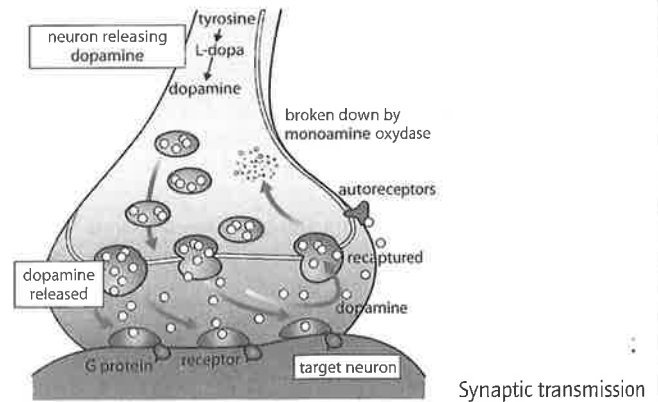


- When a nerve impulse reaches the end of the neuron, the neuron fires and neurotransmitters are released into the synaptic gap where they travel to the neuron at the other side of the synaptic gap.
- If the neurotransmitter is not absorbed it can be re-uptaken, diffused out or destroyed. The neurotransmitter then binds to specific receptors at the other side. If a neurotransmitter is blocked or replaced (e.g. because another chemical interferes) then the messages change. This affects the physiological system, cognition, mood, or behaviour.



## Dopamine

Dopamine is a neurotransmitter involved in goal-directed behaviour (motivation) such as pleasure seeking, control of movement, emotional response, and addictive behaviour. Dopamine is released in the brain's reward system.

### Dopamine and addictive behaviour

- Dopamine is released in the brain's reward system and has been associated with pleasure seeking and addictive behaviour. Addictive drugs or substances increase the amount of dopamine in the reward system.
- Dopamine can be released by environmental triggers (e.g. the sight of a cigarette package, food, or a gambling machine) because this is associated with pleasure (reward).
- Nicotine is the psychoactive ingredient in tobacco, which increases the level of dopamine in the brain's reward circuit causing feelings of pleasure and relaxation.

### Berridge and Kringelbach (2009) on dopamine in pleasure seeking

fMRI scans were used to study brain areas involved in the subjective experience of pleasure. They found that the orbitofrontal cortex was active when people reported feeling pleasure.

The researchers concluded that: dopamine and the nucleus accumbens is perhaps rather involved in *pleasure seeking*. This could explain addictive behaviour (e.g. nicotine addiction leads to craving).

The orbitofrontal cortex and natural opioids (endorphins) are perhaps linked to the subjective experience of pleasure.

### Fisher (2004) on dopamine in "addiction to love"

This is an evolutionary explanation of behaviour. "Being in love" has similarities with "being addicted" according to Fisher.

- Dopamine increases desire and reward by triggering the same emotional rush of pleasure when you see or think of the loved one as if you were taking a drug like cocaine.
- Dopamine can explain the highs of romantic passion (high levels of dopamine) and the lows of rejection (low levels of dopamine).

## RESEARCH

### Werker et al (1981)—Hindi phoneme discrimination in infants

#### Essential understanding

✪ *Infants have a natural ability to discriminate between phonemes, even for languages they are not exposed to. This ability is lost later, probably due to pruning.*

#### Aim

To compare the ability to differentiate between Hindi phonemes in infants, English-speaking adults and Hindi-speaking adults.

#### Participants

Hindi-speaking adults, infants of 6–7 months and English-speaking adults.

#### Method

Quasi-experimental comparison between groups.

#### Procedure

Pairs of stimuli were used, for example, /ta/ versus /Ta/ (Hindi). The critical difference in this pair of sounds is the place of articulation: the tongue is placed either on the alveolar ridge or on the back of the upper front teeth. This distinction between sounds is not used in English.

Participants were tested in a **discrimination paradigm**.

- For infants, this procedure involves first conditioning an infant to turn his or her head towards the loudspeaker

when there is a change in the auditory stimulus. For this the infant is reinforced with the presentation of an interesting electronically activated toy animal each time he or she turns correctly.

- Adults pressed a button when they thought they detected a change in stimulus.

#### Results

Infants were just as able to discriminate between Hindi phonemes as Hindi-speaking adults.

English-speaking adults were not able to discriminate between Hindi phonemes.

#### Conclusion

- Up to a certain age, infants have the ability to discriminate between natural language sounds without prior language experience.
- A decrease in speech perceptual abilities may be due to linguistic experience—learning one language causes people to lose the ability to discriminate between phonemes that are not used in this language.

- The theory of evolution, suggested by Charles Darwin, is based on the assumption that living organisms face environmental challenges. Organisms that adapt the best have a greater chance of passing on their genes to the next generations.

- Organisms with specific genetic traits that enhance survival are said to be naturally selected. Natural selection is a crucial evolutionary process in Darwin's theory.

### One evolutionary explanation of behaviour: disgust in pregnant women

- Nausea and loss of appetite during pregnancy may have been evolved as a way to protect the mother and the fetus against diseases which could threaten the fetus. Disgust has evolved as a food-rejection response to prevent contamination and the spread of illness.
- The theory under investigation is whether disgust has evolved to compensate for the mother and the baby's vulnerability to disease during the first few months of pregnancy.

Fessler et al (2005) Elevated disgust sensitivity in the first trimester of pregnancy

**Aim** To investigate if disgust sensitivity in the first trimester of pregnancy was elevated as predicted.

#### Procedure

- A Web-based survey was completed by 691 women recruited through pregnancy-related Web sites. No compensation was offered for participation. The women's mean age was 28.1 years.
- On the Web-based questionnaire, the participants (1) indicated their current level of nausea using a 16-point scale and (2) answered questions to test their disgust sensitivity in eight different areas (e.g. food; contact with animals, body products, and dead animals; hygiene; contact with toilets).

#### Results

- Overall, disgust sensitivity related to food and body products in women in the first trimester was higher compared to those in the second and third trimesters.
- Disgust was particularly elevated in relation to food, which was exactly what the researchers had predicted.
- Food-borne diseases are particularly dangerous to women in the first trimester and therefore it was predicted that disgust sensitivity related to food would be high. This was supported by the results.
- The results may indicate that nausea and vomiting are evolved behaviour because they limit the likelihood that pregnant women will eat dangerous food.

#### Evaluation

- The data was collected through questionnaires. Self-reports may not be reliable. This is not an effective way of measuring disgust. It would have been more reliable to confront participants with real disgust-eliciting objects.
- The effect sizes were not big but significant. The findings are supported by other studies (e.g. Curtiss et al. 2004) showing that images that threaten the immune system are judged as more disgusting.

### Evaluation of evolutionary explanations

- It is difficult to test evolutionary theories and not much is known about the life of early humans.
- Evolutionary explanations tend to focus on biological factors and underestimate cultural influences.
- According to Davey (1974) disgust for spiders may be explained by people's need to find tangible causes of illness and disease when the causes were unclear.