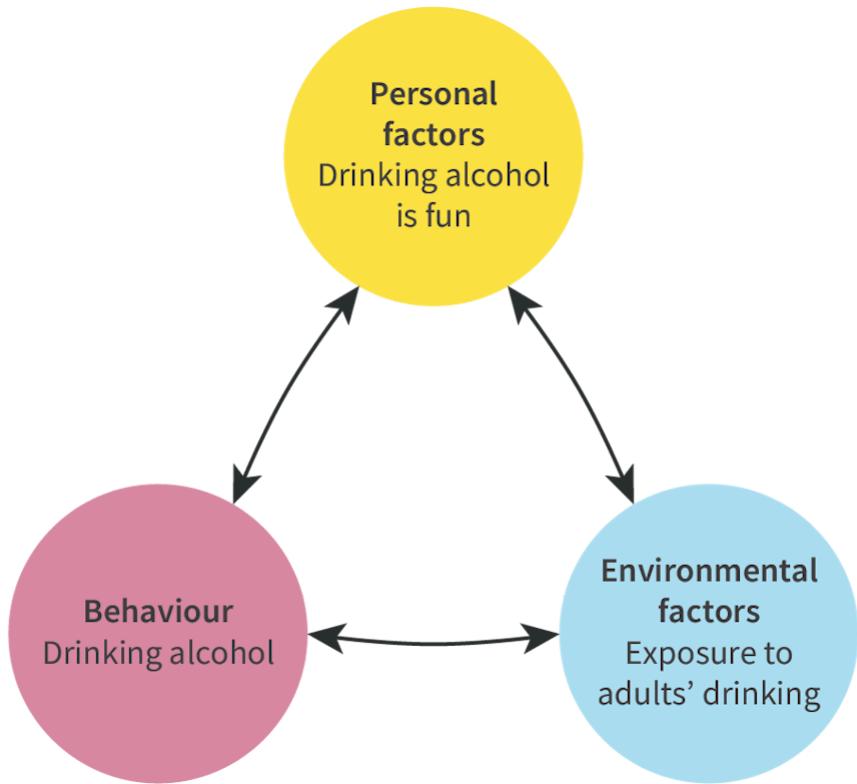


Figure 1. Bandura's social learning theory can be applied to the example of why a teenager may engage in the behaviour of drinking alcohol.

[More information for figure 1](#)

Durkin et al. (2005)

(<https://www.tandfonline.com/doi/abs/10.1080/027321790518681>) used questionnaires to evaluate the applicability of SLT in understanding binge-drinking behaviours in 1 459 college students. Students who associated more with binge-drinking peers were more likely to engage in binge drinking. Those students who held more favourable attitudes towards binge drinking were more likely to engage in the behaviour. When students perceived more rewards and less punishments from binge drinking, they were more likely to participate in it.

SLT also suggests that, based on what they have observed in others, individuals form expectations about the effects of substance use. If they expect positive outcomes from this behaviour, they will be more likely to engage in it. As seen in the study above, positive expectations of drinking led to more engagement in the behaviour.

Additionally, the theory takes into consideration the role of culture and its potential explanation for addiction development. Cultural context shapes behavioural norms and expectations. The behaviours that are reinforced and punished may differ between cultures. This can help to explain cultural differences in addiction. For example, in some cultures, drinking is seen as

acceptable and may be reinforced. However, in other cultures, alcohol consumption may be prohibited, and hence people who avoid alcohol may be praised for upholding cultural values.

HL Extension

Culture

Cultural norms and values can shape attitudes towards addiction. Hence, the development of this and other health problems can be influenced by culture. Conduct research into your own culture:

Reflection questions

- How is substance use perceived in your culture?
- What are the cultural values and norms that may contribute to this perception of substance use?

SLT can also be applied to addiction recovery. Similar to social identity theory, group recovery programmes such as Alcoholics Anonymous can use peer support and role models to change behaviours. Being surrounded by people who have overcome addiction, or been successful in abstaining from addictive behaviours, can allow individuals to observe and learn positive behaviours. Many recovery plans address changing a person's environment, such as building new social networks of non-substance users. Programmes also can introduce reinforcements for behaviours, such as reward systems for sobriety.

Overall, this theory highlights how social and environmental factors can interact with personal factors to shape behaviours such as addiction.

Concept

Perspective

There are many perspectives that can be taken in relation to addiction, and these perspectives affect how we understand and address health problems.

Reflection question

1. Discuss the role of different perspectives (biological, evolutionary, cognitive, social) in explanations for health problems such as addiction.

Activity

IB learner profile attribute: Thinker/Reflective

Approaches to learning: Thinking/Communicating

Time required to complete activity: 10 minutes

Activity type: Individual/Pairs

Applying social identity theory

Whilst this subtopic has focused on health *problems*, social identity theory can be used to encourage positive health-related behaviours.

1. Create a list of social identities with which you or people you know identify.
2. Brainstorm how you think identifying with these groups could have a positive effect on health behaviours. For example, someone may identify as a ‘runner’ if they belong to a running group, which may have a positive effect on physical activity levels.
3. (Concept application: change) How can social identities be used to change health-related behaviour?

Learning outcomes

By the end of this section, you should be able to:

- Identify and analyse factors impacting the prevalence of health problems in populations.
- Examine cultural differences in approaches to mental health, citing specific examples to illustrate diverse perspectives.
- Apply social identity theory to explain group behaviour change.
- Identify the role of social learning in understanding one or more health problems.
- Describe how social identity theory can be applied to change or explain behaviour.
- Discuss the role of perspective in explanations for health problems.

HL Extension

- Discuss the role of culture in health and well-being.

How can behaviourism explain addiction?

Guiding question(s)

In this subtopic, you are thinking about the question, '**Is addiction a function of biology or the mind?**' This section will help you make an informed response by working through the following guiding question:

- How can an understanding of behaviourism (conditioning) contribute to an understanding of addiction?

Behaviourism is a framework for understanding behaviour, which was made famous by psychologists such as Skinner, Maslow and Bandura in the mid-20th century. Behaviourism blends elements of environmental stimuli, cognition and even biology. Thus, such an approach can be a very useful lens through which to examine addictive behaviour.

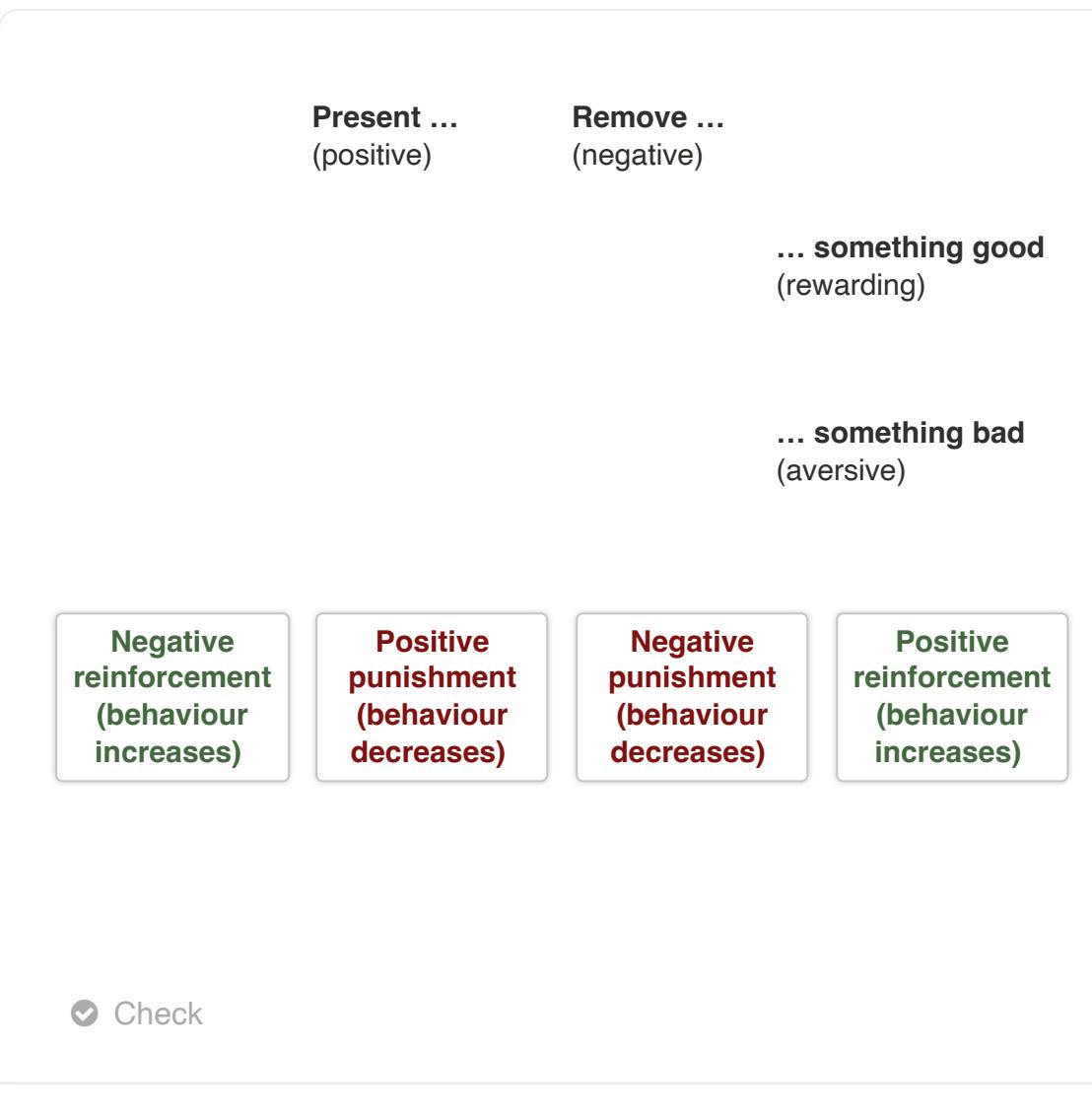
Keep the guiding question in mind as you progress through this section. The guiding questions build into the subtopic question(s). You will return to the subtopic question(s) at the end of each subtopic. The subtopic questions require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

Operant conditioning and addiction

A student decides to check their social media during their school lunch break. In the app, the photo they posted yesterday has 50 new 'likes'. This makes them feel happy about themselves. They sneak a peek at their app during their psychology class to discover that they have ten more new 'likes'. Throughout the day, they find themselves opening the app to see their 'like' count. The psychological perspective of behaviourism would explain the compulsive checking of the social media app through operant conditioning.

Behaviourism is a branch of psychology that places the emphasis on how humans are shaped by their environments, rather than internal mental states. Operant conditioning, developed by B. F. Skinner, is a type of learning which states that behaviours develop based on the consequences that follow. Behaviours can either be reinforced (strengthened) or punished (weakened). Positive reinforcement occurs when a behaviour is followed by a reward, which then increases the likelihood of the behaviour being repeated. In the example above, the behaviour (social media use) has been reinforced by the 'likes' and, hence, has encouraged the repetition of the behaviour. Negative reinforcement is when an unpleasant stimulus is removed after a behaviour, which still increases the likelihood of repeated the behaviour. Imagine you are bored and start to scroll through social media and watch entertaining videos. Your feeling of boredom has been removed and, hence, you are more likely to use social media again.

On the other hand, positive punishment is when an unfavourable stimulus is presented after a behaviour and, hence, **decreases** the likelihood of the behaviour being repeated. For example, you get a notification (positive punishment) about your screen time being too high, and you decide to stop scrolling through social media. Negative punishment is when a favourable stimulus is taken away, decreasing the likelihood of that behaviour being repeated. For example, an adult tries to take your phone away after noticing the amount of time you have spent on social media.



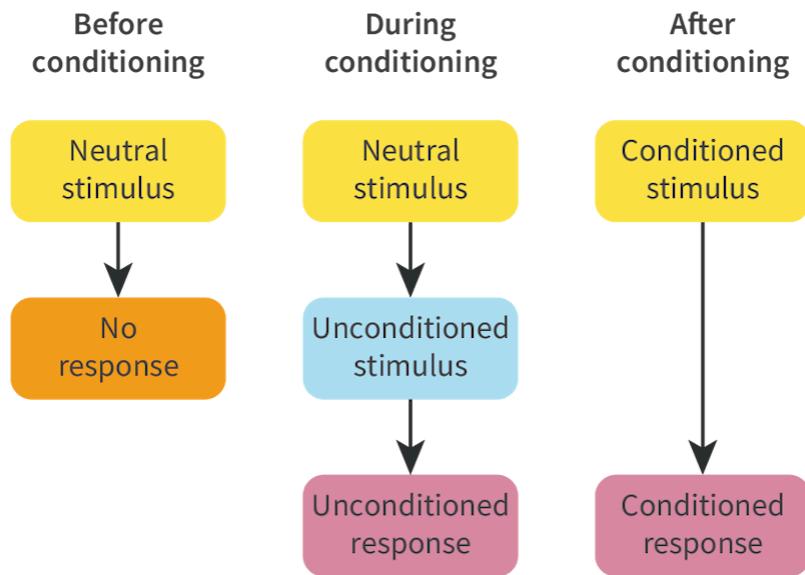
Interactive 1. Four Components of Operant Conditioning.

In relation to the development of addiction, the reinforcement from using a substance is often stronger, or more obviously apparent, than the consequences, such as relationship problems and health issues. Pleasurable effects such as relaxation or 'highs' can act as positive reinforcement, increasing the likelihood of repeating behaviours. For example, someone who drinks alcohol may find it helps them to socialise and thus are more likely to continue. Addiction can be reinforced through negative reinforcement. For example, if substance use removes unpleasant feelings such as stress or anxiety, an individual will be more likely to repeat the behaviour. This can also explain why relapse may occur, as individuals may experience withdrawal symptoms, and take the substance to relieve these symptoms.

Classical conditioning and addiction

Another type of learning called classical conditioning was developed by Ivan Pavlov and explains how we learn through developing associations between stimuli and responses, rather than reinforcing behaviours. In classical conditioning, a previously neutral stimulus comes to elicit a response after being paired with a stimulus that naturally produces that response. Applied to addiction:

- An unconditioned stimulus (US) is the stimulus that **naturally** triggers a response. In addiction, this is the addictive substance or behaviour (such as smoking or gambling). It produces a natural response such as pleasure or relaxation. This natural response is known as the unconditioned response (UR).
- The conditioned stimulus (CS) is the previously neutral (in other words, it elicits no response) stimulus that, when paired with the unconditioned stimulus, triggers a conditioned response. This could be locations, people or even smells that are initially neutral but over time become a conditioned stimulus. For example, a person may often have a cigarette with their morning coffee. The coffee eventually becomes the conditioned stimulus, as it was initially unrelated to smoking.
- The conditioned response (CR) is a learned response to the conditioned stimulus. Over time, after repeated pairings of the neutral stimulus (in the above example, coffee) with the unconditioned stimulus (in the above example, smoking) and unconditioned response (feelings of pleasure), the neutral stimulus (coffee) becomes the conditioned stimulus and triggers the conditioned response.

**Figure 1.** Classical conditioning.

🔗 [More information for figure 1](#)

In the first flow chart, labelled Before conditioning, a neutral stimulus leads to no response. In the second flow chart, labelled During conditioning, a neutral stimulus leads to an unconditioned stimulus, which leads to an unconditioned response. In the third flow chart, labelled After conditioning, a conditioned stimulus leads to a conditioned response.

In addiction, this process of classical conditioning can trigger cravings for the substance just with exposure to specific environments or cues. So, for example, by pairing smoking a cigarette with coffee, just drinking coffee can trigger cravings for a cigarette. Classical conditioning can also help to explain relapse when individuals in recovery are exposed to environments or cues. For example, a person who has quit smoking may still get a craving for cigarettes when walking past a coffee shop due to the strong conditioned response. Lazev et al. (1999) ↗ (<https://doi.org/10.1037/1064-1297.7.1.56>) exposed participants to different sensory cues (coloured lights, music, scents) paired with either smoking or not smoking. They found that smokers reported a significantly greater urge to smoke when exposed to cues that had been paired with smoking, compared to cues paired with not smoking. Participants' pulse rates also increased when encountering the environmental cues associated with smoking.

Concept

The complexity of causality and behaviourism

In many ways, behaviourism has appeal due to the seeming clarity with which one can establish causality. For example, the famous behaviourist B. F. Skinner could demonstrate very clearly that the use of positive reinforcement led to training a pigeon to spin in a circle.

However, does the reward of food explain the behaviour of the pigeon? Or could we ask a deeper question, 'why does the pigeon respond positively to food?' or put another way, 'why does the food motivate the pigeon to engage in the target behaviour?' The answer to this question can be found through a Maslow's hierarchy of needs perspective (food is a basic need for all animals and, therefore, we are motivated to get food).

This is quite straightforward when the reinforcer in question is food, and the animal is a pigeon. However, what if the reinforcer is a smile from a stranger and the animal is a human? Why might that reinforcer work for only some behaviours? Why are some humans motivated by money and others are not? With humans, understanding the motivation behind reinforcers is not always such a simple task.

Reflection questions

- Which non-chemical elements might act as a positive reinforcer for addiction?
- How might addiction be explained within a behaviourist framework?
- How could behaviourist techniques or approaches be used to attempt to extinguish addictive behaviour?

While behaviourism can help us to understand how addiction may develop over time and inform the treatment of addiction, it has been criticised for oversimplifying human behaviour and neglecting the role of biological factors and cognitive processes in addiction. Additionally, it does not take into consideration how emotions, thoughts and feelings can play a role in addiction. Many individuals are exposed to the same environments and yet not all develop addictions, which many behaviourist theories cannot explain.

Activity

IB learner profile attribute: Reflective/Inquirer/Knowledgeable

Approaches to learning: Thinking/Researching

Time required to complete activity: 30—45 minutes

Activity type: Individual

Social media conditioning

Many social media platforms and games are designed to be addictive. Choose one social media platform or game, and research and apply the principles of behaviourism to it.

Create a short presentation (two or three slides) to share with the group, outlining the following:

- A description of the platform or game
- An explanation of how classical conditioning (such as the association of certain stimuli) may contribute to addictive behaviours on the platform or game
- An explanation of how operant conditioning (including positive and negative reinforcement) may contribute to addictive behaviours on the platform or game
- A discussion of how behaviourism could be used to reduce associated addictive behaviours.
- **(Concept application: causality)** Discuss the causal relationship between social media addiction and behaviourism. Are there any other factors that contribute to this addiction?

Learning outcomes

By the end of this section, you should be able to:

- Describe examples of classical conditioning as a way of learning and illustrate how classical conditioning is applied in real-world scenarios.
- Describe examples of operant conditioning as a way of learning and illustrate how operant conditioning is applied in real-world scenarios.
- Describe the process of classical conditioning and its role in behaviour.
- Describe the process of operant conditioning and its role in behaviour.
- Discuss the causal relationship between addiction and behaviourism (conditioning).

HL Extension

- Discuss the role of technology in learning.
- Describe the effect of technology on cognition.

How can understanding addiction etiology inform treatment methods?

Guiding question(s)

In this subtopic, you are thinking about the question, '**Is addiction a function of biology or the mind?**' This section will help you make an informed response by working through the following guiding question:

- What insights can successful addiction treatment modalities provide towards understanding addictive etiology?

As explored in section 2.2.3  (<https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/what-is-the-relationship-between-etiology-and-treatment-id-49441/>), it is important to understand the relationship between etiology and treatment of any physical or mental disorder. The same principle therefore applies to health-related behaviours such as addiction. In order to develop effective treatments for addiction, we must understand addictive etiology. This section will focus on treatment, but through a relational lens.

Keep the guiding question in mind as you progress through this section. The guiding questions build into the subtopic question(s). You will return to the subtopic question(s) at the end of each subtopic. The subtopic questions require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

As you previously saw in subtopic 2.2 (<https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49438/>), treatments can provide useful insights into the etiology of a disorder. For example, depression treatments for addiction help shape our understanding of how biological, psychological, and social factors contribute to its onset and maintenance. Different treatments may be used at various stages: treating withdrawal, staying in treatment and preventing relapse.

Biological treatments for addiction

Biological treatments, also known as medication-assisted therapies (MAT), for substance-based addictions specifically target neurotransmitters such as dopamine, which play an essential role in the brain's reward pathway. Many medications either mimic (act as an agonist) or block (act as an antagonist) the effects of an addictive substance, giving evidence for the role that biology plays in addiction.

Agonist medications include methadone for opioid addiction, which activates the same receptors as opioids, but in a much more controlled manner. This reduces cravings and withdrawal symptoms without the 'high' produced by the opioid. Nicotine-replacement therapies work in a similar way, except they deliver a smaller dose of nicotine than cigarettes, gradually reducing an individual's dependence on nicotine. However, these treatments may still produce similar side effects to the substance.



Figure 1. Nicotine-replacement therapies, such as nicotine patches, reduce dependence on nicotine in smokers.

Credit: Daniel Heighton, Getty Images

Antagonist medications function by binding to specific receptors in the brain, effectively blocking or dampening the effects of addictive substances. For instance, naltrexone acts as an opioid receptor antagonist, binding to opioid receptors without activating them, which prevents opioids from producing their characteristic euphoric effects. For treating opioid addiction, naltrexone reduces the reinforcing effects of opioids, helping to decrease cravings and the likelihood of relapse.

Antidepressants may also be used to treat substance addiction, due to the underlying mechanisms involved in substance-use disorders and the common comorbidity of depression and substance-use disorders. However, the research evidence on the effectiveness of antidepressants to treat addiction is mixed ([Torrens et al., 2005](https://doi.org/10.1016/j.drugalcdep.2004.09.004)) ↗ (<https://doi.org/10.1016/j.drugalcdep.2004.09.004>).

Additionally, many biological treatments focus on managing withdrawal symptoms (as seen with benzodiazepines for alcohol withdrawal), highlighting how tolerance can develop. Over time, repeated substance use leads to tolerance, where the body requires more of the drug to achieve the same effect, and withdrawal, where the absence of the drug results in negative side effects. This shows that substance-based addiction is not just psychological, but also a biological adaptation of the brain to ongoing substance exposure.

Imaging studies, such as positron emission tomography (PET), have revealed that chronic substance use significantly reduces dopamine receptor availability in the brain, leading to a desensitised reward system. Through PET imaging, [Volkow et al. \(2004\)](https://doi.org/10.1038/sj.mp.4001507) ↗ (<https://doi.org/10.1038/sj.mp.4001507>) found a marked reduction in dopamine receptor availability in the striatum, a brain region involved in reward, motivation and pleasure. Decreased dopamine receptor levels are also associated with reduced motivation for non-drug-related activities, contributing to the compulsive nature of addiction. The study suggested that treatment approaches should focus on normalising dopamine function, such as pharmacological interventions aimed at increasing dopamine receptor availability or enhancing natural dopamine release through behavioural therapies.

This emphasises that effective addiction treatments should address both the biological and psychological aspects of addiction, given dopamine's role in reinforcing drug-seeking behaviour.

Cognitive treatments for addiction

Although addiction has a strong biological basis, research shows that cognitive-focused treatments, such as cognitive behavioural therapy (CBT) and contingency management, are also effective in treating addiction. These approaches target addiction by helping individuals:

- change harmful thought patterns
- develop coping strategies
- reduce social influences that encourage substance use.

These treatments show that distorted thinking, poor coping mechanisms (Sripada, 2022)  (<https://doi.org/10.1016/j.bbrc.2021.113639>), and emotional dysregulation (Koob, 2009)  (<https://doi.org/10.1016/j.brainres.2009.03.038>) may contribute to the development and maintenance of addiction. Individuals may use substances to escape emotional pain or stress, indicating that psychological factors are key components of addiction's etiology.

Contingency management is a treatment based on the principles of operant conditioning. Individuals receive rewards for demonstrating positive behaviours related to their recovery, such as attending treatment sessions or engaging in healthy activities. The reinforcement is usually immediate, which helps strengthen the connection between the behaviour and the reward. These rewards can be monetary cash incentives, vouchers or prizes. Contingency management has been shown to be effective in treating various substance-use disorders, including cocaine, methamphetamine, alcohol, and opioid addictions (Rash et al., 2017)  (<https://doi.org/10.1016/j.jsat.2016.09.008>).

One example is the community reinforcement approach (CRA). The CRA emphasises altering a person's environment to encourage sobriety and reduce substance use. This approach is based on the idea that substance use often provides immediate, reinforcing rewards, such as relief from stress or social connection. CRA addresses this by helping individuals build a lifestyle where non-substance-related activities provide equal or greater rewards, by using familial, social, recreational, and vocational reinforcers.

Khalid et al. (2024)  (<https://doi.org/10.3389/fpubh.2024.1229262>) conducted a randomised study where inpatients with substance-use disorders enrolled in a treatment programme. Participants either received a 12-week CRA-based intervention with traditional treatment or the baseline traditional treatment (the control group). The CRA-based intervention focused on creating positive reinforcements for sobriety, such as vocational training, social skills development and relapse prevention strategies. Measures of quality of life and happiness were

taken before and after the intervention. The findings indicated significant improvements in participants' quality of life and happiness following the CRA intervention in comparison to the control group. Participants reported greater satisfaction in areas like social relationships, employment, and overall well-being compared to the baseline.

Making connections

You learned about cognitive behavioural therapy (CBT) in [subtopic 2.2](#) (<https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49438/>). This treatment is not only effective for mental health disorders, but also for treating addiction.

CBT helps individuals recognise the negative thought patterns and behaviours associated with their substance use. CBT teaches specific skills to help manage cravings, avoid high-risk situations and cope with stress without turning to substances.

It is theorised that stress can act as a trigger for substance use, since addiction can develop as a maladaptive coping mechanism in response to environmental stressors. Treatments that focus on stress management and result in successful outcomes can indicate that factors such as stressful life events can increase the risk of developing addiction. Treating environmental stressors, such as poverty and social isolation, are crucial in preventing the development of addiction.

Cue exposure therapy (CET) exposes individuals to drug-related cues or stimuli that are related to their substance use behaviours in a controlled setting. However, they are unable to use the substance. For example, an individual who smokes when they have a break from work would be exposed to the same location where they take their break – without being able to smoke. Over time, repeated exposure to the stimulus or cues without the substance diminishes the conditioned response (cravings or urges to use), a process known as extinction. Eventually, the individual's neurobiology will no longer elicit a biological response when they encounter these triggers in their lives.

Aversion therapy is another treatment based on the principles of classical conditioning, whereby counterconditioning is used. Individuals create a negative association with the stimulus to make the use of the substance less appealing. In this therapy, the individual is given the addictive substance but is also exposed to an aversive stimulus, such as a bad taste or nausea-inducing drugs. This pairing creates a conditioned response in which the substance becomes associated with a negative experience. Over time, the individual will eventually avoid the substance. This treatment is most frequently associated with alcohol-use disorder.

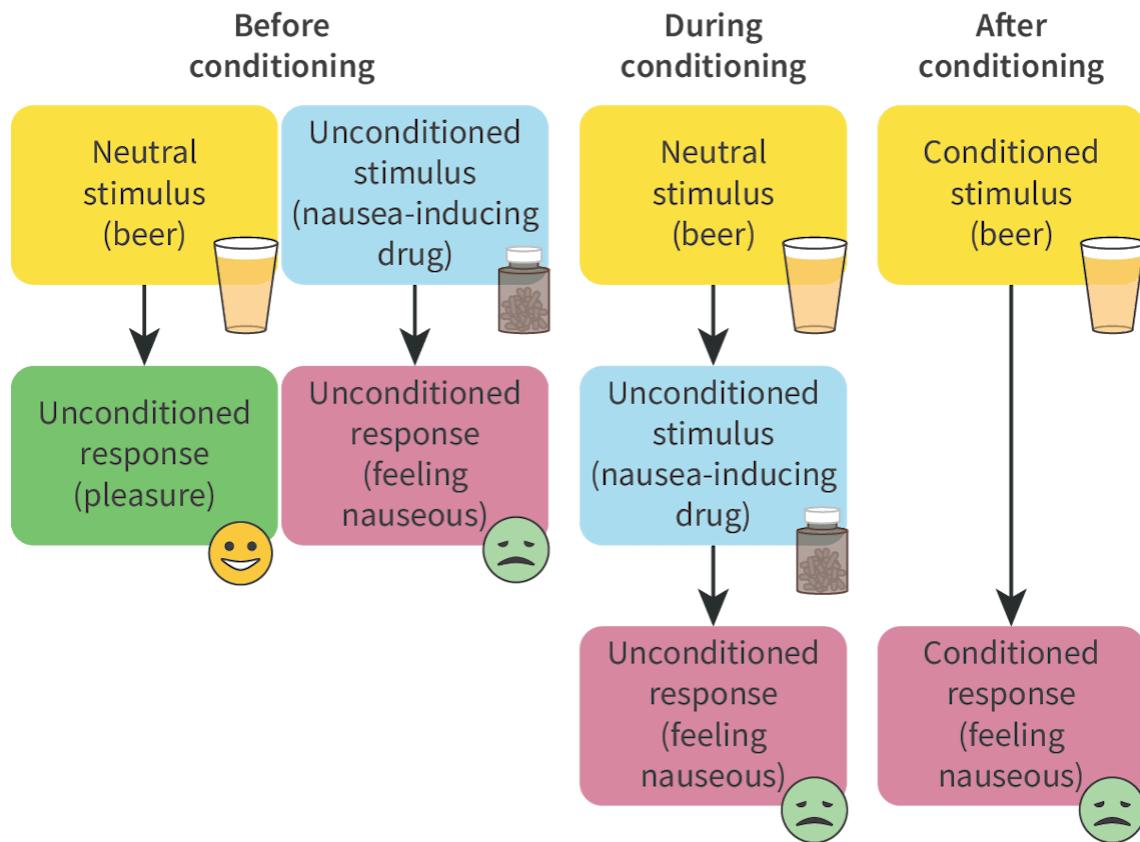


Figure 2. Aversion therapy for addiction.

[More information for figure 2](#)

Three flow charts showing classical conditioning using two stimuli. The stimuli are beer and a nausea-inducing drug. The first flow chart is before conditioning. The neutral stimulus is beer and this leads to the unconditioned response of pleasure. The unconditioned stimulus is a nausea-inducing drug, which leads to the unconditioned response of feeling nauseous. The second flow chart is during conditioning. The neutral stimulus is beer; this leads to the unconditioned stimulus which is the nausea-inducing drug; and this leads to the unconditioned response of feeling nauseous. The third flow chart is after conditioning. Beer is the conditioned stimulus and this leads to the conditioned response of feeling nauseous.

HL Extension

Technology

There are few fields or disciplines that have been changed as revolutionarily by technology as neuroscience. Prior to the technological developments of PET scans, MRI and fMRI, neuroscientists and psychologists relied on cadavers as well as animals in order to study the relation between the brain

and behaviour. Through the technological invention of brain scanning technologies, neuroscientists and psychologists can now see what's going on inside a living, active brain.

Nora Volkow of the National Institute of Health has changed the way the psychological community views addiction by leveraging the technologies of PET and fMRI to establish a clear relationship between the dopaminergic pathways of the brain and addictive behaviour ↗ (<https://pubmed.ncbi.nlm.nih.gov/29142296/>).

Not only have Volkow and her colleagues found that biological correlates of motivation are a major component of addiction (both opioid-based and food-based addictions) but have also taken a behaviourist perspective and established the role of conditioning in addiction.

Volkow et al. (2011) ↗ (<https://pubmed.ncbi.nlm.nih.gov/21402948/>) surprisingly found that individuals with opiate drug addictions had larger dopamine responses in a localised region of the limbic system (striatum) to conditioned drug cues (such as paraphernalia and images of the drug itself) than when they were actually given the drug (participants were administered morphine).

The area in which the dopamine release occurred is a localised area of the brain known to be associated with both impulse control and motivation. Thus, Volkow et al. believe that this conditioned response plays a major role in motivating an individual to engage in drug- or food-seeking behaviour.

By utilising both technology and a behaviourist perspective, Nora Volkow and colleagues at the National Institute of Health have truly revolutionised approaches to treating addiction.

Reflection questions

1. Knowing that addicted individuals develop a conditioned response to environmental stimuli associated with drug use, what kind of environmental or behavioural changes might a psychologist recommend to individuals suffering from opiate- or food-based addiction? How might a cognitive approach to treatment incorporate Volkow's findings?
2. What do Volkow et al.'s findings tell you about the role of biology, and specifically dopamine, in addiction?

Social interventions

The incorporation of social support in treatment programmes such as Alcoholics Anonymous highlights the role of social and environmental factors in the etiology of addiction. The fact that peer influence, social norms and group identity are central to addiction treatment suggests that addiction has a social component.

Individuals may develop addictive behaviours as a result of both social learning and social identity theory. Modelling of addictive behaviour and social pressure both have been theorised to play a role in the development of addiction. However, just as ingroups can create norms of engaging in addictive behaviour, they can also support recovery through the creation of norms of abstinence and social support. This suggests that social and environmental contexts are key to understanding why some people develop addictions and others do not, even when exposed to the same substances.

Alcoholics Anonymous (AA) and other 12-step intervention programmes have been shown to be effective in treating substance-use disorders when participants have high attendance rates and engage in activities ([Donovan et al., 2013](#)) ↗ (<https://doi.org/10.1080/19371918.2013.774663>). Additionally, participation in these treatments is effective in the long term. ([Moos & Moos \(2006\)](#) ↗ (<https://doi.org/10.1002/jclp.20259>) conducted a 16-year follow-up study over several time intervals with individuals who participated in AA. Their findings indicate that individuals who engaged in treatment or AA for at least 27 weeks experienced better alcohol-related outcomes over the 16 years compared to those who remained untreated. Prolonged AA involvement was linked to better recovery results, emphasising the importance of sustained engagement.



Figure 3. Programmes that incorporate social support can be effective for treatment of substance use disorders.

Credit: andresr, Getty Images

Greater participation in 12-step meetings and activities after formal treatment can provide essential support. It also acts as an ongoing form of care, which has been shown to reduce the need for mental health and substance abuse treatment services, ultimately lowering related costs. However, it is important to note effectiveness of these programmes may vary based on individual factors and level of engagement with the programmes.

HL Extension

Technology

Advancements in technology and artificial intelligence have also led to the development of treatment-focused applications, such as A-CHESS (<https://center.chess.wisc.edu/innovation/achess/>) (Addiction — Comprehensive Health Enhancement Support System), which was developed at the University of Wisconsin—Madison.

A-CHESS provides online support communities, and monitors cravings and triggers so that the individual's clinician can be **more informed**. The app can also use GPS to warn individuals about entering into spaces or environments that could be triggers, such as a certain neighbourhood or bar. This last feature is related to the work of Nora Volkow outlined in the previous HL feature.

A-CHESS Recovery App



Video 1. Patients and staff describe the uses and benefits of the A-CHESS recovery app.

As AI improves, it may be possible to have a digital clinician available 24 hours per day for individuals to consult throughout their addiction recovery journey.

Reflection questions

1. What would be the advantages of integrating a chat-based generative AI into an addiction treatment app like A-CHESS?
2. Would there be disadvantages to generative AI treatment consultations?
3. The ethics of sharing data are often raised when discussing new technologies. What ethical considerations surround AI health apps such as A-CHESS and others?
4. Identify research that supports the use of digital applications such as A-CHESS or ReSET ↗ (<https://www.novartis.com/news/media-releases/sandoz-and-pear-therapeutics-announce-launch-reset-treatment-patients-substance-use-disorder>).

So, what is the most effective treatment? Treating addiction is complex and the approach to treatment needs to be highly individualised. No single treatment is appropriate for everyone; it is important not to just target the use of the substance, but to take a holistic approach.

Concept

Causality

Examining the effectiveness of different treatment approaches for addiction can offer valuable insights into its underlying causes. Understanding how various modalities address addiction sheds light on the complex factors contributing to this behaviour.

Reflection question

1. Discuss how successful treatment approaches (modalities) may provide insight into the causality of addiction.

Activity

IB learner profile attribute: Thinker/Reflective/Communicator

Approaches to learning: Social skills/Thinking/Researching

Time required to complete activity: 60 minutes

Activity type: Group

Investigating treatments

In small groups, carry out in-depth research into one treatment for addiction and share your group's findings with the class.

For each treatment:

1. Explain what the treatment is and how it is meant to work.
2. Explain the etiological theory upon which the treatment is based.
3. State the type of addiction (for example, social media or drug addiction) for which it is considered most effective.
4. Summarise at least two studies demonstrating the effectiveness of the treatment. Include aim, basic procedure and results.
5. State the strengths and limitations of the treatment.
6. Explain any challenges associated with the treatment.

Reflection questions

1. How is the effectiveness of a treatment measured?
2. (**Concept application: perspective**) What insights have you gained into addictive etiology from understanding your chosen treatment?
3. How might cultural and societal values influence the effectiveness of treatments for addiction?
4. What barriers exist in treatments for addiction, and how might these impact our understanding of these treatments?

Learning outcomes

By the end of this section, you should be able to:

- Describe prevention and/or treatment strategies for one or more health problems and discuss their effectiveness.
- Explain the process of neurotransmission and how an understanding it allows psychologists to improve health and well-being.
- Describe the process of classical conditioning and its role in behaviour.
- Describe examples of classical conditioning as a way of learning and illustrate how classical conditioning is applied in real-world scenarios.
- Discuss how successful treatment modalities may provide insight into the causality of addiction.

HL Extension

- Discuss the role of technology in assisting in the prevention or treatment of health problems.
- Describe the effect of technology on cognition.

How can stress contribute to health problems?

Guiding question(s)

In this subtopic, you are thinking about the question, '**Can stress make us unwell?**' This section will help you make an informed response by working through the following guiding questions:

- What is stress?
- What evidence is there that supports the claim that stress is a cognitive construct?

Stress: Everyone has heard of it, but not everyone understands exactly what it is, what causes it and its effect on the human body and mind. This section will aid in your exploration of the question, 'What is stress?', as well as ask you to examine the extent to which stress may be all in our mind!

Keep the guiding question in mind as you progress through this section. The guiding question(s) build into the subtopic question(s). You will return to the subtopic question(s) at the end of each subtopic. The subtopic question(s) require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

According to one survey conducted in 122 countries (Ray, 2022)  (<https://news.gallup.com/poll/394025/world-unhappier-stressed-ever.aspx>), four in ten adults worldwide report experiencing a lot of stress daily. In the UK, 74% of people reported feeling so stressed they were overwhelmed or unable to cope in the last year (HSE, 2023  (<https://www.hse.gov.uk/statistics/assets/docs/stress.pdf>)). According to the APA  (<https://dictionary.apa.org/stress>), stress is 'the physiological or psychological response to internal or external stressors. Stress involves changes affecting nearly every system of the body, influencing how people feel and behave'.¹ The last time you had an exam or an upcoming major deadline, you may have not only felt 'stressed' but also tired. You may also have had sweaty palms and even stomach pain.

There are two main types of stress: acute stress and chronic stress. Acute stress is a short-term physiological and psychological response to a specific event. For example, think of a time you had a ‘pop quiz’ in class. You may have experienced a brief amount of stress, but as soon as the quiz was over, your stress levels would have probably decreased. Usually, acute stress has a clear start and end point, only lasting for minutes or hours.

On the other hand, chronic stress is an ongoing response to a stressor. The stressor does not have to be physically present for this to occur. Many things can cause chronic stress. The Social Readjustment Rating Scale (SRRS) (Romas & Sharma, 2022) (https://www.sciencedirect.com/topics/psychology/social-readjustment-rating-scale), also known as the Holmes and Rahe Stress Scale, assesses the amount of stress an individual is exposed to. According to this scale, some of the most stressful life events that people experience include the death of a spouse, divorce, imprisonment, major injury or illness and unemployment. Chronic stress can also result from a combination of stressors over a period of time. Additionally, stressors can come in many forms and what may be stressful for one person may not stress another. For example, some people may find driving a car a very stress-free experience, and others find this a very stressful experience. Our individual perception of stress, coping mechanisms and support systems can influence how we are impacted by stress.

Physiological aspects of stress

Imagine you are going on a hike and you spot a snake in the long grass nearby. Your heart may start beating rapidly, and your first instinct may be to turn and run away. When we first perceive a stressor, our sympathetic nervous system (SNS) is triggered almost immediately. This response is otherwise known as the flight-or-fight response. This nervous system is part of the autonomic nervous system (ANS), which controls certain body processes like blood pressure and breathing. It works without conscious effort. When stress is perceived, the SNS triggers the release of the hormones adrenaline (also known as epinephrine) and norepinephrine. These hormones lead to increased heart rate, faster breathing, higher blood pressure, inhibition of non-essential systems (like digestion) and direction of glucose to the muscles.

In response to this, the hypothalamus releases corticotropin-releasing hormone (CRH) that stimulates the pituitary gland to release adrenocorticotrophic hormone (ACTH). This is known as the hypothalamic-pituitary-adrenal (HPA) axis (see **Figure 1**). This hormone travels through the bloodstream and signals the adrenal cortex to release another hormone, cortisol. Cortisol is the body’s main stress hormone and, in moderate amounts, can be beneficial. However, when too much or too little cortisol is released, there can be many negative effects on the body. When released, cortisol can help the body respond to stress by:

- mobilising energy through increasing blood glucose levels
- enhancing the effects of epinephrine, increasing heart rate and blood pressure
- suppressing non-essential immune functions in order to conserve energy
- reducing inflammation throughout the body.

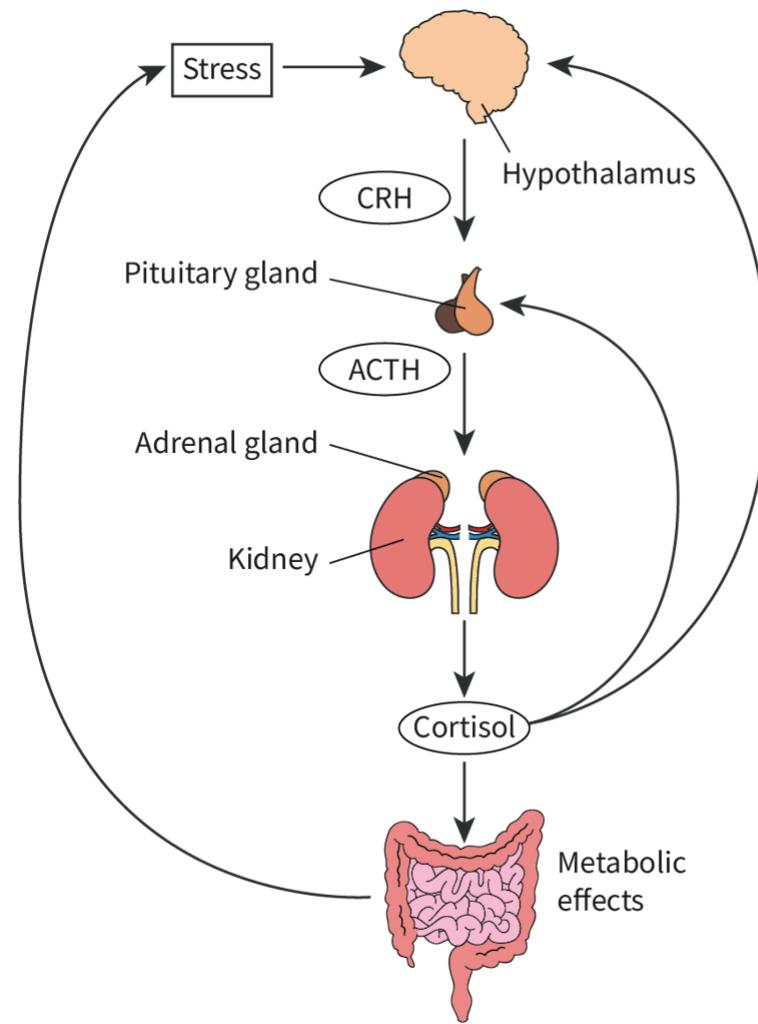


Figure 1. The relationship between stress and the hypothalamic-pituitary-adrenal (HPA) axis.

🔗 [More information for figure 1](#)

Abstract diagram showing relationships between the components of the HPA during a stress response. Stress affects the brain. The hypothalamus releases CRH to the pituitary gland. The pituitary gland releases ACTH. The adrenal glands, one on top of each kidney, release cortisol. Cortisol leads to metabolic effects in the gut and also affects the pituitary gland and the brain. Metabolic effects lead to further stress.

These functions can be beneficial for an acute stress response, as they help us to survive and remove the stressor, such as responding to the acute stressor of the snake. However, if we are under chronic stress, cortisol levels will be chronically elevated, and these functions are not as beneficial for health and well-being. These effects can lead to several health problems.

Stress and the brain

When we encounter stress, the amygdala is highly active. This is the part of the brain that is crucial for emotions such as fear and surprise, and is highly focused on survival. In comparison, other parts of the brain, such as the prefrontal cortex, are used to handle higher-order tasks such as decision-making. Some researchers believe that when one part of the brain is active, there is less energy and fewer resources for other parts of the brain to use ([Harvard Health Publishing, 2021](https://www.health.harvard.edu/mind-and-mood/protect-your-brain-from-stress)) ↗ (<https://www.health.harvard.edu/mind-and-mood/protect-your-brain-from-stress>). In animal studies, animals that are under prolonged stress have less activity in some parts of the brain, such as the prefrontal cortex. The more used parts of the brain, such as the amygdala, then become stronger.

The hippocampus, responsible for learning and memory, is one part of the brain that is highly vulnerable to stress. This is because the hippocampus is dense with cortisol receptors. Prolonged periods of stress, resulting in exposure to high levels of cortisol, can overstimulate these receptors and damage the neurons in the hippocampus. Long-term potentiation (the process of strengthening synapses and an important mechanism for learning and memory) is inhibited when the hippocampus is exposed to prolonged cortisol. Because of this, there is a reduction of the synaptic plasticity of the hippocampus, and the effects of stress can lead to memory problems, cognitive decline and potentially increased vulnerability to mental health disorders such as depression.

Newcomer et al. (1999) ↗

(<https://jamanetwork.com/journals/jamapsychiatry/fullarticle/1673779>) conducted a randomised, double-blind, placebo-controlled trial, aiming to test the effects of cortisol on memory in 51 healthy participants. Participants were matched and assigned to three conditions: high cortisol, low cortisol or the control group. Two cortisol doses were given (40 mg/day for the low cortisol group and 160 mg/day for the high cortisol group) for four days. Participants were asked to recall a paragraph of text to test their memory recall. Higher doses of cortisol (160 mg/day) caused temporary reductions in verbal declarative memory. There was no significant difference between the low cortisol group and control condition. The findings suggest elevated cortisol levels, similar to high-stress situations, can temporarily impair memory but are reversible.

Psychological aspects of stress

While there is a clear biological explanation of stress, our experiences with it are highly individual because we all perceive stress differently. Lazarus & Folkman (1984) (https://link.springer.com/referenceworkentry/10.1007/978-1-4419-1005-9_215) developed a model known as the transactional model of stress and coping. They suggested that stress is a process of the bidirectional interaction between a person and their environment. It states that cognitive appraisal plays a crucial role. This occurs in two parts:

- **Primary appraisal** – First assessment of whether a situation is relevant and is threatening. If we decide it is threatening, we make a secondary appraisal.
- **Secondary appraisal** – Evaluation of our ability to cope with the situation.

Stress will then occur if the perceived demands, such as risk, difficulty and uncertainty, exceed coping resources, such as social support. We then engage in coping strategies. According to the model, there are two types of coping: problem-focused coping, where we attempt to change the stressful situation, and emotion-focused coping, where we attempt to regulate our emotional response to the stress. These strategies can be adaptive if they help us to manage our stress (such as focusing on the good), or maladaptive if they don't help in the long term (such as smoking). This model suggests that this process is dynamic. We make re-appraisals, going through the appraisal process again, and this can help us by either stopping the stress or changing coping styles.

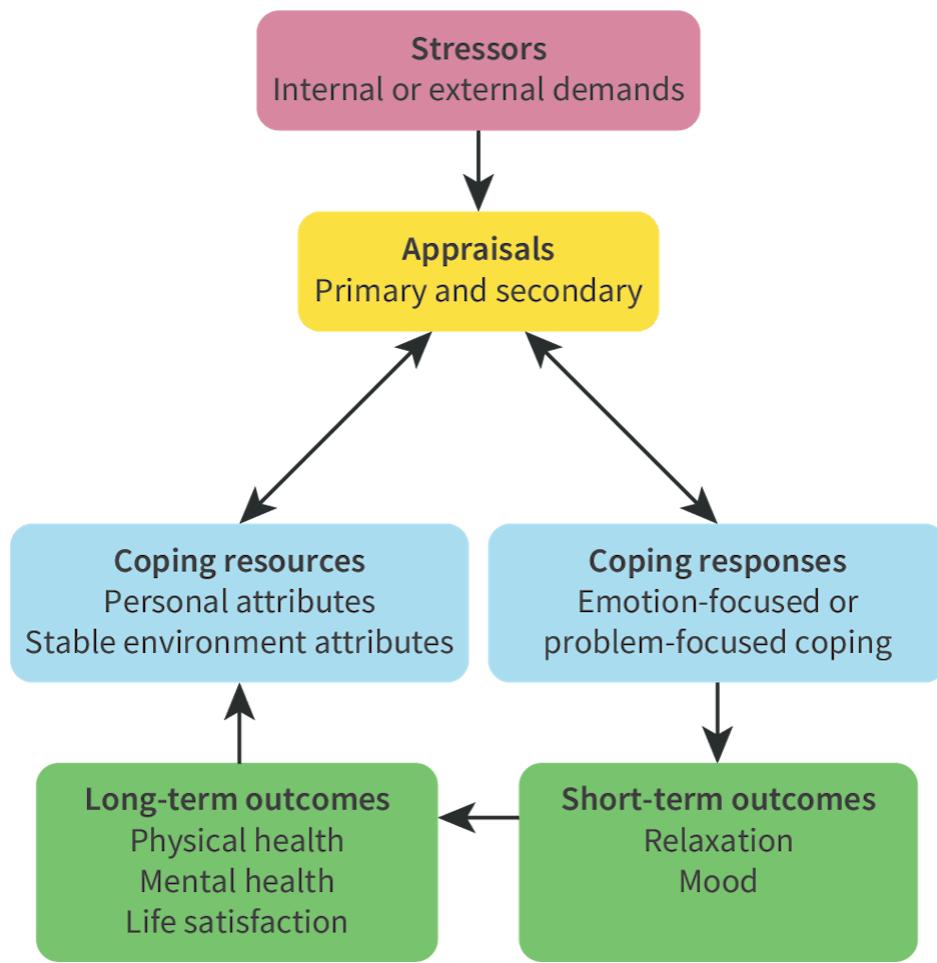


Figure 2. Lazarus and Folkman's transactional model of stress and coping.²

🔗 [More information for figure 2](#)

Flow chart. Stressors, which are internal or external demands, lead to appraisals, which can be primary or secondary. Appraisals are linked by two-way arrows with two sets of coping resources. The first set of coping responses includes personal attributes and stable environment attributes. The second set of coping responses includes emotion-focused or problem-focused coping. This second set of coping responses leads to short-term outcomes, including relaxation and mood. Short-term outcomes lead to long-term outcomes, including physical health, mental health and life satisfaction. Long-term outcomes lead back to the first set of coping resources: personal attributes and stable environment attributes.

This model can better help us understand the role of individual differences in stress and the psychological aspects of the stress response. The model holds that stress is not always negative: our perception of the situation can help us to recognise stress as a challenge and opportunity for growth. For example, some students see exams as positive challenges, while others may view them as stressors. However, the relationship between stress and our cognition is bidirectional: how we think can lead to stress, but stress can also influence how we think.

Concept

Perspective

Lazarus and Folkman's model of stress and coping highlights how our appraisal of stress affects our response to it. It recognises that individuals can appraise the same situation differently, leading to different emotional responses. This suggests that one's perspective of a situation shapes their appraisal of it.

Reflection question

1. Discuss how an individual's perspective could influence cognitive and biological effects of stress.

Health problems and stress

Exposure to chronic stress can have significant impacts on our health. Prolonged release of cortisol results in overexposure to cortisol, which can be disruptive to the body's processes. Some negative effects of exposure to cortisol include impacts on cardiovascular health, like heart disease and hypertension ([American Psychological Association, 2018](https://www.apa.org/topics/stress/body)) ↗ (<https://www.apa.org/topics/stress/body>) and a weakened immune system ([Morey et al., 2015](https://doi.org/10.1016/j.copsyc.2015.03.007) ↗ (<https://doi.org/10.1016/j.copsyc.2015.03.007>)). Additionally, stress can impact our sleep ([Martire et al., 2020](https://doi.org/10.1016/j.neubiorev.2019.08.024) ↗ (<https://doi.org/10.1016/j.neubiorev.2019.08.024>)).

[Lohitashwa et al. \(2015\)](http://dx.doi.org/10.18203/2320-6012.ijrms20151391) ↗ (<http://dx.doi.org/10.18203/2320-6012.ijrms20151391>) surveyed a sample of medical students using standardised questionnaires to assess stress levels and sleep quality. Stress was measured using a validated stress scale and sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). The study found a significant association between high stress levels and poor sleep quality among the students. Those with higher stress scores reported more sleep disturbances, difficulty falling asleep and lower overall sleep quality.

The hippocampus is vulnerable to stress. Because of this, people who have chronic stress can have impaired memory and learning. Stress can cause us to have difficulty concentrating and impair our focus. There is evidence to suggest that chronic stress can be a risk factor for Alzheimer's disease (AD), in which the hippocampus is one of the main brain regions affected ([Machado et al., 2014](https://doi.org/10.1515/revneuro-2014-0035) ↗ (<https://doi.org/10.1515/revneuro-2014-0035>)).

Making connections

In subtopic 2.1 ↗ (<https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/the-big-picture-id-49425/>), you learned about the etiologies for depression. How do you think stress can contribute to the onset of depression? What is the relationship between stressful life events and depression?

Chronic stress also increases our susceptibility to mental health disorders like depression and anxiety. Prolonged exposure to cortisol can contribute to the symptoms of depression and anxiety and increase our vulnerability to these disorders. Stress can impact the functioning of specific parts of the brain responsible for emotion and mood regulation, such as the prefrontal cortex and the hippocampus. Many research studies, such as Caspi et al. (2003) ↗ (<https://doi.org/10.1126/science.1083968>) studied in section 2.1.3 (<https://app.kognity.com/study/app/psychology-new/sid-540-cid-763690/book/can-society-cause-mental-health-disorders-id-49428/>), are increasingly showing the relationship between stressful life events and genetic predispositions that may increase the vulnerability to mood disorders such as depression and anxiety.

Chronic stress is also a risk factor for addiction. One maladaptive coping mechanism for many people may be to use alcohol or drugs to escape from stress. These maladaptive coping mechanisms can also increase the risk for other disorders such as depression and anxiety. The changes that occur in the brain due to stress can impact function. For example, the prefrontal cortex can be impaired ↗ (<https://doi.org/10.1038/tp.2012.59>), which is responsible for decision-making and self-regulation, leading to impulsivity and a lack of behavioural control.

Activity

IB learner profile attribute: Thinker/Reflective/Inquirer

Approaches to learning: Thinking/Researching

Time required to complete activity: 30 minutes

Activity type: Pairs/Group

Stress and perception

Concept application: Perception

In pairs, list stressors that a student may experience and organise these into acute vs. chronic stressors. Then, discuss the following questions:

1. How do you perceive each stressor?
2. Does your perception of this stressor differ from your partner's?
3. How does the perception of these stressors influence your stress response? Does your stress response occur by simply thinking of these stressors?
4. How can you change your perception of stress? Discuss some strategies with your partner.

Learning outcomes

By the end of this section, you should be able to:

- Identify the role of stress in one or more health problems.
- Explain the role and use of cognitive models in understanding mental health disorders.
- Explain the process of neuroplasticity and the role that environmental factors play on brain development.
- Discuss how perspective influences cognitive and biological effects of stress.

¹ Definition from the APA Dictionary of Psychology. Retrieved 18-11-24 from <https://dictionary.apa.org/stress> ↗ (<https://dictionary.apa.org/stress>).

² Figure adapted from [Margaret K., Ngigi S. & Mutisya S. \(2018\)](https://www.researchgate.net/publication/329444557_Sources_of_Occupation) ↗ (https://www.researchgate.net/publication/329444557_Sources_of_Occupation ‘Sources of occupational stress and coping strategies among teachers in borstal institutions in Kenya’, *Edelweiss: Psychiatry Open Access*, Volume 2, Issue 1, Pages 18–21. Copyright: © 2018 Margaret K, et al. Licensed under the CC-BY-4.0 licence <https://creativecommons.org/licenses/by/4.0/> ↗ (<https://creativecommons.org/licenses/by/4.0/>).

What are effective methods for treating health problems?

Guiding question(s)

In this subtopic, you are thinking about the question, '**Can stress make us unwell?**' This section will help you make an informed response by working through the following guiding question:

- What are some evidence-based, effective treatments for health problems?

This section will examine treatments for health problems through an evidence-based lens. The relationship between this guiding question and the overarching essential question for the subtopic is an examination between stress and well-being. Might treating stress result in certain increases in well-being?

Keep the guiding question in mind as you progress through this section. The guiding question(s) build into the subtopic question(s). You will return to the subtopic question(s) at the end of each subtopic. The subtopic question(s) require you to pull together your knowledge and skills from different sections, to see the bigger picture and to build your conceptual understanding.

As you learned in the previous section, stress is a significant health problem affecting many people. Stress is a natural response to challenging situations. However, in prolonged amounts, stress can greatly affect both short- and long-term health, as it triggers a series of physical and psychological reactions that may contribute to numerous health issues. This includes mental health problems such as anxiety and depression, and cognitive issues such as impaired memory and concentration. Stress can also result in behavioural problems such as unhealthy coping mechanisms, for example, smoking, drinking alcohol, overeating or physical inactivity. These behaviours further exacerbate the risk of developing health issues such as obesity and substance dependence.

Understanding how to treat health problems such as stress is not as simple as learning relaxation techniques that you may have read about in magazines or on social media. Treatments for stress are varied and highly dependent upon the individual and the stressors to which they are exposed. Often, these techniques

help to improve cognitive and emotional functioning, as well as physical health. It is important to understand which treatments are deemed to be effective, based on the evidence that exists.

Mindfulness

Recently, mindfulness-based practices have received attention from many researchers. Mindfulness is the focused awareness of one's experiences and a purposeful focus on the present moment. Structured programmes like Mindfulness-Based Stress Reduction (MBSR) teach participants techniques such as breathwork, meditation, body scanning and gentle yoga. Over time, individuals develop the ability to observe emotions, thoughts and physical sensations as they occur, rather than reacting automatically or worrying about future events. This practice promotes a shift from instinctive reactions to more adaptive responses, fostering a greater awareness of the present moment and improving stress-management skills. A review conducted by [Keng et al. \(2011\)](#) ↗ (<https://doi.org/10.1016/j.cpr.2011.04.006>) found that mindfulness-based interventions such as MBSR showed positive effects on a variety of psychological symptoms, including both short-term and long-term stress.

[Shapiro et al. \(2005\)](#) ↗ (<http://doi.org/10.1037/1072-5245.12.2.164>) conducted a randomised control trial to investigate the effectiveness of MBSR for health-care professionals, who often report significant stress. 38 participants were randomly assigned to either the waitlist control group or the MBSR group, where they received an eight-week intervention. There was a significant mean reduction in stress scores and an increase in self-compassion after the intervention, demonstrating the potential benefits of MBSR in stress reduction.



Figure 1. Mindfulness-based therapies are successful in the treatment of health problems.

Credit: Kerrick, Getty Images

Lifestyle changes

When you hit exam time, you may notice that you eat a less balanced diet and exercise less. You are not alone! People tend to neglect a balanced diet and physical activity during stressful times ([Oliver & Wardle, 1999](#)) ↗ ([https://doi.org/10.1016/S0031-9384\(98\)00322-9](https://doi.org/10.1016/S0031-9384(98)00322-9)). Prolonged exposure to cortisol can increase our cravings for sugar and fat ([Harvard Health Publishing, 2012](#)) ↗ (<https://www.health.harvard.edu/healthbeat/how-stress-can-make-us-overeat>). Simple lifestyle changes, like incorporating more fruits and vegetables into the diet, can help to manage and reduce stress levels by boosting the immune system ([Radavelli-Bagatini, 2021](#)) ↗ (<https://doi.org/10.1016/j.clnu.2021.03.043>), while providing more energy to deal with challenges.

The AusDiab study (2022) ↗ (<https://doi.org/10.1007/s00394-022-02848-5>) investigated the association between the intake of specific fruits and vegetables and perceived stress levels among 8,640 Australian adults aged 25 and older. It found that higher consumption of apples, pears, oranges, bananas and colourful vegetables was linked to significantly lower odds of experiencing high perceived stress. The results suggest that a diverse diet, including fruits and vegetables, may also help in reducing stress levels.

Physical activity, such as running and dancing, are also effective stress management techniques. Exercise increases adrenaline in the short term, while simultaneously increasing the level of endorphins. Endorphins are the body's natural painkillers and mood boosters, also known for giving you the 'runner's high.' Consistently exercising reduces the amount of resting cortisol ([Hackney & Walz, 2013](https://tss.awf.poznan.pl/Hormonal-adaptation-and-the-stress-of-exercise-training-the-role-of-glucocorticoids,188953,0,2.html)) ↗ (<https://tss.awf.poznan.pl/Hormonal-adaptation-and-the-stress-of-exercise-training-the-role-of-glucocorticoids,188953,0,2.html>), the body's main stress hormone. Even short bouts of exercise can provide immediate stress relief. A study on high school students (Shaw and Lubetzky, 2021) ↗ (<https://doi.org/10.3389/frvir.2020.598506>) found that a single short session of exercise was effective for immediate reduction of stress and anxiety during exam weeks.

Additionally, physical activity can be seen as an 'escape' from our stressors, taking our mind off them, similar to mindfulness. Joining athletic-focused clubs or groups can also increase social support, another intervention that is beneficial for reducing stress. Physical activity can be both a great treatment for stress in the short-term and a long-term protection against future stress.



Figure 2. Exercise and lifestyle changes are effective in treating health problems such as stress.

Credit: Maskot, Getty Images

Childs and de Wit (2014) ↗ (<https://doi.org/10.3389/fphys.2014.00161>) conducted a study in which 111 participants were exposed to an acute stress-inducing test or a non-stressful control task. They took physiological and self-reported measures before and after the task, finding that non-exercisers reported a greater decline in

positive emotions after the test, compared to those who exercised at least once per week. While correlational only, this finding indicates that regular exercise can protect against negative emotional consequences of stress.

Activities such as yoga have been shown to reduce psychological and physiological measurements of stress, and can be just as effective as evidence-based treatments, such as cognitive behavioural therapy (CBT). A study conducted by [Granath et al. \(2007\) ↗ \(https://doi.org/10.1080/16506070500401292\)](https://doi.org/10.1080/16506070500401292) compared CBT and yoga for stress management within a sample of 33 Swedish employees. They found significant improvements in stress for both groups after ten sessions over four months, with no significant difference between the two treatments. This indicates that yoga can be just as effective as traditional treatments, such as CBT.

Creativity, activity, service

Strand

Service

Learning outcome

- Demonstrate how to initiate and plan a CAS experience.

How does your school promote a healthy lifestyle? Plan a CAS project initiative where you can promote healthy lifestyle strategies in which your peers can engage.

Social support

Have you ever turned to a friend in a time of stress? Perhaps when you are studying for your exams, a group study session helps to relieve some of the exam stress. Social support is the support you get via access to other individuals, groups and the larger community. This could be your close friends, your classmates and your school community. It is important to cultivate human connection not only for social reasons but also for health reasons. [Research in this area ↗ \(https://doi.org/10.1016/s0306-4530\(03\)00086-6\)](https://doi.org/10.1016/s0306-4530(03)00086-6) has found that loneliness can activate adverse biological stress-related effects, such as increased hypothalamic-pituitary-adrenal (HPA) axis reactivity. This can be harmful, as it results in the prolonged or excessive release of stress hormones, such as cortisol. Social connectivity has also been correlated with the release of oxytocin, a hormone that plays a role in mitigating the biological stress response.

Heinrichs et al. (2003) ↗ ([https://doi.org/10.1016/S0006-3223\(03\)00465-7](https://doi.org/10.1016/S0006-3223(03)00465-7)) aimed to assess the effects of social support and oxytocin on stress responses in humans. Using a double-blind design, 37 men underwent the Trier Social Stress Test. Participants received either oxytocin or placebo and had either social support from a friend or none. Combined, oxytocin and social support significantly lowered cortisol, increased calmness and reduced anxiety, suggesting oxytocin enhances social support's stress-buffering effects.

HL Extension

Technology

Many technology apps promote interventions such as diet, exercise and even mindfulness. What role can technology play in treating health problems? Do you think that they can be just as effective as face-to-face interventions?

Acoba (2024) ↗ (<https://doi.org/10.3389/fpsyg.2024.1330720>) applied Lazarus and Folkman's transactional model of stress and coping to examine whether perceived stress mediates the relationship between social support and mental health outcomes. The study was conducted among 426 Filipino adults, using a cross-sectional online survey. The results revealed that support from family and significant others lowered perceived stress, which in turn improved positive affect, and reduced anxiety and depression. However, perceived stress did not mediate the effects of friend support on mental health outcomes. The study highlights the importance of family and significant other support in reducing stress, but also how social support can influence our appraisal of stress too.

Concept

Causality

While there is a lot of evidence supporting a variety of treatments for health problems, there are still many issues, such as the operationalisation of concepts like mindfulness and a reliance on self-reported data.

Reflection question

1. Note down further limitations with the research on the effectiveness of these treatments and discuss the role of causality in effective treatment of health problems.

Activity

IB learner profile attribute: Inquirer

Approaches to learning: Social skills/Communicating

Time required to complete activity: 20–30 minutes, dependent on class size

Activity type: Group

Treatments for stress

Concept application: Causality

1. Choose one treatment described in this section.
2. Investigate its effectiveness by finding at least two related research studies in support or refutation. You should use pubmed.gov  ([http://pubmed.gov/](https://pubmed.gov/)) or [Google Scholar](https://scholar.google.com)  (<https://scholar.google.com/>) to conduct your research.
3. In small groups, discuss the extent to which your chosen treatment approach can be said to cause the elimination of stress.

Learning outcomes

By the end of this section, you should be able to:

- Describe prevention and/or treatment strategies for one or more health problems and discuss their effectiveness.
- Discuss the role of causality in effective treatment of health problems.

HL Extension

- Discuss the role of technology in assisting in the prevention or treatment of health problems.

2.3 Health problems

Activity sheet: How do genetic and environmental factors affect addiction?

In this activity, you will be exploring the different explanations for addiction by looking at significant research studies on the genetics of addiction and then evaluating the theories that have been explored in this subtopic.

Subtopic question(s)

During this activity sheet, you will be working towards answering the following subtopic question:

- Is addiction a function of biology or the mind?

Part A

Knowledge and understanding

Which neurotransmitter is most commonly associated with the reward system involved in addiction?

1 Dopamine

2 Serotonin

3 Adrenaline

4 Cortisol

Which psychological approach suggests that addiction develops due to learned behaviours, reinforced by rewards?

 Type here

Which term describes the need for increasing amounts of a substance to achieve the same effect?

 Type here

Part B

Application and analysis

Twin studies can help us understand the role of genetics vs. the environment in the development of health problems such as addiction. A twin study, conducted by Kendler & Prescott (1998),  (<https://doi.org/10.1192/bjp.173.4.345>) focused on understanding the etiology of cocaine use, abuse and dependence in women through a sample of Caucasian female twins from the Virginia Twin Registry (USA). The study involved 1,934 individual twins from female–female pairs, including both monozygotic (MZ) and dizygotic (DZ) twins.

Key findings:

- The prevalence rates for lifetime cocaine use, abuse and dependence were found to be 14.0%, 3.3% and 2.3%, respectively.
- Concordance rates for cocaine use were 54% in MZ twins and 42% in DZ twins.
- For cocaine abuse, the rates were 47% for MZ twins and 8% for DZ twins.
- For cocaine dependence, the rates were 35% for MZ twins and 0% for DZ twins.
- Cocaine use was due to both genetic and familial-environmental factors, while cocaine abuse and dependence symptoms were attributed solely to genetic factors.
- Overall, estimated heritabilities were 0.39 for cocaine use, 0.79 for cocaine abuse and 0.65 for symptoms of dependence.

How do the findings of this study contribute to our understanding of the relative roles of genetic and environmental factors in the development of addiction?



Your answer

0/2000

What implications do the findings have for understanding gender differences in addiction?

 Your answer

0/2000

To what extent can the findings of this study be generalised to other populations?

 Your answer

0/2000

How can the findings of this study inform the development of treatment and prevention strategies for addiction?



Your answer

0/2000

Kendler et al. (2000) ↗ (<https://doi.org/10.1001/archpsyc.57.3.261>) conducted a similar study to the one above but with male twin pairs.

Create a table to compare the findings of this study to those of Kendler and Prescott (1998).



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What new insights can you now draw from these two studies about addiction?

Your answer

0/2000

Part C

Synthesis and evaluation

This subtopic has looked at several theories that are used in the explanation of health problems such as addiction.

Choose two theories to evaluate. Create a table or a poster addressing the following prompts:

1. What are the key concepts in each theory?
2. Explain the strengths and limitations of each theory.
3. How are these theories different?
4. How are these theories similar?
5. How can these theories be used in the treatment of health problems?



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Summary

In this activity, you have explored the question, ‘Is addiction a function of biology or the mind?’ by investigating the role of cognitive models in explaining addiction and biological explanations for addiction. You have also looked at the role of the environment in addiction, too. By now, you should understand that addiction is complex and multifaceted, and that we can explore this problem through many perspectives.

Reflection

‘Is addiction a function of biology or the mind?’

How would you answer this question after completing this activity?



Your answer