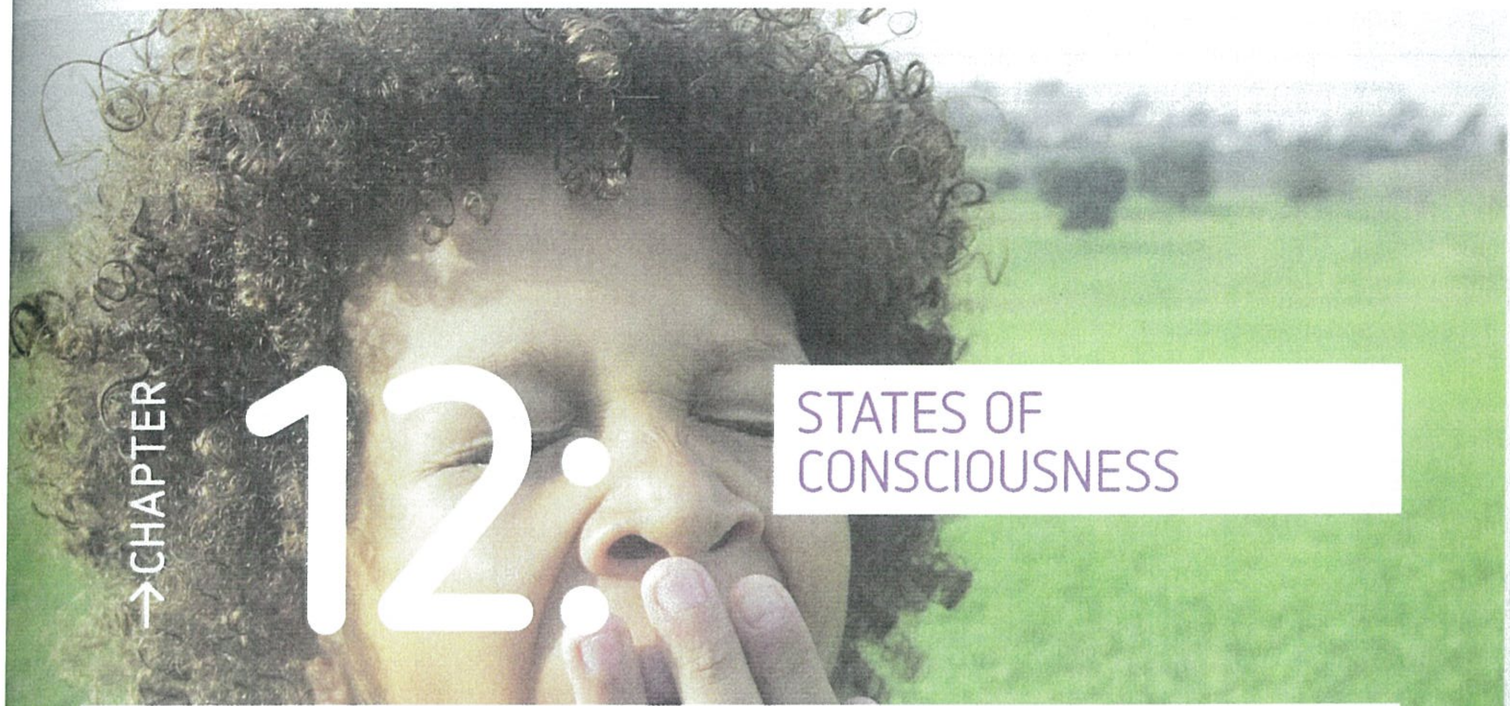

CHAPTER 12: STATES OF CONSCIOUSNESS

ACTIVITY 1: STREAM OF CONSCIOUSNESS

1 Why is consciousness considered a hypothetical construct?

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2 Examine the image below and explain the 'stream of consciousness' theory developed by William James.

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→ACTIVITY 2: CHARACTERISTICS OF CONSCIOUSNESS

Complete the following table by defining each change in psychological states during a normal waking consciousness and an altered state of consciousness.

CHARACTERISTIC	NORMAL WAKING CONSCIOUSNESS	ALTERED STATE OF CONSCIOUSNESS
Levels of awareness		
Controlled & automatic processes		
Content limitations		
Perceptual & cognitive distortions		
Emotional awareness		
Self-control		
Time orientation		

→ACTIVITY 3: CHARACTERISTICS OF NORMAL WAKING CONSCIOUSNESS (NWC) AND ALTERED STATES OF CONSCIOUSNESS (ASC)

Read the scenarios below and, for each, determine the state of consciousness (NWC/ASC) and the relevant characteristic of that state of consciousness. An example has been provided to assist you.

SCENARIO	STATE OF CONSCIOUSNESS: NWC/ASC	CHARACTERISTIC: • Level of awareness • Content limitations • Controlled and automatic processes • Perceptual and cognitive distortions • Emotional awareness • Self-control • Time orientation
Example: Crying at the funeral of a relative	NWC	Emotional awareness
Inability to walk a straight line because of alcohol intoxication		
Sirens sounding louder in the night while you sleep		
Brushing your teeth and putting the towel on the rack with the other hand		
Focusing on writing an essay		
At first you are listening to the teacher, then you start thinking about your hunger pangs		
Surgery seems so quick under anaesthetic		
Avoiding doing a presentation because you fear being embarrassed		
Having disjointed and senseless dreams		
Accurately judging the remainder of class time		

→ACTIVITY 4: NORMAL WAKING CONSCIOUSNESS OR ALTERED STATE OF CONSCIOUSNESS

Look at the pictures below and, for each, determine if the person is in a normal waking consciousness or an altered state of consciousness.

1

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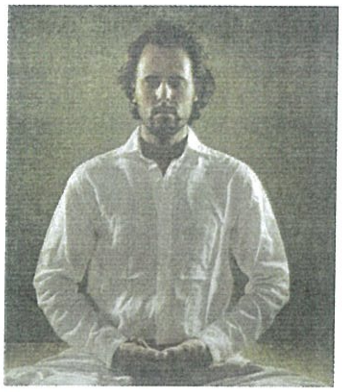

2

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4

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5

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6

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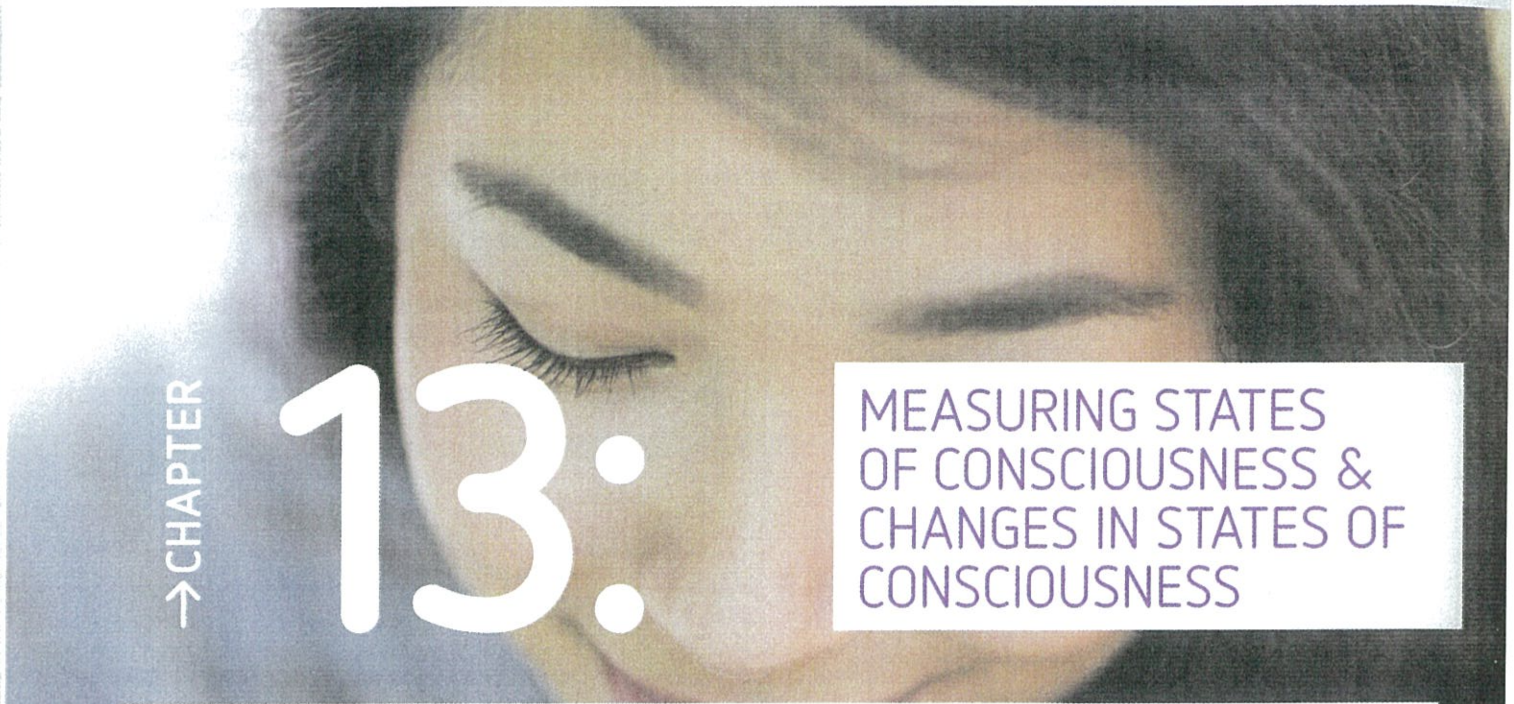


→CHAPTER 13: MEASURING STATES OF CONSCIOUSNESS & CHANGES IN STATES OF CONSCIOUSNESS

→ACTIVITY 1: BRAINWAVES

1 Read the scenarios below and determine the alertness level, brainwave pattern and brain activity frequency that may appear on each person's EEG.

a Steve is meditating.

____

b Joshua fell asleep about an hour ago and is in a deep sleep.

____

c Sasha is focusing on playing a computer game.

____

d Caroline was attached to an EEG and the sleep researcher noticed that her eyes were moving rapidly beneath her eyelids.

____

e Sebastian has been sleeping at a sleep laboratory. His EEG recordings show waves with a medium frequency and mixed amplitude (some high, some low).

____

f Teigan is lying on her bed, relaxing.

g Kellan is exhibiting hypnic jerks, which occur in the earliest stage of sleep.

h Zoe is learning to bake a cake with a new recipe.

2 Look at each of the EEG traces below and identify the type of brainwave pattern.

a

b

c

→ACTIVITY 2: WHAT DOES THIS DEVICE DO?

The following table has statements that refer to EEGs, EOGs, EMGs or EKGs. In each cell of the table, write in the relevant device.

This device detects, amplifies and records the electrical activity of muscles.	This device detects that, during sleep, there are periods of no, or very little rapid eye movement (NREM sleep) and others that consist of bursts of rapid eye movement (REM sleep).	This device detects, amplifies and records electrical activity in the brain in the form of brainwaves.	Electrodes are placed on the eye muscles.
Electrodes measure the very small voltages assumed to be created by the synchronised activity of large numbers of neurons (nerve cells) in the outer layer of the brain.	This device detects, amplifies and records electrical activity in the muscles that allow the eye to move.	One set of electrodes measures the electrical activity of the muscles of the right eye and the other measures the muscles of the left eye.	This device indicates changes in muscle activity, muscle tone or muscle tension that may accompany changes in states of consciousness.
This device detects brainwaves that vary in amplitude.	During sleep, this device shows moderate to low electrical activity in muscles during NREM sleep (with some mild spasms associated with light sleep) and virtually non-existent activity during REM sleep.	This device monitors the electrical activity of the brain that is detectable on the outside of the skull.	This device detects brainwave patterns that can vary in frequency.

→ACTIVITY 3: MATCHING TERMS

Match each term below to the correct definition.

TERM
amplitude
K-complexes
sleep spindles
selective attention
divided attention
sleep diaries
self-reports

DEFINITION
The periodic bursts of rapid frequency are indicative of Stage 2 non-rapid eye movement (NREM) sleep.
The capacity to attend to, and perform more than one activity at the same time.
The height of the peaks and troughs of the curved graph that represents brainwave activity.
Statements and answers to questions made by the participants concerning their psychological experience.
A sharp rise and fall in amplitude, lasting for about two seconds).
What we focus our attention on at any one time, to the exclusion of other stimuli.
Often used when a person is experiencing sleep troubles such as sleep apnoea or insomnia, and these can help sleep experts understand the participant's experience.

→ACTIVITY 4: CHANGES IN CONSCIOUSNESS

Read the article and answer the questions that follow.

WHY IT'S TIME TO LOWER AUSTRALIA'S BLOOD ALCOHOL DRIVING LIMIT

Soames Job, *The Conversation*, 21 September 2012

Around one quarter of deaths on Australia's roads involve drink-driving. Over a decade, this amounts to over 3,500 deaths, as well as many thousands of serious injuries.

While the most common death in a drink-driving crash is the drink-driver, many victims are innocent pedestrians, occupants of other vehicles, and other road users who happened to be in the path of the drink-driver.

Far from improving, data on drink-driving trends (graphed below) show the problem is getting worse.

Across Australia, the general driving and riding population has a legally allowed blood alcohol concentration (BAC) limit of 0.05, which has been in force for over 30 years. But technology, attitudes and knowledge have improved. So isn't it time to reconsider this BAC limit?

Around 30 years ago and for many years, Australia led the world in drink-driving regulation and enforcement. Victoria led the introduction of random breath testing (RBT), and New South Wales was the first to run RBT on a massive scale and prove its power. The rest of Australia and many other countries followed those leads. Now, despite widespread use of RBT, Australia has slipped behind many other countries.

The European Transport Safety Council's 2012 Drink-Driving: Towards Zero Tolerance report recommends all EU member countries move to zero BAC limits (possibly with a small tolerance). Many European countries have already made the move, with Sweden, Poland, Slovenia and Estonia enforcing 0.02 limits, and Hungary, Czech Republic, Romania and Slovakia adopting 0.00 BAC limits.

We may still see ourselves as different from these countries in that we simply drink more. Not so.

The World Health Organization's 2011 Global Status Report on Alcohol and Health placed countries into categories of pure alcohol consumption per capita, and found that Australians ranked in the 10-to-12.49 litres per person (per year) category. Of all the European countries mentioned above, four (Sweden, Belgium, Greece and Austria) ranked in the same range as Australia, while all the rest ranked in the highest consumption range (12.5 litres or more per person, per year).

It's important to note that the aim of drink-driving reform is not to reduce drinking – though this may be of value for other health reasons. The aim is to disconnect drinking from driving.

So what evidence is there to support a case for reducing the BAC limit to 0.02 or even zero?

We know alcohol affects behaviour and cognitive functioning, even at low concentrations. This increases the time drivers take to make decisions and reduces their capacity for precise motor movements. Alcohol also reduces inhibition and increases confidence and risk-taking.

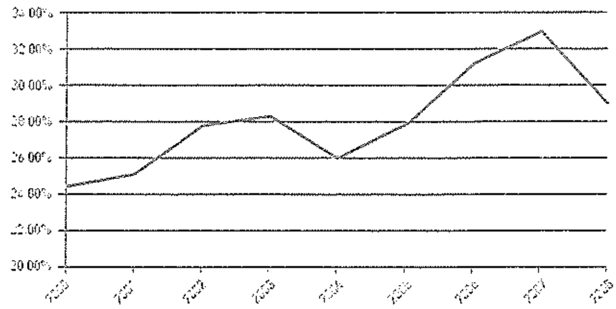
Lower limits, especially a zero tolerance approach, reduce the risk of inaccurate estimates of BAC. The same level of alcohol consumption can affect individuals differently and result in wide variations in BAC. For this reason, counting drinks isn't an accurate method for avoiding drink-driving.

Previous Australian experience in lowering BAC limits also offers support. When the ACT reduced the BAC limit from 0.08 to 0.05, random breath tests showed a 34% reduction in the number of drivers with a BAC between 0.15 and 0.20, and a 58% reduction in the number with a BAC above 0.20. Well beyond just affecting the low range drink-drivers, these results support the logic that lowering BAC limits reduces misjudgement and risk-taking decisions made under the influence of alcohol.

Internationally, Ireland's large reduction in drink-driving deaths – from 37% in 2003, to 14% in 2007 – was largely achieved by lowering the BAC limit. And studies of the lowered BAC limit in Sweden identified a 10% reduction in fatal crashes related to drink-driving after the change.

[...]

There's no doubt that a zero or 0.02 BAC limit would strongly reinforce the message that drinking and driving should be separate activities, and drinkers should plan alternatives to driving before they start drinking.



Proportion of killed vehicle operators over the BAC limit, 2000 to 2008. National Road Safety Strategy 2011–2020. Note: Percentages are based on cases with known BAC status. These data are from a study of BAC, which is otherwise not easily obtained.

1 How many deaths on Australian roads are caused by alcohol?

____

2 In which year did the highest proportion of drink-drivers die?

____

3 Which countries have developed a zero tolerance?

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4 On average, how much alcohol does an Australian consume in a year?

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5 Explain how alcohol affects driving.

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6 What message is this article trying to convey?

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7 In your opinion, should the legal Blood Alcohol Concentration decrease?

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→ACTIVITY 5: DRUG-INDUCED STATES

Read the following research and answer the questions that follow.

RAT STUDY REVEALS LONG-TERM EFFECTS OF ADOLESCENT AMPHETAMINE ABUSE ON THE BRAIN

Science Daily, 30 March 2016

A study of rats given regular, high doses of amphetamine finds that those exposed to the drug at an age corresponding to human adolescence experience long-term changes in brain function that persist into adulthood.

The study, reported in the journal *Neuroscience*, found that amphetamine leads to changes in dopamine signaling. Dopamine is a neurotransmitter that plays a role in memory, attention, learning and feelings of pleasure.

'The dopamine system, which continues to develop throughout adolescence and young adulthood, is a primary target of psychostimulant drugs like amphetamine,' said University of Illinois psychology professor Joshua Gulley, who led the new research. 'Changes in dopamine function in response to repeated drug exposure are likely to contribute to the behavioural consequences – addiction and relapse, for example – that abusers experience.'

Parallels between rat and human development make rats a worthy model for the study of human drug addiction, which often begins in adolescence, Gulley said.

'Rats exhibit many of the characteristics that human adolescents do. They tend to be more impulsive than adult rats; they tend to make more risky decisions,' he said. They also can engage in 'addiction-like behaviors,' he said.

'They show increased drug use in response to stress,' Gulley said. 'And, just as in humans, there is evidence that animals that start using drugs in adolescence are more likely to relapse than animals that start in adulthood.'

A limitation of the new study was that, unlike humans, who generally choose whether or not to partake in drug use, 'the rats had no say in whether they got amphetamine,' Gulley said.

A previous study from Gulley and his colleagues looked at the effects of amphetamine abuse on working memory – the ability to retain information just long enough to use it – in young and adult rats.

'In that study, we found that animals that were exposed to the drug during adolescence had much more significant deficits in working memory than those exposed during adulthood,' Gulley said.

The researchers hypothesized that drug exposure during adolescence, a time of vast changes in the brain, "somehow influences the normal developmental trajectory,' Gulley said. 'But how?'

To get at this question, the team focused on the prefrontal cortex, a brain region behind the forehead that is among the last to fully develop during adolescence. The researchers found that repeated exposure to amphetamine – beginning in adulthood or in adolescence – reduced the ability of key cells in the rats' prefrontal cortex to respond to dopamine. In this part of the brain, dopamine influences 'inhibitory tone,' telling cells to stop responding to a stimulus, Gulley said.

'Inhibition in the nervous system is just as important as activation,' he said. 'You need cells that are firing and communicating with one another, but you also need cells to stop communicating with one another at certain times and become quiet.

'Our research suggests that a subtype of dopamine receptor, the D1 receptor, is altered following amphetamine exposure,' Gulley said. 'It's either not responding to dopamine or there are not as many of these receptors after exposure as there used to be.'

This change in dopamine signaling persisted for 14 weeks after exposure to amphetamine in the adolescent-exposed rats, he said.

'That's akin to a change in humans that persists from adolescence until sometime in their 30s, long after drug use stopped,' he said.

'Along with other studies, this shows pretty clear evidence that drug use during adolescence, a time when the brain is still developing, has extremely long-lasting consequences that go far beyond the last drug exposure,' Gulley said.

1 What is dopamine? What does it do?

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2 Why were rats used in this study?

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3 Using information from this article, write a hypothesis about drug use and the teenage brain.

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4 What were the findings from these studies?

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5 What can be concluded from these studies?

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→ACTIVITY 6: MULTIPLE-CHOICE QUESTIONS

1 In a sleep laboratory, a participant:

a is wired up to record the participant's physiological measurements

b is told to relax and watch a moving clock in order to be hypnotised

c will have body temperature and respiration measured

d will be able to relax and finally get some sleep without any disturbances.

2 Video monitoring is one technique used to study sleep. The disadvantage of this technique, however, is that:

a it only measures physiological responses

b data collected is subjective and hence open to bias

c the data collected provides only a limited amount of information and is not reliable enough

d it is the only technique used to understand sleep.

3 Chantal participated in a study on meditation. During this study, researchers were trying to determine the physiological changes that occurred during meditation. Chantal was wired to an EEG. This device would show changes in Chantal's

a brainwave patterns

b body temperature

c muscle tension and heart rate

d heart rate.

4 A disadvantage of sleep laboratories is that:

a a participant's behaviour may be blocked from view of a camera

b they only measure physiological responses

c the artificial environment might disrupt normal sleep patterns

d the data obtained is objective.

5 Self-reports allow people to rate the quality of their sleep

a via statements and answers to questions

b by comparing themselves to other people

c by viewing themselves on pre-recorded video monitoring devices

d all of the above.

6 In psychology, measuring speed and accuracy on cognitive tasks allow us to:

a distinguish between the characteristics of NWC and ASC

b distinguish between NWC and REM

c distinguish between the different stages of sleep

d all of the above.