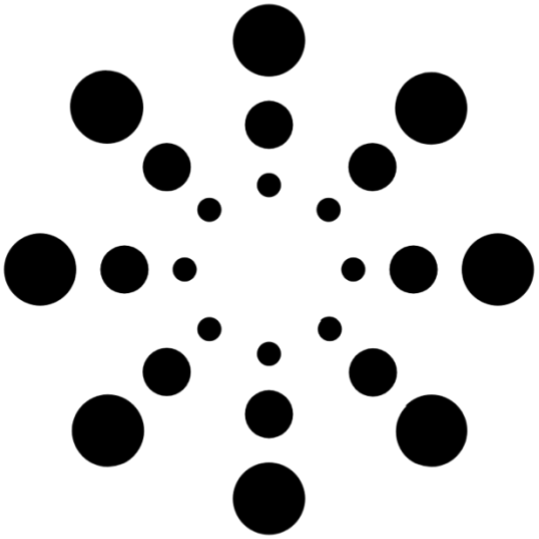
Department of Education

GOVERNMENT OF WESTERN AUSTRALIA

Year 11 ATAR Psychology

Cognition – Consciousness



Year 11 SELF – Cognition
Consciousness

Instructions to Students

This resource package provides you with learning materials for the Psychology ATAR Year 11 course. The package focuses on the topic **Consciousness**.

This package is designed to support the program you are completing at your school. If feedback is required when completing this package, you should consult your teacher.

CONTENTS

It is recommended that you further investigate concepts covered in this resource package by conducting your own research using the text/s that you use at school or the internet.

Syllabus Points Covered

- *the role of sensation and perception in cognition*
    - *attention – selected, divided, habituation, dishabituation*
- *physiological responses indicating different states of consciousness*
    - *electrical activity of the brain*
    - *heart rate*
    - *body temperature*
    - *galvanic skin response*

Learning Content and Activities

CONSCIOUSNESS

William James (1890) defined consciousness as a constantly moving stream of thoughts, feelings, and emotions. **Consciousness** can be viewed as our subjective awareness of mental evens.

Range of states of consciousness:

- **conscious** – fully alert, paying full attention
- **intermediate** – daydreaming, meditation, sleeping
- **unconscious** – coma.

ACTIVITY ONE

For each description, write the name of the consciousness state from the list below:

Selective Attention	Divided Attention	Daydreaming	Meditative State
Hypnotised	Asleep	Anaesthetised	Unconscious (Coma)

State of Consciousness	Description
	A five-stage cycle consisting of four non-rapid eye movement (NREM) stages and one rapid eye movement (REM) stage where a person's most vivid dreams occur.
	A state where the person is focusing on one thing, such as breathing, and ignoring everything else to achieve physical and mental relaxation and perhaps inner calmness.
	A highly focused state in which a person is able to concentrate on something and be virtually oblivious to other things going on around them.
	A state in which attention shifts from external stimuli to internal ones.
	A mental state that involves complete or near-complete lack of responsiveness to people and other environmental stimuli, including not have sleep-wake cycles, and not making voluntary actions.
	A state in which two things can be done at the same time; attention is not fully focused on one thing.
	An artificially induced, sleep like state of deep relaxation often used in therapy to access deeper thoughts and memories.
	A state of being unfeeling or unconscious through the use of narcotic substances, usually either alcohol or pharmaceutical drugs.

MEASURING CONSCIOUNESS

Physiological responses are associated with different states of consciousness. The important changes that can be measured are –

- **Heart rate** - Changes in heart rate indicate the degree of consciousness. During sleep, the heart rate slows. We can slow our own heart rate consciously by taking deep, slow breathes. This is used in meditation. Heart rate can be measured by taking your pulse and counting the number of beats per minute. An electrocardiography (**ECG**) is the process of recording the electrical activity of the heart over a period of time using electrodes placed on the skin.

- **Brain waves** - Brain waves are recorded by an electroencephalogram (**EEG**). Brain waves are measured in terms of the number of waves per second (**frequency**) and the size of the peaks and troughs (**amplitude**). High frequency brain waves are faster than low frequency. During waking consciousness EEG show brain waves as fast frequency and small amplitude.

- **Body temperature** - Temperature does not alter greatly with changes of consciousness. However, body temperature does drop during sleep, with it being its lowest at around 3-4am.

- **Conductivity of the skin** - Test known as the **galvanic skin response (GSR).** Is measured by attaching electrode to the hairless parts of the skin (fingers or palms). As we sweat the skin becomes wet and will pass an electrical current more easily. Sweating occurs when we are aroused (anxious, fearful, stressed, or excited). The higher the GSR the more aroused we are. One of the tests used in lie detectors.

ACTIVITY TWO

1. For each of the following statements decide whether it refers to brain waves, heart rate, body temperature or electrical conductivity of the skin. Write your answers in the box.

	Rates change as level of awareness changes
	Measured in terms of frequency (waves per second) and amplitude (wave height)
	Changes are known as the galvanic skin response (GSR)
	Normal waking consciousness waves are high frequency (fast) and low amplitude (small)
	Is measured in beats per second and is taken from your pulse
	Measured by attaching electrode to hairless parts of the body such as fingers or palms
	Rate can be raised by fast shallow breathing or use of stimulants (that lead to altered states of consciousness)
	Does not vary significantly, but does drop more than 1 degree Celsius during sleep
	Patterns are recorded on an electroencephalogram (EEG)
	Measures arousal, anxiety, fear or excitement levels through changes in electrical conductivity that result from moisture on the skin
	Rate is slower when we sleep and can be also be lowered by slow deep breathing

2. How can you beat a lie detector test? Use this article to help you answer the question https://www.livescience.com/33512-pass-lie-detector-polygraph.html

3. Given your understanding of lie detector tests, justify why they are not a scientifically reliable tool for actually detecting lies.

4. Normal adult resting heart rate is about 70 beats per minute. Would you expect the heart rate to ***increase*** or ***decrease*** in the following situations which reflect different states of consciousness?

   Focused attention _____

   Lying down in the park or on the beach _____

   Listening to soft slow music _____

   Driving in peak hour traffic _____

   Doing yoga _____

COGNITION AND CONSCIOUSNESS

Besides the physiological changes with the level of consciousness, there are changes in cognition, such as -

- Shift attention/awareness
- Distorted perception
- Lack of memory for the time/amnesia
- Changed sense of time
- Distorted thinking
- Increased suggestibility

Altered consciousness can affect our perceptions by making experiences more vivid, reducing or dulling sensory experiences and even a loss of touch with reality such as being unaware of passing time or out of body experiences.

In normal waking consciousness content coming into our brain may be limited and restricted through selective attention. This means it should be organised and logical. In altered states of consciousness content coming into our brain is not as limited because there is little control over what enters consciousness. This means it is often illogical, disorganised and nonsensical.

ATTENTION

Our conscious awareness is limited in capacity and we are aware of only a small amount of the stimuli around us at any one time. **Attention** refers to the process by which we focus our awareness. The goals of attention are:

- directing our functioning toward the environment
- control of the content of consciousness eg. I will think about this issue but not that one
- maintaining alertness

Selective Attention

Selective attention is voluntarily focusing on a specific sensory input. This can be studied by supplying two sets of stimuli and asking participates to focus on only one eg: a dichotic listening task.

Watch the video www.youtube.com/embed/IGQmdoK_ZfY

Simons and Chabris (1999) demonstrated selective attention with the so-called "invisible gorilla" test. The test had volunteers watching a video where two groups of people are passing basketballs around. The volunteers were asked to count the passes among players dressed in white while ignoring the passes of those in black. They found that **half of the people** who watched the video and counted the passes missed the gorilla. It was as though the gorilla was invisible. The study revealed how people can focus so hard on something that they become blind to the unexpected, even when staring right at it. When one develops **"inattentional blindness**," as this effect is called, it becomes easy to miss details when one is not looking out for them.

Divided Attention
Divided attention is when we are not fully focused on one thing and instead divide our attention between multiple stimuli. This is how we are able to do two things at once.

It is humanly impossible to concentrate on two different tasks simultaneously. Your brain can only process one task at a time. So, you are really not "focused" on two tasks at a time, you are really continuously alternating your attention between tasks. That is why it is so difficult and dangerous to text and drive or talk and drive at the same time.

ACTIVITY THREE

1. Go to www.youtube.com/embed/UAKAlP1B5WY and watch the video. Answer the questions below.

    a) What is the stroop effect?

    b) Why does the stroop effect happen?

Habituation
Habituation is a decrease in response to a stimulus after repeated presentations.

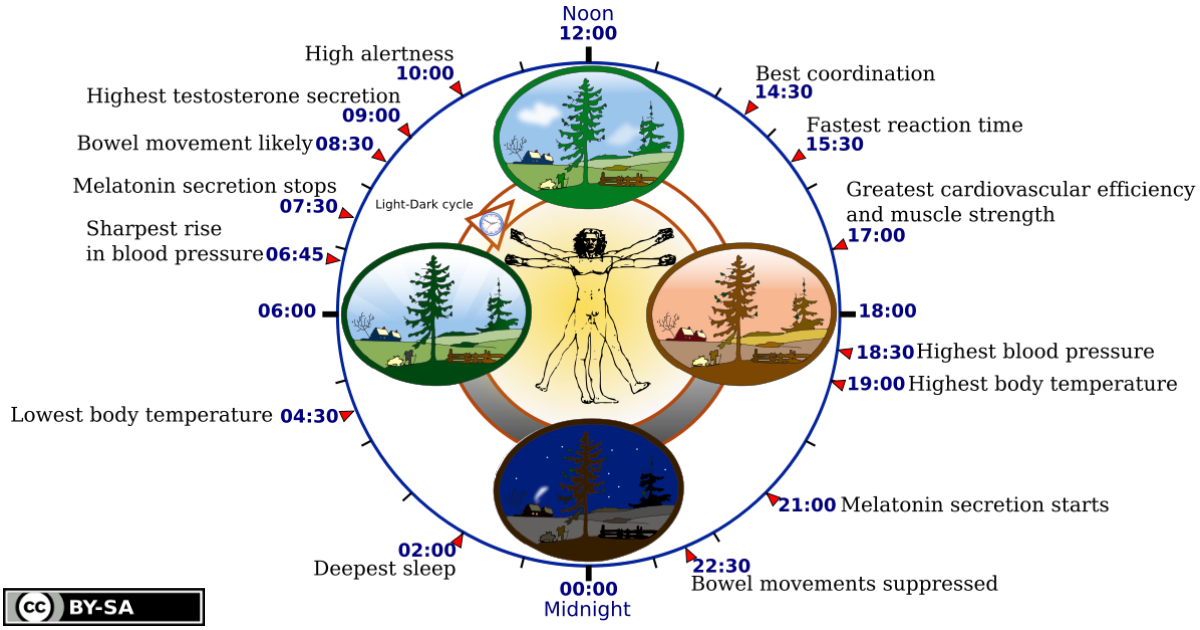
For example, spritzing on some perfume in the morning before you leave for work. After a short period, you no longer notice the scent of your perfume; it's been "habituated". A co-worker pops by your office for a quick chat and comments that she really likes your perfume. Because you have habituated to the scent, you no longer notice it. Your co-worker, who is encountering the scent for the first time, notices it right away.

Dishabituation is when there is a renewal of attention due to a change in stimuli.

Daydreaming
Daydreams are shifts in attention toward internal thoughts and imagined scenarios. Often are spontaneous shifts of attention away from the here and now into a make-believe world. The urge to daydream peaks about every 90 minutes. Daydreams may provide stress relief and encourage creativity.

CIRCADIAN CYCLES

Circadian cycles are those that last “about a day”.



https://commons.wikimedia.org/w/index.php?curid=3017148#mw-head

Circadian rhythms are governed by an area of the hypothalamus. Jet lag is the result of desynchronization of the circadian rhythm.

Sleep

Functions of sleep:

- memory consolidation
- energy conservation
- preservation from predators
- restoring bodily functions.

There are **5 stages of sleep**. Each stage shows different brain wave activity which can be used to detect the stage of sleep one is in.

During the night we cycle through the 5 stages of sleep. The most interesting stage is known as stage 5 or REM sleep. **REM** stands for “rapid eye movement”. This is the period of time when we dream.

ACTIVITY FOUR

Complete the table below summarising the 5 stages of sleep. This website can be useful to help find the answers https://www.klusster.com/portfolios/conscious-media-publishing/contents/1226

Stage	NREM or REM?	Types of Brain Waves	Description
1			
2			
3			
4			
5			

Importance of Dreaming

- **Psychoanalytic view -** Dreams represent a window into the unconscious. The latent content (meaning) can be inferred from the manifested content (the actual dream).
- **Cognitive view** - Dreams are constructed from the daily issues of the dreamer. Information gathered during the day is reprocessed to strengthen memory.
- **Biological view** - Dreams represent the attempt of the cortex to interpret the random neural firing of the brain during sleep. Random outbursts of nerve cell activity are interpreted as stories by higher brain centers.

Sleep Disorders

- **Insomnia** is the inability to achieve or maintain sleep.
- **Nightmares** are vivid fear-evoking dreams that occur during REM sleep.
- **Night terrors** are episodes of intense panic that occur during delta sleep (early in night).
- **Sleepwalking** originates during deep sleep (stage 3 or 4) and results in walking or performing other complex behaviours while asleep.
- **Sleep apnea** refers to awakening brought on by cessation of breathing during sleep.
- **Sleep paralysis** when you feel awake but can't move. Caused by a slow transition out of REM sleep.
- **Narcolepsy** falling asleep during the day.

Sleep deprivation can alter immune function and lead to early death. Sleep deprivation can also lead to hallucinations and perceptual disorders.

ACTIVITY FIVE

Go to www.youtube.com/embed/nSNRdvusmQs and watch the story about Peter Tripp. Complete the following questions.

1. Who was Peter Tripp and what did he try to do?

2. What was his normal behaviour like?

3. After 2-3 days what started happening to Peter Tripp?

4. By the 3rd day what changes were observed to Peter Tripp?

5. How long did he sleep for when he completed the 200 hours?

6. Where there any long-term consequences for Peter Tripp?

HYPNOSIS

Hypnosis is a trancelike state in which people can respond more easily to suggestion. It is a state of consciousness characterized by deep relaxation and suggestibility. Effects observed during hypnotic state include:

- age regression
- change in pain perception
- ability to recall memories into consciousness.

Hypnosis has been used in conjunction with psychotherapy and as an anesthetic in dentistry and surgery. Hypnosis tends to be a shift of awareness in the direction of sleep without actually falling asleep. The key factors are absorption of awareness, relaxation of the body, and dissociation from your surroundings.

Hilgard's demonstration of the "Hidden Observer"

Ernest Hilgard became convinced that we all have another being sharing our lives. Hilgard termed this entity the ‘‘hidden observer.’’ In one of his books, Hilgard described a classic test of how this hidden entity is part of our consciousness. Hilgard conceived of the "hidden observer" as that part of the mind which communicates with the hypnotist but is not available to consciousness. Relative to this theory, pain control under hypnosis would involve the inhibition of specific areas of the brain in connection with the dissociative effect of hypnosis.

Although quite controversial, if true, it shows that people can be treated with hypnosis to dissociate pain by splitting awareness into two separate simultaneous streams and giving pain to the sub-conscious one.

ACTIVITY SIX

Research the web to find out why the following hypnosis myths are false. Explain the reasoning for each.

- Myth 1: When you wake up from hypnosis, you won't remember anything that happened when you were hypnotised.

- Myth 2: Hypnosis can help people remember the exact details of a crime they witnessed.

- Myth 3: You can be hypnotised against your will.

- Myth 4: The hypnotist has complete control of your actions while you're under hypnosis.

- Myth 5: Hypnosis can make you super-strong, fast or athletically talented.

PAIN

The experience and measurement of pain can be regarded as an altered state of waking consciousness. Pain is an unpleasant feeling associated with damage or irritation to the body, accompanied by heightened emotion.

Pain can be acute (short term) or chronic (long term). Chronic pain is often more difficult to treat, and patients seek other pain management techniques to avoid being on pain medication for a long time.

Four psychological techniques for controlling pain:

- reduce anxiety - keep anxiety as low as possible because high levels increase pain
- control over a painful stimulus reduces suffering
- distraction - direct attention away from pain by focusing attention on something pleasant such as listening to music
- re-interpretation - thinking that the pain is not unpleasant can assist in reducing it.

MEDITATION

Meditation involves techniques which improve the ability to focus and relax. They are aimed at relaxing physical and mental states to reach inner calm. Techniques can include yoga and transcendental meditation.

During meditation one focuses on breathing and ignoring everything else. Breathing slows, heart rate decreases, muscle tension is reduced and blood pressure lowers. Meditation can also suppress activity of the sympathetic nervous system.

ACTIVITY SEVEN

1. Read the article about the man who killed his wife while sleepwalking at https://www.abc15.com/news/crime/old-time-crime-woman-stabbed-drowned-by-sleepwalking-husband-in-1997

   With all that you now understand about altered states of consciousness, if he actually did commit the crime during an episode of sleepwalking, should he be held responsible? Justify your reasoning.

Additional Resources

Textbook references and activities

Nelson Psychology WA ATAR Unit 1&2

- Read textbook pages 33-40
- Complete end of chapter questions on page 50 - Terminology 1-5, MCQ 4-6 and SAQ 4-5

Nelson Psychology WA ATAR Unit 1&2 Student Workbook

- Read and complete pages 49-57

Additional reading and weblinks

Check out the additional reading in the following links to help you clarify your understanding.

Attention and Inattentional blindness https://www.youtube.com/embed/YJfxwme0_78

Divided Attention https://www.youtube.com/embed/mjHxypw1bDQ

Hypnosis https://www.verywellmind.com/what-is-hypnosis-2795921

Attention and distraction https://learn.genetics.utah.edu/content/memory/distraction/

Answers

ACTIVITY ONE

For each description, write the name of the consciousness state

State of Consciousness	Description
Asleep	A five-stage cycle consisting of four non-rapid eye movement (NREM) stages and one rapid eye movement (REM) stage where a person's most vivid dreams occur.
Meditative state	A state where the person is focusing on one thing, such as breathing, and ignoring everything else to achieve physical and mental relaxation and perhaps inner calmness.
Selective attention	A highly focused state in which a person is able to concentrate on something and be virtually oblivious to other things going on around them.
Daydreaming	A state in which attention shifts from external stimuli to internal ones.
Unconscious (coma)	A mental state that involves complete or near-complete lack of responsiveness to people and other environmental stimuli, including not have sleep-wake cycles, and not making voluntary actions.
Divided attention	A state in which two things can be done at the same time; attention is not fully focused on one thing.
Hypnotised	An artificially induced, sleep like state of deep relaxation often used in therapy to access deeper thoughts and memories.
Anaesthetised	A state of being unfeeling or unconscious through the use of narcotic substances, usually either alcohol or pharmaceutical drugs.

ACTIVITY TWO

1. For each of the following statements decide whether it refers to brain waves, heart rate, body temperature or electrical conductivity of the skin. Write your answers in the box.

Heart rate	Rates change as level of awareness changes
Brain waves	Measured in terms of frequency (waves per second) and amplitude (wave height)
Galvanic skin response	Changes are known as the galvanic skin response (GSR)
Brain waves	Normal waking consciousness waves are high frequency (fast) and low amplitude (small)
Heart rate	Is measured in beats per second and is taken from your pulse
Galvanic skin response	Measured by attaching electrode to hairless parts of the body such as fingers or palms
Heart rate	Rate can be raised by fast shallow breathing or use of stimulants (that lead to altered states of consciousness)
Body temperature	Does not vary significantly, but does drop more than 1 degree Celsius during sleep
Brain waves	Patterns are recorded on an electroencephalogram (EEG)
Galvanic skin response	Measures arousal, anxiety, fear or excitement levels through changes in electrical conductivity that result from moisture on the skin
Heart rate	Rate is slower when we sleep and can be also be lowered by slow deep breathing

2. How can you beat a lie detector test? Use this article to help you answer the question https://www.livescience.com/33512-pass-lie-detector-polygraph.html

   Heighten arousal levels artificially (increase sweating, stress response, heart rate) so the machine can tell the different between arousal changes with a truth or lie. Think of something scary or inflict pain (pin in the shoe technique) when asked a question to tell the truth on so arousal levels are higher then.

3. Given your understanding of lie detector tests, justify why they are not a scientifically reliable tool for actually detecting lies.

   The test measures level of arousal. It doesn't tell if you are telling a lie, only if you are stressed/ aroused about what is being discussed. People can fake and alter these responses. People may have false results for many other reasons than just lying.

4. Normal adult resting heart rate is about 70 beats per minute. Would you expect the heart rate to ***increase*** or ***decrease*** in the following situations which reflect different states of consciousness?

   Focused attention increase
   Lying down in the park or on the beach decrease
   Listening to soft slow music decrease
   Driving in peak hour traffic increase
   Doing yoga decrease

ACTIVITY THREE

Go to www.youtube.com/embed/UAKAlP1B5WY and watch the video. Answer the questions below.

a) What is the stroop effect?

The effect of increasing the processing time to say the colour of a word, when the written text of the word does not match.

b) Why does the stroop effect happen?

Interfering messages are coming into the brain. Reading the word is easier and processed more readily. It is hard to discount the information to say the colour of the word when it doesn't match the written word. It demonstrates automatic processing of language and also that we cannot process (focus) more than one thing at a time.

ACTIVITY FOUR

Complete the table below summarizing the 5 stages of sleep. This website can be useful to help find the answers https://www.klusster.com/portfolios/conscious-media-publishing/contents/1226

Stage	NREM or REM?	Types of Brain Waves	Description
1	NREM	Alpha and theta	Easily woken from, slow rolling eye movements. Lasts 5-10 minutes
2	NREM	Theta	Increased relaxation, heart rate slows, body temp drops. Eye movements stop. Lasts 20 minutes
3	NREM	Delta	Entered deep sleep. Brain waves slow further, growth hormone secreted. Heart rate and digestion slow further. Lasts 15-30 minutes
4	NREM	Delta	Deepest phase of sleep, brain waves the slowest. When sleep-walking can occur. Difficult to wake a person in this stage. Lasts 30 minutes
5	REM	Beta (most like awake brain waves)	Rapid eye movements. Breathing rapid, shallow and irregular. When dreams occur. Lasts 2 minutes because with each REM cycle it increases in length up to an hour by the end of the night.

ACTIVITY FIVE

Go to www.youtube.com/embed/nSNRdvusmQs and watch the story about Peter Tripp. Complete the following questions.

1. Who was Peter Tripp and what did he try to do?

   A disc jockey, trying to stay awake for 200 hours (8 days) to raise money for charity.

2. What was his normal behaviour like?

   Happy, vibrant person

3. After 2-3 days what started happening to Peter Tripp?

   Tried to play tricks on the scientists so he could go to sleep.

4. By the 3rd day what changes were observed to Peter Tripp?

   Abused people, body temperature started dropping, hallucinations. Brain waves showed he was shadowing a 90 minute dream sleep cycle, hallucinations most common during this cycle. He appeared to be having dreams and nightmares even though he was awake.

5. How long did he sleep for when he completed the 200 hours?

   24 hours

6. Where there any long-term consequences for Peter Tripp?

   Peter didn't think so, but his wife did, and his marriage ended after the experiment. The scientists also thought he was changed and not the happy carefree person he once was.

ACTIVITY SIX

Research the web to find out why the following hypnosis myths are false. Explain the reasoning for each.

- **Myth 1: When you wake up from hypnosis, you won't remember anything that happened when you were hypnotized.**

  While amnesia may occur in very rare cases, people generally remember everything that transpired while they were hypnotized. However, hypnosis can have a significant effect on memory. Posthypnotic amnesia can lead an individual to forget certain things that occurred before or during hypnosis. However, this effect is generally limited and temporary.

- **Myth 2: Hypnosis can help people remember the exact details of a crime they witnessed.**

  While hypnosis can be used to enhance memory, the effects have been dramatically exaggerated in popular media. Research has found that hypnosis does not lead to significant memory enhancement or accuracy, and hypnosis can actually result in false or distorted memories.

- **Myth 3: You can be hypnotized against your will.**

  Despite stories about people being hypnotized without their consent, hypnosis requires voluntary participation on the part of the patient.

- **Myth 4: The hypnotist has complete control of your actions while you're under hypnosis.**

  While people often feel that their actions under hypnosis seem to occur without the influence of their will, a hypnotist cannot make you perform actions that are against your wishes.
- **Myth 5: Hypnosis can make you super-strong, fast or athletically talented.**

  While hypnosis can be used to enhance performance, it cannot make people stronger or more athletic than their existing physical capabilities.

ACTIVITY SEVEN

Read the article about the man who killed his wife while sleepwalking at https://www.abc15.com/news/crime/old-time-crime-woman-stabbed-drowned-by-sleepwalking-husband-in-1997

With all that you now understand about altered states of consciousness, if he actually did commit the crime during an episode of sleepwalking, should he be held responsible? Justify your reasoning.

Various answers
Yes – he should be held responsible. Evidence shows that we are still in control and aware of what is going on and what we are doing in altered states of consciousness. For example under hypnosis people will not do what they believe is wrong.

No – if he was asleep we are in another state that we don't control. People can control what happens during sleep or what we dream.