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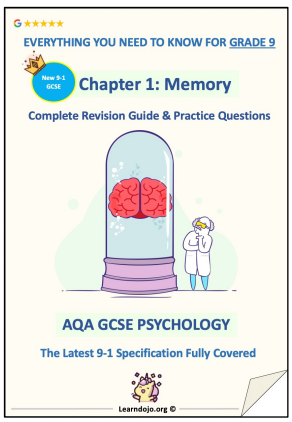

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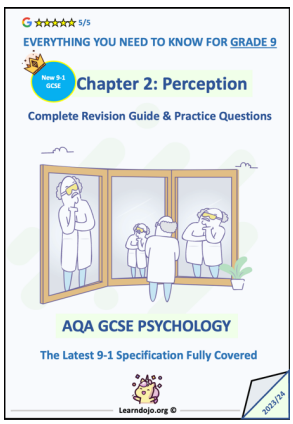

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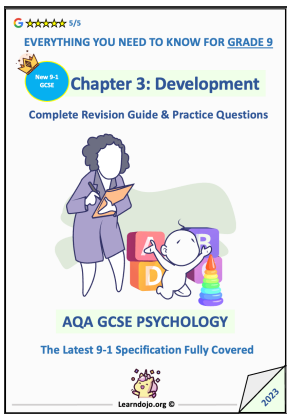

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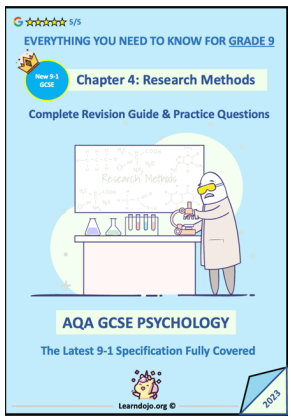

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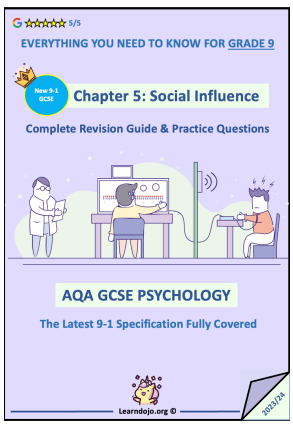

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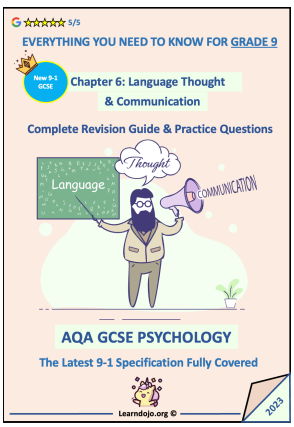

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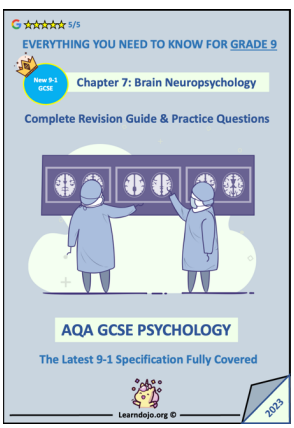

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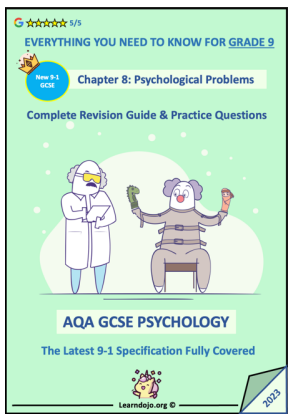

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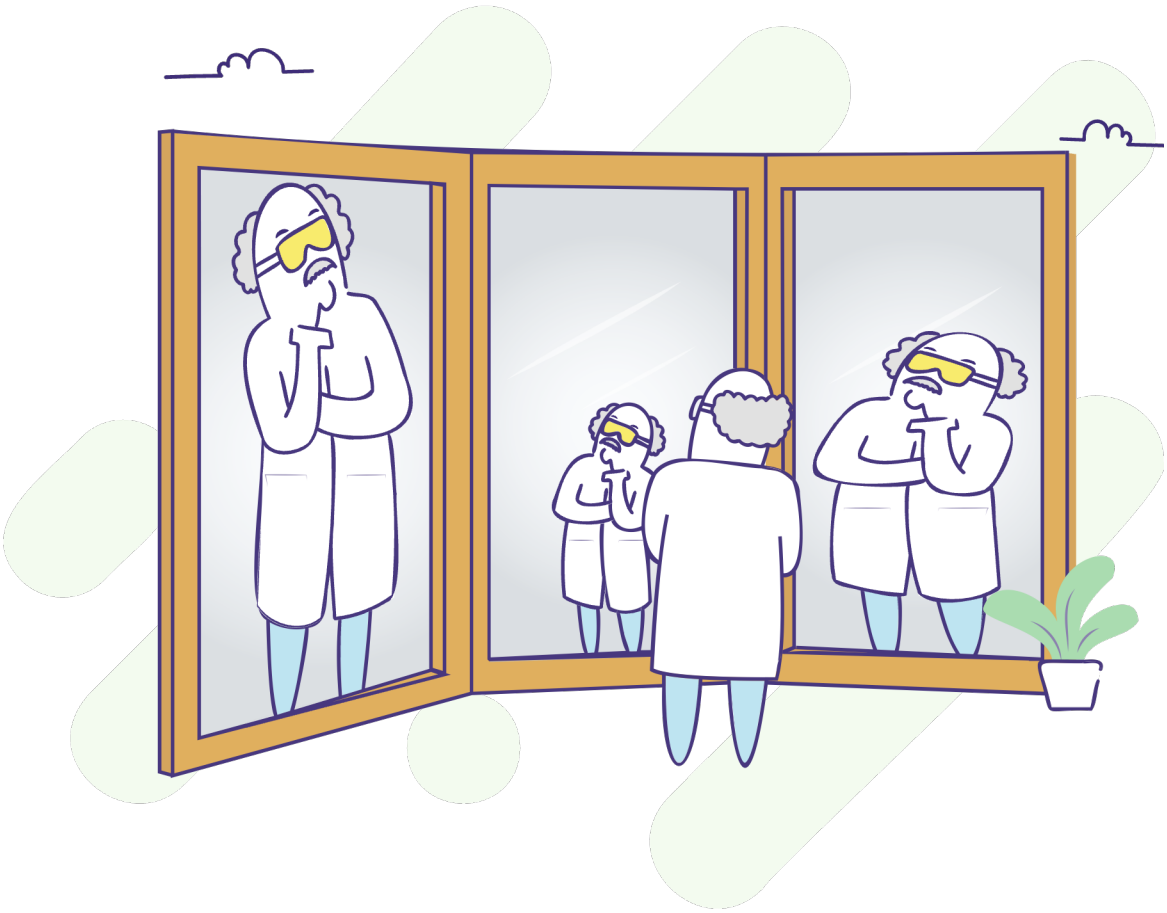
What is perception?



Perception is how we interpret or make sense of the sensory information that we receive.
There are various explanations and theories for how perception actually works including how culture can affect perception.

Take a look at the picture above – What can you see in this collection of dots and blobs?

Some people can make out the outline of a dalmatian walking along. This is quite strange considering there is no actual outline of the dog in the picture.

What this shows us is that our visual system has a tendency to organise information so we see patterns. This then raises important questions as to how our visual system actually works:

- Is perception a **bottom-up process** whereby our perception is based solely on the information received by our eyes?
- Or is perception a **top-down process** where our mind generates expectations of what we are looking at, and it is these expectations that then help us make sense of the information our eyes receive?

The two main theories that attempt to explain how perception works which we will explore in this chapter are:

1. **Gibson's direct theory of perception (and the influence of nature)**
2. **Gregory's constructivist theory of perception (the role of nurture)**

Sensation

Information we receive through the senses is known as a sensation.

Our bodies are equipped with special sensory organs which are designed to detect information from the environment and convert this information into electrical signals in a process known as transduction.

The body is bombarded with lots of information, far more than we can actually cope with if we were to give it all attention. For example, we hear many sounds and noises in the background which do not require our attention. We also see things which are irrelevant and this applies to our other senses also.

We, therefore, need to interpret and make sense of all the information we receive and it is this process which is known as perception.

Perception

Perception is all about us trying to understand and make sense of all the information our body receives.

If we were unable to organise this information somehow it would be overwhelming and we would struggle to understand what anything meant.

Our eyes, for example, receive information about how much light or darkness there is as well as colour which is picked up as tiny dots however we do not see a mass of tiny dots even though this is actually what our visual receptors see.

We instead see patterns such as shapes, people and objects and even if we see some things faintly, our past experience allows us to make out and infer what we think it is because of this process known as perception.

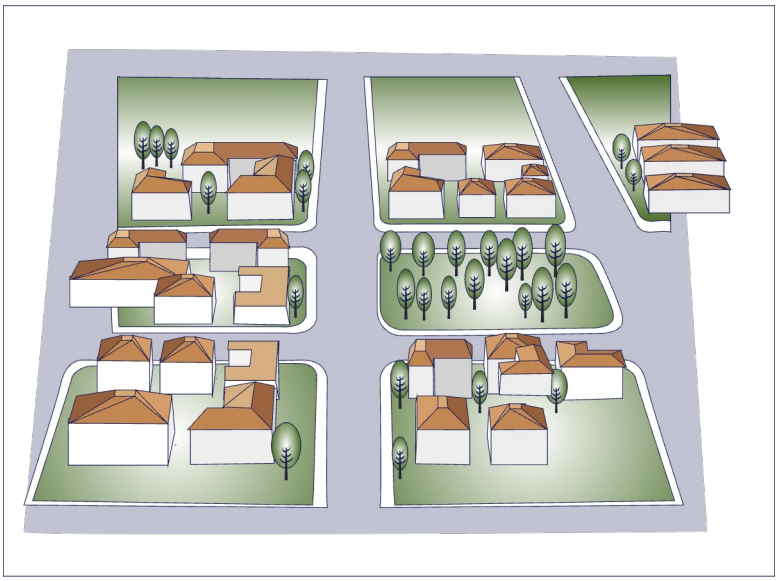
Visual Cues and Constancies

Our eyes receive an image that is two dimensional similar to a picture.
We, however, live in a three-dimensional world where we must also consider depth and distance to avoid bumping into things or being hit by moving traffic. To do this we need to know how far things are and judging this distance is something we do automatically using information known as **depth cues**.

Depth cues tell us about the third dimension of our world, specifically, the depth or distance and this aids us in survival as it tells us how far or near something is from us. Depth cues are visible in pictures despite them being two dimensional and based on height and width.

Pictures instead use a set of cues known as monocular depth cues as we can use them even if we are looking with only one eye. These **monocular depth cues** tell us how far things are but this is not completely accurate.

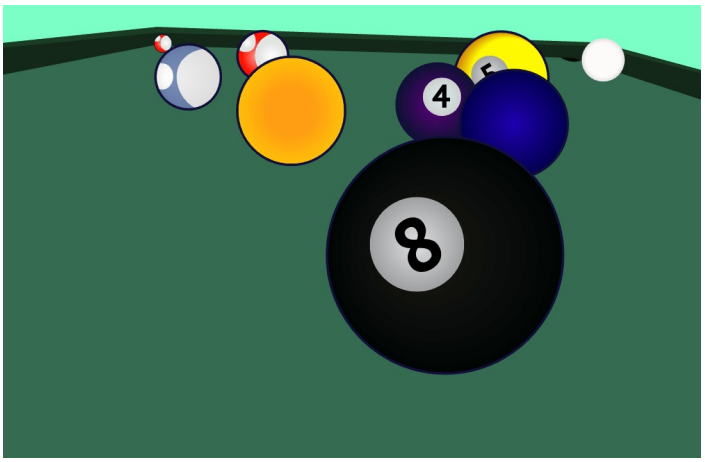
To have greater accuracy, other depth cues rely on the usage of two eyes as this involves comparing the slight differences in images that each eye receives. This is referred to as **binocular depth cues**.



Monocular Depth Cues

There are **4 main types of monocular depth cues** we use when it comes to pictures.

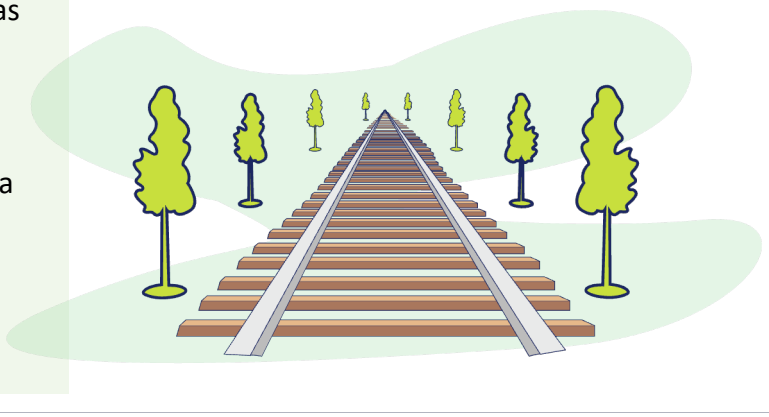
One cue we might use is how things that are further away often appear to be positioned higher up. This cue is known as a **height in plane.**



- Another monocular depth cue we may use involves us perceiving things which are closer to be larger and this depth cue is known as **relative size.** The picture above of the pool balls demonstrates this as well as the next monocular cue which is **occlusion.**
- **Occlusion** is another depth cue which involves one object covering or overlapping another – when this happens we perceive the object that is overlapping the other to be closer.

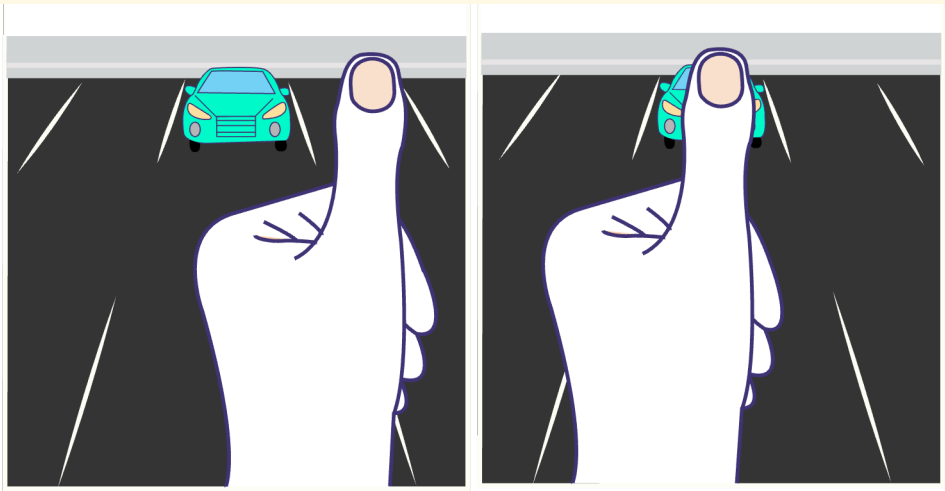
The fourth depth cue we may use is known as a **linear perspective.**

This involves straight lines pointing towards a single point in the horizon known as the vanishing point. This helps us understand distance in a landscape for example.



Binocular depth cues identify how far away things are using two eyes.

We see two images from each eye which are almost identical and it is by comparing these two images and their differences, our brain is able to work out how far away things are.



Using binocular depth cues enables us to be much more accurate in our judgements when it comes to depth and distance.

There are two ways binocular depth cues work: **Convergence** and **retinal disparity.**

- **Convergence** works by detecting differences in our eye muscles. Our eyes focus differently when we see things that are closer compared to how they focus when things are further away. The brain detects the differences in how these muscles are working and use this as a cue to perceive distance.
- **Retinal disparity** compares the two images received by each eye. If an object is close to us there is a difference between what they see. However if an object is further away there will be less of a perceived difference and usually, beyond 10 metres the difference is less noticeable.

Gibson's Direct Theory of Perception

Psychologist James Gibson proposed his direct theory of how perception works.

Gibson's Direct Theory of Perception is the idea that we **perceive simply by using the information we receive** through our senses and this is enough information for us to make sense of the world around us. He proposed people, as well as animals, do not receive simply passive images about the world around them but they are active within it and this activity changes the visual images we receive.

An example of this is when we are in motion and moving along a road; the visual image we receive changes as things closer to us appear to be moving much faster as we go past them while things that are further away appear to move slower or not very much. This effect is known as **motion parallax** and happens only if we move and it combines depth cues to help us accurately judge distances.

To clarify – Motion Parallax is the way in which our visual field changes with movement with close objects seeming to move more than objects which are far away.

We also use other cues according to Gibson's direct theory of perception. When we look around we do not see blocks of colours but instead, we see different textures, patterns of shade, mixtures of tones or smoothness to inform us what they are like.

Looking at someone's lawn you may notice that the part of the lawn which is closest to you appears more detailed and you can see individual blades of grass. As you look further away the lawn looks smoother with the furthest parts looking the most smooth. This occurs as the depth cues of relative size and height in-plane combine to change the textures were looking at producing a gradient with things that are further away appearing more smooth. The same effect happens with colour to produce a colour gradient with colours appearing more brighter when closer and paler the further away they are.

Gibson argued the real world was three-dimensional and where we stand and move about within it is as much a part of real-world perception as shape and colour..

An ecological theory of perception

Gibson's direct theory of perception was also known as an ecological theory of perception because he believed perception evolved in order to help animals best deal with their environment.

Gibson believed humans, birds and primates developed colour vision to help us pick ripe fruits and berries while depth perception is seen as essential for jumping across branches by primates to avoid potential threats on the ground. Dealing with the environment includes our own actions in addition to the information our senses receive.

For example, a tree stump offers us various possibilities for interaction: we can stand on it to see further away, sit on it to relax or use it as a table. Gibson argued our perception includes the possibilities for actions which they afford (their affordances) and affordances were a part of his theory of direct perception. He argued the environment was not totally separate from us and we perceived what was around us in terms of ourselves and what this allowed us to do.

Our world is therefore not seen as totally three-dimensional and we, therefore, do not need to make inferences about the world or guess what we are seeing as we have enough information from our senses to understand the world before us and how we can interact with it.

Evaluating Gibson's Direct Theory

- The theory proposes perceptual abilities such as depth perception are due to nature and this is supported by various research from infant studies. This means we do not always have to use past experiences or make inferences in order to perceive the world around us and depth perception may actually be innate.
- Gibson's theory proposes that sensation and perception are the same processes however studies into visual illusions have demonstrated that they are a separate process that involves us making inferences about what we see when the image is ambiguous. This undermines Gibson's theory as not everything we perceive is then direct but also relies on inferences we make from past experiences. We often interpret what we see depending on what we expect it to be rather than actually what it is.

Visual Illusions

Visual illusions happen when our visual perception is “tricked” into seeing something inaccurately as the brain uses inappropriate strategies for interpreting sensory information received.

There are a number of reasons this happens such as **misinterpreting depth cues** where we incorrectly apply the rules of depth perception.

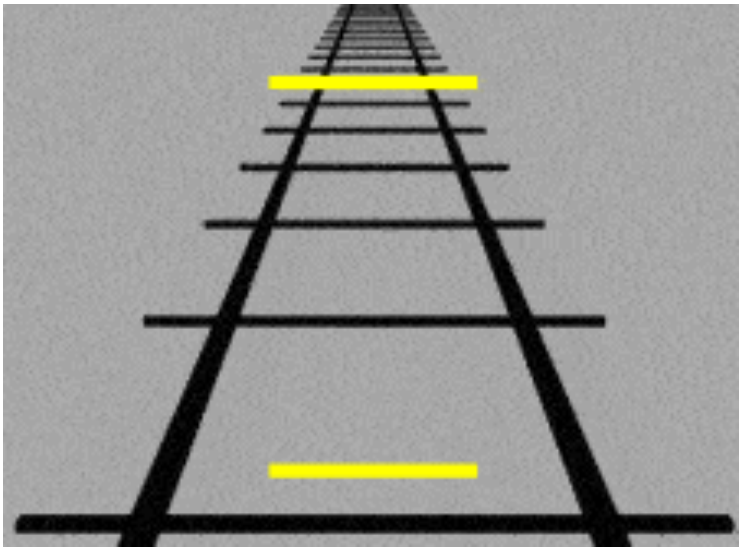
The Ponzo Illusion

Depth cues help us to identify distance but with line drawings, we can be easily misled.

The Ponzo illusion above relies on the depth cue of linear perspective with the two outer lines of the drawing creating an illusion of perspective.

We therefore unconsciously see the top lines being further away and thus perceive it as being longer.

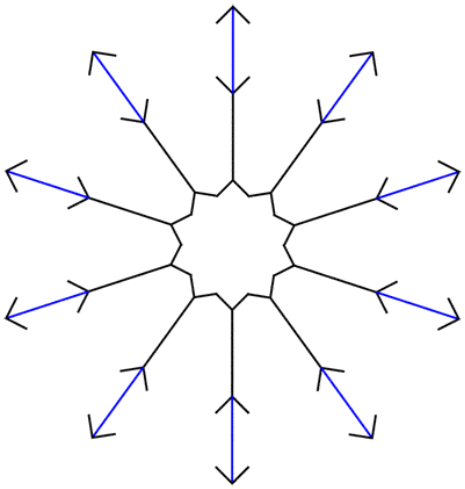
Measuring the lines however you can see they are both the same length.



The Muller-Lyer illusion

A similar effect is perceived with the Muller-Lyer illusion where we perceive the length of the lines as different dependent on whether the arrow points outwards or inwards however in truth the lines are of equal length:

Sarcone's Dynamic Müller-Lyer Illusion

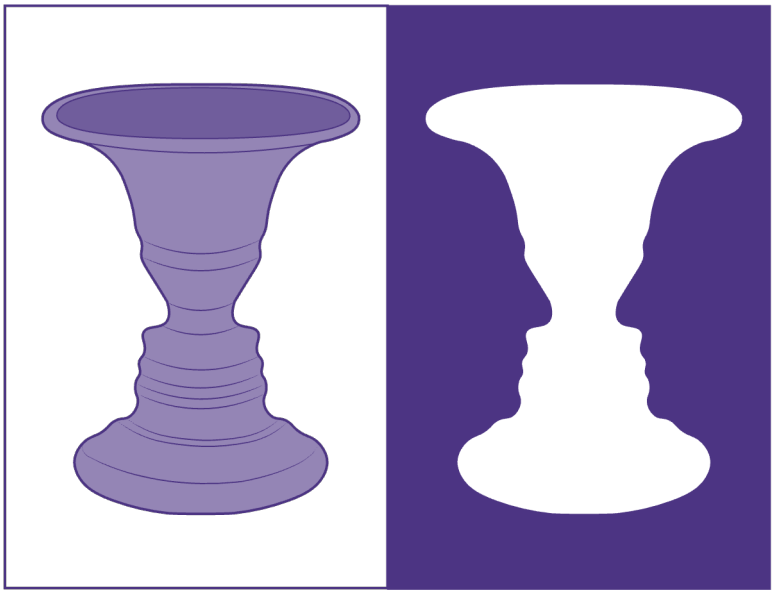


The Rubin's Vase illusion

Ambiguity means when an image could well be one thing or another.

Ambiguity is another cause for visual illusions. When there are two equally possible explanations, the brain focuses on one explanation rather than the other.

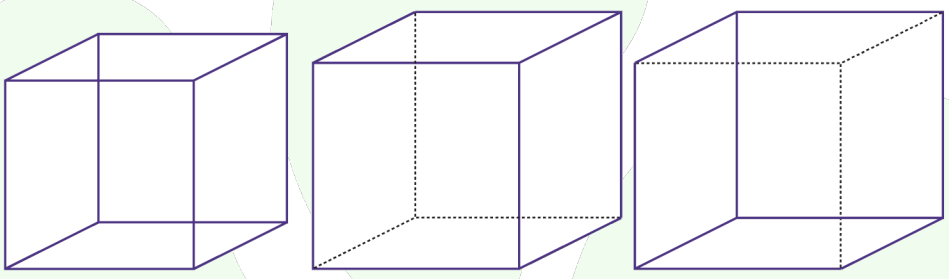
The Rubin's vase illusion is an example of this; we see either a vase or it could be two faces seen from the side. We are able to see either the vase or the faces but not both at the same time as the other disappears.



The Necker Cube

The Necker Cube is another example of ambiguity.

The image of the Necker Cube is so ambiguous, the brain cannot decide where the front is as the image is perfectly balanced. It can, therefore, be seen in different ways as there is more than one possible viewpoint for it.



The necker cube: a wire frame cube with no depth cues

One possible interpretation of the Necker cube.

Another possible interpretation

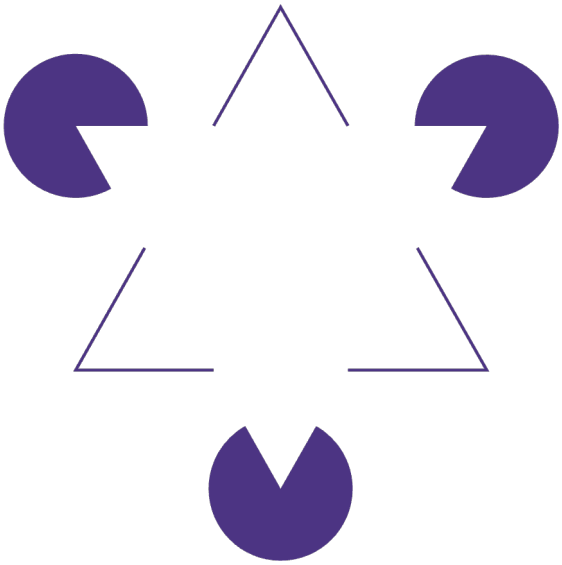
The Kanizsa Triangle

Fiction – Creating something that isn't really there in order to complete the image.

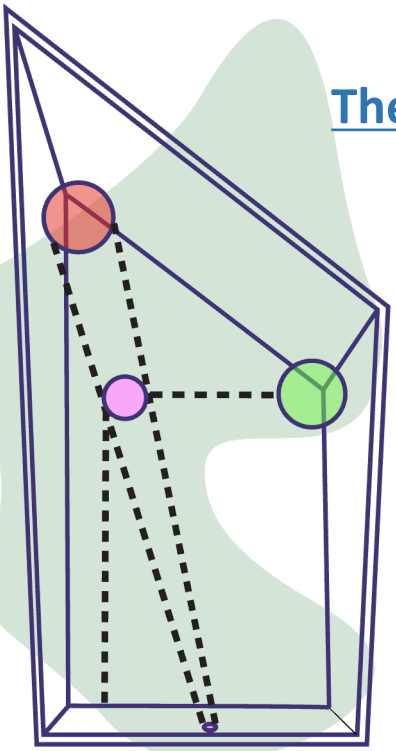
The third type of illusion created by our minds is fiction. The Kanizsa triangle is a good example of this on the right.

We see a triangle in the middle but in reality, it is not there and a form of fiction our perception has created which has been influenced by the shapes around it.

Our perceptual system generates an image which fills the gap to create something plausible for us.



The Ames Room illusion



Size constancy: keeping the original perception of the size of an object even when information received by the eyes changes. Perceptual constancy is about how we perceive objects as being the same (constant) even when the visual image we receive is different.

For example, if we look at a cup from different angles, the shapes we receive on the retina of our eyes is very different but we still see the same shape because we are applying constancy scaling which helps us make allowances for these changes. This is known as shape constancy.

A similar process occurs when we see people who are in the distance. As they are further away we see them as smaller but as they approach we do not see them growing larger even though this is what is happening in the visual image. We apply size constancy which enables us to see them as the same size in reality.

The Ames room uses size constancy to produce a visual illusion.

It does this because we look at it from a specific viewpoint and the result is we see one person as being much larger than another.

This happens because although the room looks square it isn't in reality.

The two people are also at different distances with the person who appears smaller actually being further away however the lines of the room are carefully designed to mask this from the observer.

See the image above and video below on how the Ames room actually works.

You can view a video of the Ames illusion here:

https://www.youtube.com/watch?v=gJhyu6nlGt8

Gregory's Constructivist Theory of Perception

Richard Gregory's constructivist theory of perception argues that past knowledge and experience is the most important factor when making sense of the world around us.

Gregory proposed that perception worked by making reasonable guesses about what we are seeing based on what it is most likely to be. These were referred to as perceptual hypotheses i.e. the most probable explanation for the visual information we receive. Gregory believed perception involved cognitive processes and that we do not simply perceive information that we receive. Instead, we also rely on stored knowledge and experiences which affects our perception.

Gregory's Theory of Perception Evaluation

There is evidence from studies to suggest that our perception is influenced by our past experiences as Gregory's constructivist theory proposes.

- Research by **Gilchrist and Nesberg (1952)** found that hunger affected how people perceived images of food.
- This study is important as it showed how motivation can affect our perception with participants who were most hungry in this study perceiving images to be brighter.
- A criticism, however, is that not everyone agrees with the explanations given for illusions such as the Muller-Lyer illusion. Critics argue the illusion works because the arrowheads on the lines make them look like the near edge of a building or the far corner of a room which makes us think the line is nearer to us than the other.
- A strength, however, is that this illusion still works when the arrowheads are replaced with circles. It, therefore, seems that both nature and nurture have an effect on the way sensations received by us influence perception.

Factors Affecting Perception

The **perceptual set is a state of readiness** for the information we receive from the environment around us. At any one time, we are receiving more information than we can take in so **we need to be able to select what we are going to focus our attention on and what we are going to ignore**. We do this by developing a state of readiness which psychologists call the perceptual set which helps us anticipate what is coming so we can act effectively.

All our cognitive processes such as **memory, decision-making, learning and perception** can all be affected by the perceptual set.

For example, with **memory, we remember different things dependent on our mood** i.e. if we are in a bad mood this makes it more likely that we will remember the negative things while being in a good mood makes it more likely that we remember the pleasant things.

Our **decision-making** is also believed to be affected by the perceptual set. Dependent on what we have just seen or what we are expecting, our decision making is affected by such.

Our **learning is affected by the perceptual set** as we are more prepared to learn some things than others – for example, babies learn nursery rhymes more easily than normal sentences or letters e.g. the alphabet song is more easily learnt if in the form of a nursery rhyme rather than if the letters are taught individually. This is because babies and toddlers are set to learn through repetition.

How expectation affects perception

Perception is also affected as when we expect something, we are more likely to notice it and Bruner and Minturn's study on expectation provides research support for this.

One research study found that when participants were shown the pictures of birds heads and then shown an ambiguous picture (see below,) the participants were more likely to report seeing birds.

If they were shown pictures of rabbits heads prior then this is less likely which demonstrates how expectation can influence perception.

How culture affects perception

The culture we are brought up in can also influence perception.

Children in western societies are raised accustomed to line drawings and cartoons which although not realistic they become used to seeing. When asked to draw an animal, they then draw one similarly from the side as seen in cartoons however children from traditional tribal societies behave differently. They instead draw it as if it were flat and spread across and they do this because they perceive the whole animal.

Children from western societies, however, are shaped by their exposure to line drawings so draw them from the side showing only half the animal.

How emotion and motivation affect perception

We as people all experience a range of different emotions and moods. At times we may be happy, other times we may be annoyed or sad.

Emotions can influence how we perceive things as they contribute to our perceptual set and make us more likely to perceive things in a particular way that is in line with how we feel.

For example, someone who is already quite upset is more likely to notice other upsetting events or actions rather than positive ones.

Ambiguous pictures which can be seen as either positive or negative may also be more likely to be interpreted in a negative way due to a person's negative mood.

Children that are excited about Christmas approaching have also been shown to draw bigger pictures of Santa which include lots of presents compared to after once Christmas has passed due to less excitement.

Motivation is what drives us to do things and we have many different motives to do things. We may have physical motives such as being hungry or thirsty which may then encourage us to eat or drink or social motives may drive us to stay in contact with friends. Motivation can also influence perception and a key research study into this is Gilchrist and Nesberg's need and perceptual change study (1952).

Gilchrist and Nesberg 1952 Motivation Study

Aim: To investigate how motivation affects a person's perception.

Design: Laboratory experiment

Method: 26 university students who volunteered to go 20 hours without any food and consume only water were recruited as participants.

The students were randomly allocated to be in either one of two groups: one group which went without food (the experimental group) and the other, which was a control group, which had normal meals during the 20 hours. The participants were told they would see a set of pictures on the screen for 15 seconds before the screen turned off. After 15 seconds the screen would come on again with the pictures however they would not look the same. The student's task was to adjust each picture so that it looked the same as before in the first instance they were shown it. The pictures were a set of 4 colour images that were taken from magazines that showed typical meals such as T-bone steaks, fried chicken, hamburgers and spaghetti. The second time the students were shown the pictures, the brightness of the pictures was changed and the students were asked to re-adjust the brightness by turning on a knob. They were tested at the beginning of the study just after their lunchtime meal and again after the 6-hour interval as well as the 20-hour interval.

Results: The control group showed very little difference in their memory of how bright the pictures were as time went on and adjusted them to be most accurate. The experimental group judged the pictures to be brighter the hungrier they became.

Conclusion: The conclusion drawn was that hunger can affect the way people perceive images of food which suggests motivation can affect perception.

Evaluating Gilchrist and Nesberg's 1952 Motivation Study

The study showed that motivation can have an impact on perception. The study was also realistic and has ecological validity as the participants were actually tested while hungry.

The carefully controlled nature of the experiment with it being in the laboratory allowed researchers to limit extraneous variables and match the timings and conditions for both sets of groups apart from hunger.

The laboratory setting also makes it easy for other researchers to replicate the study and its findings if need be to check for reliability.

Limitations of the study are however that not many participants were involved and the sample size was small meaning generalisation is therefore difficult.

All the participants were also students of a similar age which makes it difficult to apply the results to other age ranges.

Participants in this study were also all volunteers and therefore their behaviour may not have been representative of real-world behaviours as they were keen to take part.

Due to the nature of the study being an experiment, participants may have also guessed what the study was about and this could have affected their behaviour and thus invalidated the results.

Bruner and Minturn's Perceptual Set Study 1955

Aim: Bruner and Minturn conducted a study to investigate how expectations can direct (influence) perception.

Study design: Laboratory experiment.

Method: 24 participants took part in an experiment on recognising letters and numbers. Letters and numbers were flashed on the screen very quickly initially faster than the eye could see at 30 milliseconds and then this increased by 20 milliseconds each time. The participants were then asked to draw the letter or number as soon as they could recognise it. The test stimulus used was a broken letter "B" which was designed to be ambiguous and be seen as either the letter B or the number 13 – this is shown in the image below:

Half the participants were shown a series of 4 stimulus letters (L, M, Y and A) as training on what to do.

They were then shown the test stimulus followed by a series of test numbers (16, 17, 10 and 12) and then the test stimulus again.

They were then shown a series of mixed letters and numbers, again followed by the test stimulus which meant each participant saw the test stimulus 3 times: once when they were expecting a letter, again when they were expecting a number and again when they were expecting either to come up. The other half of the participants were exposed to the same procedure except they were counterbalanced.

The participants were shown the stimulus numbers first, followed by the test stimulus, then the letters followed by the test stimulus and then a mixture of letters and numbers followed by the stimulus.

Results: Bruner and Minturn's results found that most participants drew an open figure B similar to the number 13 (as above in the image) when expecting a number to come up and a closed figure (B) when they were expecting a letter. When they were expecting either letter or number, they produced mixed results with some drawing an open figure and others drawing the closed letter.

Conclusion: Researchers concluded that the expectations participants had directly influenced how they interpreted the stimulus figure.

May 2019 Perception Exam Questions

What is the best explanation for the visual illusion known as the Necker Cube?

a. Ambiguity

b. Convergence

c. Misinterpreted depth cues

d. Size constancy

[1 mark]

What is meant by 'sensation'?

[1 mark]

Name two monocular depth cues

1.

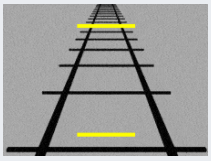
2.

[2 mark]

People often incorrectly think the two horizontal lines in the Ponzo illusion are of different lengths

Use your knowledge of Gregory's constructivist Theory of Perception to explain the Ponzo illusion shown in Figure 1.

Figure 1



[4 marks]

A researcher studied the effects of emotion on perception.

Two weeks before Christmas, he asked a group of children to each draw a picture of a Christmas tree with presents under it.

He counted the number of presents that the children drew before and after Christmas.

Table 1 shows the mean number of presents drawn by children before and after Christmas.

Table 1	Before Christmas	After Christmas
Mean number of presents drawn by children	12	5

Identify the type of data that is shown in **Table 1** and explain your answer.

[2 marks]

Use your knowledge of how emotion affects perception to explain the results shown in Table 1

[3 marks]

Outline Gibson's Direct Theory of Perception

[6 marks]

You have been asked to investigate the effect of motivation of perception.

Explain how you would design an experiment to do this.

You need to include the following information in your answer:

- The experimental design you would choose and why this would be suitable.
- What you would ask the participants to do and what data you would collect.
- The results you would expect to find from your experiment.

[6 marks]

May 2020 Perception Exam Questions

Which **two** of the following are binocular depth cues?

a. Convergence

b. Height in plane

c. Linear Perspective

d. Relative Size

e. Retinal disparity

[2 marks]

Which is the **best** explanation for the visual illusion known as the Ames room?

Pick **one.**

a. Ambiguity

b. Fiction

c. Occlusion

d. Size constancy

Briefly evaluate Gibson's direct theory of perception.

[4 marks]

Sketch the Müller-Lyer illusion

[1 marks]

Outline how psychologists would explain the Müller-Lyer illusion.

[3 marks]

A teacher carried out an experiment to investigate factors that can affect perception.

She divided her class into two groups: A and B

Group A was shown nine different pictures of rabbits.

Group B was shown nine different pictures of ducks.

Both groups were then shown Figure 1 and were asked what animal they saw.

The results are shown in **Table 1.**

Figure 1

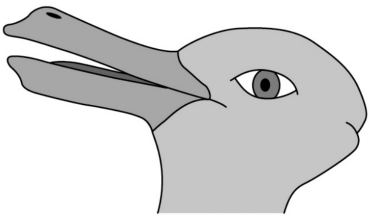


Table 1

Animal	Group A	Group B
Rabbit	11	2
Duck	3	13
Other	1	0

Calculate the percentage of students in Group B who saw Figure 1 as a rabbit.

State your answer using **two** significant figures **and** show your workings.

[3 marks]

Workings:

Answer:

Which of the following is the correct fraction of Group A who saw Figure 1 as a duck?

Pick **one.**

a. 1/3

b. 1/4

c. 1/5

d. 1/6

[1 mark]

Use your knowledge of one factor that affects perception to explain the results shown in Table 1

[4 marks]

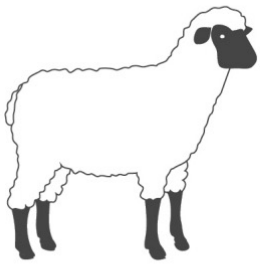
A psychologist carried out a laboratory experiment to see whether or not culture affects perception. He asked Marc and José to look at the three images shown in **Figure 2** and decide which image was the odd one out.

Marc was brought up on a farm and still lives in a rural part of France. Marc said,

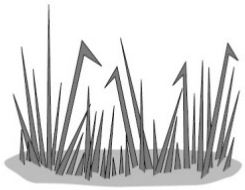
"The cat is the odd one out. The sheep and the grass go together best because sheep eat grass."

José was brought up in the Spanish city where he still lives. "No!" said José, "it's the grass. The cat and the sheep go together best because they are both animals."

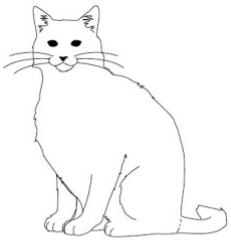
Figure 2



Sheep



Grass



Cat

Outline how culture can affect perception. Refer to both Marc and José's comments in your answer.

[4 marks]

Explain one strength of using laboratory experiments in research

[2 marks]

The Legal Stuff

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