**Paper 2- AO3 Knowledge Booklet**

**Approaches:**

**Evaluation of the behaviourist approach – strengths and weaknesses**

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| Strengths | Limitations |
| **Scientific credibility:**  Behaviourists use scientific methods to investigate human behaviour 🡪 focused on objectivity and replication in controlled lab settings.  This gave them greater credibility and status. | **Mechanistic view of behaviour:**  Behaviourists view humans as machine-like responders to the environment with little or no conscious thought into their behaviour.  They do not consider the influence of thought and cognitive processes as they are not observable, however other theories (e.g cognitive approach) have demonstrated the influence of cognitive processes on human behaviour 🡪 e.g. how our brain processes information from the environment influences how we respond to that information. |
| **Real-life application:**  Principles of conditioning has supplied many practical solutions to many human problems.  Operant conditioning:   * Formed the basis of **token economy systems** which have been used successfully in institutions, such as prisons and psychiatric wards.   Classical conditioning:   * Been used to treat people with phobias. * Watson and Raynor-Little Albert study | **Ethical issues in using animals in experiments:** The animals involved in the Skinner Box were exposed to stressful and aversive conditions which critics have said is unethical.  **Counter-argument:** The opposing argument is that it is more ethical to test animals in this way than testing humans. |
|  | **Practical issues in using animal research:**  It has been argued it is not appropriate to apply findings on animals to humans due to the differences in the complexity of human and animal behaviour.  There are genetic influences on what different species can and cannot learn which reflect their different evolutionary histories- e.g. rats can be conditioned to respond to tastes but not to smells. |

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**Evaluation of Social Learning Theory– strengths and weaknesses**

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| Strengths | Limitations |
| **Takes into account thought processes:**  Humans and animals store information about the behaviour of others and use this to make judgements about when it is appropriate to perform certain actions. Neither classical nor operant conditioning recognise these cognitive factors, but SLT does🡪 role of mediational processes.  Bandura’s study- children behaved more aggressively when they saw the model being rewarded for being aggressive 🡪 highlights the role of cognitive processes such as expectation of consequences.  SLT provides a more comprehensive explanation of human learning. | **Research studies have demand characteristics:**  Many of Bandura’s studies were carried out in lab settings and so participants may respond to demand characteristics. With the bobo doll the main purpose of the doll is to strike it, therefore children were simply behaving in a way that they thought was expected. Consequently, the research may tell us little about how the children learn aggression in everyday life. |
| **Explains cultural differences in behaviour:**  Can account for how children learn from other individuals around them and through the media.  This explains the differences in behaviour as different societies have different cultural norms. As a result, SLT has proved useful in understanding a range of behaviour such as how children come to understand their gender role. | **REDUCTIONIST: Underestimates role of other influences:**  The approach focuses exclusively on the processes of social learning and so disregards other potential influences on behaviour.  E.g. when explaining development of gender role behaviour, SLT emphasises importance of gender specific modelling. However, in real life a child is exposed to many diff. influences🡪 genetic predispositions, media portrayals, locus of control etc. These all interact in complex ways and SLT does not take this into account. |
| **Real-life applications:**  E.g .Watershed on TV- In the UK programmes with violence, sexual content or obscene language are only shown after 9pm 🡪 before 9pm, children may be watching unattended and therefore exposed to inappropriate content, which they could then imitate.  Akers (1998)- the probability of engaging in criminal behaviour increases when one is exposed to models who commit crimes, identify with those models, and expect positive consequences.  **COUNTER-ARGUMENT:** There is an issue with causality. Siegel and McCormick (2006) suggest that young people who possess deviant attitudes and values would seek out peers with similar attitudes and behaviours. As a result it may not be social learning that has caused criminal behaviour, but the possession of deviant attitudes prior to contact with models who commit crimes. |  |

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**Evaluation of the cognitive approach – strengths and weaknesses**

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| Strengths | Limitations |
| **Scientific credibility:**  Use of rigorous and highly controlled experimental methods in order to enable researchers to infer cognitive processes at work. This has given the study of the mind scientific rigour.  **COUNTER-ARGUMENT:** Lack ecological validity- Experimental studies of mental processes are often carried out in artificial settings that may not represent everyday experience. | **Machine reductionism:**  Computer analogy criticised for seeing people as mechanistic and losing sight of the person as a whole. It over-simplifies complex processes and ignores the influence of emotion and motivation on the cognitive system and how this may affect our ability to process information.  E.g research has shown that emotional factors have an impact on human memory, such as the influence of anxiety on eyewitnesses. |
| **Real-life application:**  The cognitive approach has been applied to a wide range of practical and theoretical contexts.  For example:   1. In psychopathology to understand dysfunctional behaviour and tracing it back to faulty thinking processes. This has led to successful treatment of people suffering from OCD/ depression. 2. In the development of artificial intelligence (AI) and the development of ‘thinking machines’ (robots). |  |
| **Less deterministic than other approaches:**  It is founded on soft determinism-it recognises that our cognitive system can only operate within the limits of what we know, but that we are free to think before responding to a stimulus. This is a more reasonable ‘middle-ground’ position than the hard determinism suggested by the behaviourist approach. |  |

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**Evaluation of the biological approach – strengths and weaknesses**

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| Strengths | Limitations |
| **Scientific methods of investigation:**  Adopts scientific methods in order to investigate the genetic and biological basis of behaviour.  E.g. brain scanning techniques (fMRIs and EEGs), family and twin studies and drug trials.  This means the data obtained is not open to bias and is highly objective. | **Lack of Causal conclusions:**  A lot of evidence from biological research shows a relationship between two factors but this does not mean they necessarily cause one another.  e.g. Theory states that the action of neurotransmitters is the cause of certain mental disorders- they have based this conclusion on studies which have shown a particular drug which aims to lower the levels of a neurotransmitter reduces symptoms of a mental disorder 🡪assumes that that neurotransmitter that was lowered by the drug has caused the disorder. Discovering an association between 2 factors doesn’t mean that one is a cause. |
| **Real-life application:**  Psychoactive drugs- increased understanding of biochemical processes in the brain has led to the development of psychoactive drugs that treat serious mental illnesses (depression, schizophrenia, OCD)= has revolutionised treatment for many. | **Deterministic view of behaviour:**  Sees human behaviour as governed by internal, biological causes over which we have no control.  Implications for legal system- if there is a discovery of say a ‘criminal gene’ this may complicate the principles of law that states offenders are legally and morally responsible for their actions.  **COUNTER-ARGUMENT:** However, this may be a positive because if individuals discover they have a genetic predisposition for criminality this gives them the opportunity to avoid environmental situations likely to trigger this predisposition or to develop coping skills that would protect them from its influence. |

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**Evaluation of the psychodynamic approach – strengths and weaknesses**

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| Strengths | | | Limitations | |
| **Explanatory power:**  The psychodynamic approach has been used to explain a wide range of phenomena such as personality development, and has drawn attention to the connection between experiences in childhood and later development.  E.g., Studies on attachment in childhood have been shown to influence relationships in adulthood. Gerard McCarthy (1999) studied 40 adult woman and found that the type of attachment they had when they were children had impacted their relationships as an adult. This research strengthens psychodynamic theories regarding the link between childhood experiences and later development. | | | **Gender-biased approach:**  Freud’s views of women and female sexuality were less well developed than his views on male sexuality 🡪 he remained ignorant of female sexuality.  Karen Horney= criticised Freud’s views on women and their development. She targeted the concept of ‘penis envy’ and the fact that Freud had framed the personality development of young girls in terms of men. She put forward her own theory, known as ‘womb envy’- Maybe it wasn’t that women coveted men’s power, but that men secretly harboured feelings of inferiority at their inability to produce human life.  Dismissing women and their sexuality in such a way is problematic 🡪many of Freud’s patients were female. | |
|  | | | **Untestable concepts:**  Karl Popper 🡪 psychodynamic approach does not meet the scientific criterion of **falsification-**it is not open to empirical testing (and the possibility of being disproved). Many of Freud’s concepts (such as the id and the Oedipus complex) = unconscious, making them difficult to test as they are not directly observable. There is little objective evidence to support the approach.  This affords psychodynamic theory the status of **pseudoscience (‘fake’ science)** rather than real science.  **COUNTER-ARGUMENT:** Fisher and Greenberg (1996) summarised 2,500 psychodynamic studies and concluded there is support for the existence of unconscious motivation in human behaviour and for the defence mechanisms of repression, denial and displacement 🡪 adds scientific credibility to psychoanalytic explanations of human behaviour. | |
|  | | | **Case study method:**  Freud’s theory was based on the intensive study of single individuals. Although Freud’s observations were detailed and carefully recorded, critics have suggested that it is not possible to make such universal claims about human nature based on studies of such a small number of individuals who were psychologically abnormal.  Furthermore, Freud’s interpretations were highly subjective. E.g., in the case study of Little Hans, it is highly unlikely that any other researcher would have drawn the same conclusions. | |
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**Evaluation of Humanistic Psychology– strengths and weaknesses**

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| Strengths | | | Limitations | |
| **Positive approach:**  Humanistic psychologists ‘bring the person back into Psychology’ and promote a positive image of the human condition.  Freud saw human beings as slaves to their past. Humanistic psychology offers a refreshing and optimistic alternative; it sees all people as basically good, free to work towards the achievement of their potential and in control of their lives.  **COUNTER-ARGUMENT:** Some critics argue that Humanistic Psychology represents an overly idealised and unrealistic view of human nature- the view that personality development is directed only by an innate potential for growth is seen as an oversimplification.  Encouraging people to focus on their own self-development rather than on situational forces may be neither realistic nor appropriate in modern society. | | | **Culture-biased:**  Many of the ideas that are central to humanistic psychology would be more associated with individualist cultures in the Western world (US). Collectivist cultures such as India and China, which emphasise the needs of the groups, community and interdependence, may not identify so easily with the ideals and values of humanistic psychology.  E.g. Maslow’s hierarchy of needs doesn’t apply easily to collectivist cultures. Nevis (1983) – found in China belongingness needs were seen as more fundamental than physiological needs and that self-actualisation was defined more in terms of contributions to the community than in terms of individual development. | |
| **Research support for conditions of worth:**  Individuals who experience conditional positive regard are likely to display more ‘false self behaviour’- doing things to meet others’ expectations even when they clash with their own values.  Harter et al. (1996) 🡪 teenagers who created a ‘false self’ and pretended to be the kind of person his or her parents would love, were more likely to develop depression and a tendency to lose touch with their true self. These results are consistent with Roger’s theories. | | | **Untestable concepts:**  Humanistic Psychology does include a number of vague ideas that are abstract and difficult to test. Concepts such as ‘self-actualisation’ and ‘congruence’ may be useful therapeutic tools but would prove problematic to assess under experimental conditions.  **COUNTER-ARGUMENT:** Rogers did attempt to introduce more rigour into his work by developing the **Q-sort**- an objective measure of progress in therapy. | |
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**Biopsychology- AO3 Knowledge:**

**Evaluation of the fight or flight response- strengths and weaknesses**

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| Limitations | |
| **The ‘tend and befriend’ response:**  Taylor et al. (2000) suggest that, for females, behavioural responses to stress are more characterised by a pattern of tend and befriend than fight or flight.  This involves protecting their young through nurturing (tending) and forming protective alliances with other women (befriending). As women evolved in the context of being the primary caregiver their system for coping with stress may be different. Fleeing at any sign of danger would put a female’s offspring at risk.  Scientific evidence: Lee and Harley (2012) have found a genetic basis for gender differences in the fight or flight response. The SRY gene, found only on the Y (male) chromosome, promotes aggression and results in the fight-or-flight response to stress. The SRY gene may prime males to respond to stress in this way. In contrast, the absence of the SRY gene in females (who do not have a Y chromosome) may prevent this response to stress, leading instead to ‘tend and befriend’ response.  This evidence suggests that pervious research, which has mainly focused on males, has obscured patterns of stress response in females. | **The ‘freeze’ response:**  Gray (1988) argues that the first phase of reaction to a threat is not to fight or flee, but to avoid confrontation. He suggests that, prior to responding with attacking or running away, most animals display the ‘freeze response’. His initial freeze response is a ‘stop, look and listen’ response, where the animal is hyper-vigilant, alert to the slightest sign of danger.  The adaptive advantages of this response for humans are that ‘freezing’ focuses attention and makes them look for new information in order to make the best response for that particular threat. The fight or flight response does not take this into account. |
| **Positive rather than ‘fight or flight’ behaviours:**  Vin Dawans et al. (2012) challenge the classic view that, under stress, men respond only with ‘fight or flight’, whereas women are more prone to ‘tend and befriend’.  Their study found that acute stress can actually lead to greater cooperative and friendly behaviour, in both men and women. For example, during the 9/11 terrorist attacks cooperative and friendly behaviour was shown resulting in human connections. | **Negative consequences of the fight-or-flight response:**  The fight-or-flight response is useful in response to situations which require energetic behavioural responses. However, the stressors of modern life rarely require such levels of physical activity and this can be harmful on our body.  If the stress response is repeatedly activated. For example, the increased blood pressure that is triggered by the activation of the SNS can lead to physical damage in the blood vessels and can eventually lead to heart disease. |

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**Evaluation of localisation of function in the brain- strengths and weaknesses**

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| Strengths | | Limitations | | |
| **Brain scan evidence of localisation:**  Petersen et al. (1988) used brain scans to demonstrate how Wernicke’s area was active during a listening task and Broca’s area was active during a reading task, suggesting that these areas of the brain have different functions.  Plenty of objective methods for measuring activity in the brain 🡪 provides sound scientific evidence of localisation of brain function. | | **Law of equipotentiality:**  It has been found that when the brain is damaged and a function is lost, the rest of the brain can reorganise itself in an attempt to recover the lost function.  Lashley described this as the **law of equipotentiality=** surviving brain circuits ‘chip in’ so the same neurological action can be achieved.  E.g. there are a few cases of stroke victims being able to recover abilities that were lost as a result of the stroke. | | |
| **Case study evidence of localisation:**  The case study of Phineas Gage (see last lesson).  **COUNTER-ARGUMENT:** This is a case study and is unique to the individual. As a result it is hard to draw general conclusions from these results as it may not be the case for everyone. | | **Evidence for holistic theory:**  Lashley (1950)- suggested that higher cognitive functions, are not localised but distributed in a more holistic way in the brain.  He removed areas of the cortex (between 10 and 50%) in rats that were learning a maze. No area was proven to be more important than any other area in terms of the rats’ ability to learn the maze. The process of learning appeared to require every part of the cortex, rather than being confined to a particular area.  This evidence seems to suggest that learning is too complex to be localised and requires the involvement of the whole brain. | | |
| **Support for language centres from aphasia studies:**  There has been evidence which has revealed that damage to either Broca’s or Wernicke’s area has led to different types of language difficulty (aphasia).  Expressive aphasia (Broca’s aphasia)= an impaired ability to produce language. In most cases caused by brain damage in Broca’s area. E.g. Patient Tan. Paul Broca treated a man who could understand speech but couldn’t produce any coherent words (could only say the word ‘Tan’). When he died a post-mortem revealed that Tan had a lesion in the left frontal lobe= area responsible for speech production.  Receptive aphasia (Wernicke’s aphasia)= an impaired ability to understand language 🡪 usually the result of damage in Wernicke’s area. This suggests that the role of speech production and speech comprehension is localised in the brain.  **COUNTER-ARGUMENT:** Dronkers et al. (2007)- MRI of 2 Broca’s patients- found other areas other than Broca’s area which had been damaged 🡪 suggests that language and cognition are far more complicated and involve networks of bran regions rather than being localised to specific areas. | |  | | |
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**Evaluation of Hemispheric Lateralisation- Strengths and Weaknesses**

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| Strengths | | Limitations | | |
| **Related to increased neural capacity:**  By using only one hemisphere to engage in a particular task (e.g. language or mathematical ability), this would leave the other hemisphere free to engage in another function and thus increasing neural processing capacity.  E.G. Rogers et al. (2004)- in the domestic chicken, brain lateralisation is associated with an enhanced ability to perform two tasks simultaneously- finding food and being vigilant for predators.  **COUNTER-ARGUMENT:** It is very hard to apply this finding in animals to human brains. There has been very little evidence showing that lateralisation is advantageous to the functioning of the brain in humans. | | **Differences in function may be overemphasised:**  One legacy of Sperry’s work is that it tends to overemphasise and oversimplify the functional distinction between the left and right hemispheres.  Modern neuroscientists 🡪 the actual distinction between left and right hemisphere is less clear-cut. In the normal brain the two hemispheres are in constant communication when performing everyday tasks, and many of the behaviours associated with one hemisphere can be performed by the other..  E.G. Patient J.W. developed the capacity to speak out of the right hemisphere. He can now speak about information presented to the left or to the right brain. (This also provides evidence for brain plasticity).  This challenges the claim that the right hemisphere is unable to handle language. | | |
| **Scientific methodology:**  The experiments involving split-brain patients made use of highly specialised and standardised procedures. There was a high degree of control over all variables 🡪 increasing the internal validity of the experiment.  **COUNTER-ARGUMENT:** Many researchers have urged caution in the widespread acceptance of the conclusions drawn from this split-brain research. Split-brain patients = an unusual sample of people.  There were only 11 who took part in all variations of the basic procedure, all of whom had a history of epileptic seizures. This may have caused unique changes in the brain that may have influenced the findings 🡪 lowering the internal validity of the research and making it difficult to draw general conclusions. | | **Lateralisation changes with age:**  Lateralisation of function appears not to stay the same throughout a lifetime, but changes with normal ageing.  Szaflarski et al. (2006)- found language became more lateralised to the left hemisphere with increasing age in children and adolescents, but after the age of 25, lateralisation actually then decreased with each decade of life. Across many types of tasks and many brain areas, lateralised functions (functions tended to be dealt with by one hemisphere) found in younger individuals tend to switch to bilateral functions (functions dealt with by both hemispheres) in healthy older adults.  This implies that a lateralised brain is only a feature of young adults and not true for all ages. | | |
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**Evaluation of brain plasticity and functional recovery- strengths and weaknesses**

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| Strengths | | Limitations | | |
| **Research support from animal studies for neural plasticity:**  Kempermann et al. (1998)- found evidence of an increased number of new neurons in the brains of rats housed in complex environments compared to rats housed in laboratory cages. The rats housed in the complex environment= an increase in neurons in the hippocampus (associated with the ability to navigate from one location to another).  **COUNTER-ARGUMENT:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | **Negative plasticity:**  The brain’s ability to rewire itself can sometimes have maladaptive behavioural consequences.  It was found that prolonged use of marijuana resulted in poorer cognitive functioning as well as an increased risk of dementia later in life.  Phantom limb syndrome= 60-80% of amputees have been known to develop this. This means they continue to experience sensations in the missing limb as if it were still there. These sensations are usually unpleasant and are thought to be due to the cortical reorganisation in the somatosensory cortex that occurs as a result of limb loss. | | |
| **Research support from humans for neural plasticity:**  Maguire et al. (2000)= London cabbies and Davidson et al. (2004)= Tibetan monks  -Both used a control group- allows us to conclude that there is a significant difference  -Use of scientific, objective measurements (MRI and electrodes fitted to brain)  -Both attempted to study a real world phenomena- high ecological validity | | **Plasticity changes with age:**  Age is a confounding variable which affects the plasticity of the brain. Functional plasticity tends to reduce with age. According to this view the only option following traumatic brain injury beyond childhood is to develop compensatory behavioural strategies to work around the deficit (such as seeking social support for developing strategies to deal with cognitive deficits).  **COUNTER-ARGUMENT:** Some studies have shown that even abilities commonly thought to be fixed in childhood can still be modified in adults with intense retraining. Researchers showed that 40 hours of golf training in 40-60 year olds produced changes in the neural representation of movement 🡪 suggests that neural plasticity is evident in all ages and not just young people. | | |
| **Support from animal studies for functional recovery:**  Hubel and Wiesel (1963)- sewed one eye of a kitten shut and analysed the brain’s cortical responses. It was found that the area of the visual cortex associated with the shut eye was not idle (as predicted) but continued to process information from the open eye.  **COUNTER-ARGUMENT:**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |  | | |
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**Evaluation of Circadian Rhythms- strengths and weaknesses**

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| Strengths | | Limitations | | |
| **Practical application to shift work:**  Knowledge of circadian rhythms has given us a better understanding of the adverse consequences if they are disrupted= **desynchronisation.**  **E.g 1- Boivin et al. (1966)-** night workers engaging in shift work experience a period of reduced concentration around 6am resulting in more mistakes and accidents.  **E.g 2-** **Knutsson (2003)-** A relationship found between shift work and poor health- shift workers are three times more likely to develop heart disease.  Research into the sleep/wake cycle may have economic implications in terms of how to best manage worker productivity. | | **Poor control in studies:**  In most early research studies of circadian rhythms participants were isolated from variables that might affect their circadian rhythm, such as clocks, radios etc.. But they were not isolated from artificial light because it was believed that dim artificial light would not affect their circadian rhythms.  Research suggests that this may not be true- Researchers altered participants’ circadian rhythms down to 22 hours and up to 28 hours by using dim artificial lighting alone🡪 these early studies may have been confounded by the presence of artificial light. | | |
| **Practical application to drug treatments (chronotherapeutics):**  One real-world application of circadian rhythms is chronotherapeutics- the study of how timing affects drug treatments.  There are certain peak times during the day or night when drugs are likely to be at their most effective 🡪 has led to the development of guidelines to do with the timing of drug dosing for a whole range of medications such as anticancer, anti-epileptic etc. | | **Use of case studies and small samples:**  Studies of the sleep/wake cycle tend to involve small groups or studies of single individuals🡪 may not be representative of the wider population and this limits the extent to which meaningful generalisations can be made.  In Siffre’s most recent cave study he observed, at the age of 60, that his internal clock ticked much more slowly than when he was a young man. This illustrates the fact that, even when the same person is involved, there are factors that vary which may prevent general conclusions being drawn. | | |
|  | | **Individual differences:**  Cycle length: Research has found that circadian cycles can vary from 13 to 65 hours.  Cycle onset: Individuals appear to be innately different in terms of when their circadian rhythms reach their peak.  This explains why some people prefer to rise early and go to bed early, whereas others prefer to wake late and go to bed later. | | |
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**Evaluation of infradian and ultradian rhythms- strengths and weaknesses**

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| Strengths | | Limitations | | |
| **Research support for BRAC:**  Ericsson et al. (2006) 🡪 studied a group of elite violinists and found that practice sessions were usually limited to a duration of 90 minutes at a time, with practice distributed during the day in these 90-minute segments. It was also indicated that violinists frequently napped to recover from practice, with the very best violinists napping more than the teachers.  Ericsson discovered the same pattern among other musicians, athletes, chess players and writers. | | **Methodological limitations in menstrual synchronisation studies:**  Early synchronisation studies have been criticised for not controlling confounding variables. There are many factors that may effect change in a woman’s menstrual cycle, including stress, changes in diet, exercise etc. that may have influenced results. This means that any supposed pattern of synchronisation is no more than would have been expected to occur by chance bringing into question the validity of the results.  In addition, the research typically used small samples of women and relies on participants self-reporting the onset of their own cycle. | | |
| **Evolutionary basis of the menstrual cycle:**  Menstrual synchrony (as demonstrated by McClintock study) is thought to have an evolutionary value. For our ancestors it may have been advantageous for females to menstruate together and therefore fall pregnant around the same time. This would mean that new-borns could be cared for collectively within a social group increasing the chances of the offspring’s survival.  **COUNTER-ARGUMENT:** Researchers have argued that if there were too many females in sync together within a social group, this would produce competition for the highest quality males (and thereby lowering the fitness of any potential offspring). From this point of view no synchrony in menstrual cycles would have been adaptive for survival and for passing on genes to offspring. | |  | | |
| **Practical application for SAD:**  Research on infradian rhythms and SAD has allowed the development of effective treatment for SAD. One of the most effective treatments for SAD is phototherapy = a lightbox that simulates very strong light in the morning and evening. It is thought to reset melatonin levels in people with SAD. This relieves symptoms in up to 60% of sufferers.  **COUNTER-ARGUMENT:** The same study recorded a placebo effect of 30% using a ‘sham negative-ion generator’ (participants were told it was another form of treatment). This brings into doubt the chemical influence of phototherapy. | |  | | |
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**Evaluation of Endogenous Pacemakers and Exogenous Zeitgebers- strengths and weaknesses**

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| Strengths | | Limitations | | |
| **Research support from animal studies for the role of the SCN:**  Morgan (1995) - see last lesson  **COUNTER-ARGUMENT:** It is difficult to generalise findings of the sleep-wake cycle from animals onto humans. | | **Influence of exogenous zeitgebers may be overstated:**  Miles et al. (1977) 🡪 a young man, blind from birth, with a circadian rhythm of 24.9 hours. Despite exposure to social cues, his sleep-wake cycle could not be adjusted and he had to take sedatives at night and stimulants in the morning to keep pace with the 24-hour world.  Similarly, studies of individuals who live in arctic regions (where the sun does not set during the summer months) show normal sleep patterns despite the prolonged exposure to light.  Both of these example suggest that there are occasions when exogenous zeigebers may have little bearing on our internal rhythm.  **COUNTER-ARGUMENT:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
| **Research support from humans for influence of light:**  Campbell and Murphy (1998)- see last lesson  **COUNTER-ARGUMENT:** It has been suggested that there may have been some limited light exposure to the participants’ eyes and acted as a confounding variable.  Also isolating one exogenous zeitgeber (light) in this way does not give us insight into the many other zeitgebers that influence the sleep-wake cycle and the extent to which these may interact. | |  | | |
| **Practical applications for jetlag:**  Burgess et al. (2003)- volunteers participated in one of three treatments before an east-west flight; (continuous bright light, intermittent bright light and dim light), each of which shifted their sleep-wake cycle back by 1 hour a day over 3 days 🡪 those exposed to the continuous bright light prior to the flight needed less time to readjust to the local time on arrival.  This suggests that light exposure prior to a flight would allow travellers to arrive with their circadian rhythms already partially re-entrained to local time. | |  | | |
| **Trigger word** | **Description** | | **Counter- argument trigger word** | **Description** |
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