FREE EDITION · NOTES + 3 SAMPLE MCQS

CUET · PSYCHOLOGY · CLASS XI · CODE 324

Sensory, Attentional and Perceptual Processes

CUET unit: Sensory, Attentional and Perceptual Processes
(Foundations of Psychology — Cognitive Processes)

By **UniDrill** · NCERT-grounded study material

📌 Snapshot

- Establishes how knowledge of the world arises through three interrelated processes — sensation, attention and perception — collectively called cognition.
- Introduces psychophysics concepts (absolute threshold, difference threshold) and the seven sense modalities (five external + two deep senses).
- Distinguishes selective vs. sustained vs. divided attention and explains three classical theories (Broadbent's filter, Treisman's filter-attenuation, Johnston & Heinz's multimode).
- Develops perception via Gestalt principles, processing approaches (bottom-up vs. top-down), depth cues (monocular & binocular), perceptual constancies, illusions and socio-cultural influences.
- A high-yield CUET chapter because terms, theorists, and Gestalt principles are easily framed as one-line MCQs.

📖 Detailed Notes

2.1 Core concepts

NCERT Chapter 4 explains how human beings come to know the external world through three basic, interrelated processes — **sensation, attention** and **perception** — together called **cognition** (NCERT §Knowing the World, p. 61). Sensation is the entry point of information; attention selects what reaches consciousness; perception interprets it and gives it meaning. Human beings possess **seven sense organs**: five external organs (**eyes, ears, nose, tongue, skin**) and two **deep senses** — the **kinesthetic** sense (giving information about body movement and the position of body parts) and the **vestibular** sense (giving information about body posture and balance) (NCERT §Nature and Varieties of Stimulus, pp. 61-62). Each sense organ is specialised for a particular kind of stimulus — eyes for light, ears for sound, nose for smell — and is therefore called a **sense modality**.

Sensation is the initial experience of a stimulus registered by a sense organ (NCERT §Sense Modalities, p. 62). The branch of psychology that studies the quantitative relationship between physical stimuli and the sensations they evoke is called **psychophysics**. Two foundational psychophysical concepts matter most. The **absolute threshold (AL)** or **limen** is the minimum value of a stimulus required to activate a given

sensory system; because the threshold fluctuates from trial to trial, AL is operationally defined as the stimulus value detected on **50 per cent of trials**. The **difference threshold (DL)** is the minimum change in a physical stimulus that produces a noticeable difference in sensation, again on **50 per cent of trials** (NCERT §Sense Modalities, pp. 62-63). Students should remember that both thresholds use the same 50% detection criterion — a frequent NTA trap.

Attention is the process by which certain stimuli are selected from a group of others (NCERT §Attentional Processes, p. 63). NCERT emphasises that attention is more than mere selection — it also includes alertness, concentration and search, and involves **"effort allocation"**. Attention has both a **focus** (the central object of awareness) and a **fringe** (peripherally noticed but not centrally attended). There are three forms of attention. **Selective attention** picks a limited number of stimuli from many and is influenced by **external factors** (size, intensity, motion, novelty, moderate complexity, human photographs, rhythmic auditory stimuli) and **internal factors** — motivational and cognitive (interest, attitude, preparatory set) (NCERT §Selective Attention, p. 64). Three classical theories explain selective attention: **Donald Broadbent's Filter Theory (1956)** proposes a bottleneck through which only one stimulus passes the selective filter at a time; **Anne Treisman's Filter-Attenuation Theory (1962)** modified Broadbent by arguing that unattended stimuli are merely weakened (attenuated), not fully blocked; and **Johnston and Heinz's Multimode Theory (1978)** proposes selection across three stages — sensory, semantic and conscious (NCERT §Theories of Selective Attention, pp. 64-65). **Sustained attention** or **vigilance** is the ability to maintain attention on an object or event over long durations and is influenced by sensory modality (auditory > visual), clarity of stimuli, and temporal and spatial uncertainty (NCERT §Sustained Attention, pp. 65-66). Box 4.1 (p. 64) explains **divided attention** — possible when activities are highly practiced and automatic; automatic processing occurs without intention, unconsciously and with little thought. Box 4.2 (p. 65) introduces the **span of attention** (perceptual span) — what **George Miller** called the "**magic number seven plus or minus two**" — measured by a **tachistoscope**. Box 4.3 (p. 66) describes **ADHD**, characterised by impulsivity, excessive motor activity and inability to attend; more prevalent in boys and treated with Ritalin (with side-effects), behavioural management and cognitive-behavioural training.

Perception is the process by which we recognise, interpret and give meaning to sensory information (NCERT §Perceptual Processes, p. 67). NCERT distinguishes two opposing processing approaches. In **bottom-up (data-driven) processing**, championed by **James Gibson**, recognition begins from the parts and builds up to the whole. In **top-down (concept-driven) processing**, championed by **Richard Gregory**, recognition begins from the whole — the perceiver's expectations and knowledge guide the identification of components. The perceiver's **motivation, expectations** (perceptual set), **cognitive styles** (**field dependent** — holistic; **field independent** — analytic) and **cultural background** all influence perception (NCERT §The Perceiver, pp. 67-68).

The **Gestalt psychologists** — **Wolfgang Köhler, Kurt Koffka** and **Max Wertheimer** — argued that perception is fundamentally of organised wholes rather than disconnected sensations and proposed the law of **prägnanz** or "good figure": cerebral processes are always oriented towards perceiving the most regular, organised form possible (NCERT §Principles of Perceptual Organisation, p. 69). The most primitive form of perceptual organisation is **figure-ground segregation** — the perceiver separates an object (figure) from its background (ground), as in Rubin's vase. The Gestalt grouping principles include **Proximity** (objects close together are grouped), **Similarity** (similar objects are grouped), **Continuity** (smooth continuations are preferred), **Smallness** (smaller areas tend to be seen as figure), **Symmetry** (symmetrical regions tend to be seen as figure), **Surroundedness** (surrounded areas are seen as figure), and **Closure** (incomplete figures are completed mentally) (NCERT pp. 70-71).

Depth and distance perception transforms two-dimensional retinal images into three-dimensional experience using two classes of cues. **Monocular (pictorial) cues** — available to one eye and used by artists — include **relative size, interposition/ overlapping, linear perspective, aerial perspective, light and shade, relative height** and **texture gradient**. **Motion parallax** is a **kinetic** monocular cue (it depends on movement) and is therefore not pictorial (NCERT §Monocular Cues, pp. 71-72). **Binocular (physiological) cues** depend on both eyes: **retinal/binocular disparity** (the difference between the two retinal images caused by the eyes' ~6.5 cm separation), **convergence** (the inward turning of the eyes for close objects, generated by eye muscles), and **accommodation** (the changing thickness of the lens by the ciliary muscle to focus on near or distant objects) (NCERT §Binocular Cues, p. 72).

Perceptual constancies — size, shape and brightness — keep our perception of objects stable despite changes in the retinal image: a friend walking away looks smaller on the retina but is perceived as the same size (NCERT §Perceptual Constancies, p. 73). **Illusions** are misperceptions arising from external stimulus situations and are also called "primitive organisations". Famous examples include the **Müller-Lyer illusion** (two lines of equal length appear unequal because of the orientation of arrowheads), the **vertical-horizontal illusion** (the vertical line is perceived as longer than an equal horizontal line) and the **phi-phenomenon** (apparent movement produced by motionless pictures presented in rapid succession) (NCERT §Illusions, pp. 73-74). Socio-cultural studies by **Segall, Campbell and Herskovits** (and corroborated by **Hudson, Sinha and Mishra**) show that perceptual habits are learnt: African subjects, used to forest verticality, are more susceptible to the vertical-horizontal illusion; Westerners, used to a "carpentered" right-angled world, are more susceptible to the Müller-Lyer illusion (NCERT §Socio-Cultural Influences on Perception, pp. 74-75).

2.2 Definitions to memorise

Term	Definition	Page
Sensation	Initial experience of a stimulus/object registered by a sense organ	62

Term	Definition	Page
Sense modality	A specialised sense organ that deals with a particular kind of stimulus	62
Absolute threshold (AL)	Minimum value of a stimulus required to activate a given sensory system (50% criterion)	62
Difference threshold (DL)	Minimum change in a physical stimulus capable of producing a sensation difference on 50% of trials	63
Kinesthetic sense	Deep sense providing information about body movement and position of body parts	62
Vestibular sense	Deep sense providing information about body posture and balance	62
Attention	Process through which certain stimuli are selected from a group of others	63
Selective attention	Selection of a limited number of stimuli from a large number	64
Sustained attention / Vigilance	Ability to maintain attention on an object or event for longer durations	65
Divided attention	Attending to more than one task at a time when one is highly practiced/automatic	64
Span of attention	Number of objects one can attend to at a brief exposure (Miller's 7 ± 2)	65
Perception	Process by which we recognise, interpret or give meaning to sense-organ information	67
Bottom-up processing	Recognition begins from parts and builds up to the whole (Gibson)	67
Top-down processing	Recognition begins from the whole and proceeds to identifying parts (Gregory)	67
Field dependent	Cognitive style favouring holistic, context-rich perception	68
Field independent	Cognitive style favouring analytic, context-poor perception	68
Pragnanz / Good figure	Gestalt principle that cerebral processes are oriented to perceive a regular, organised form	69
Figure-ground segregation	The most primitive form of perceptual organisation	69
Retinal/Binocular disparity	Difference between the two retinal images caused by the ~6.5 cm separation of the eyes	72
Convergence	Inward turning of the eyes to bring an image on each fovea; cue for depth	72
Accommodation	Change in lens thickness via ciliary muscle to focus the image on the retina	72

Term	Definition	Page
Perceptual constancy	Tendency for perceived properties of objects to remain stable despite changes in retinal image	73
Illusion	Misperception arising from misinterpretation of sensory information	73
Phi-phenomenon	Apparent-movement illusion produced by motionless pictures presented in succession	74

2.3 Diagrams / processes to remember

- **Fig. 4.1 — Sub-processes of perception (p. 67):** Stimulus → Sensory receptors → (Attention) → CNS (brain), learning, memory and other psychological processes → Perception. The diagram makes clear that perception is not pure data — attention and memory shape it.
- **Fig. 4.2 — Embedded-triangle item (p. 68):** Test stimulus for measuring **field-dependent vs field-independent** cognitive styles; participants must find a target shape hidden in a complex pattern.
- **Fig. 4.3 — Rubin's Vase (p. 69):** Classic figure-ground reversal — observers see either two faces or a vase but cannot see both at once, demonstrating that figure-ground segregation is a perceptual choice.
- **Figs. 4.4–4.10 — Gestalt grouping demonstrations (pp. 70-71):** Visual examples of Proximity, Similarity, Continuity, Smallness, Symmetry, Surroundedness and Closure.
- **Fig. 4.11 — Monocular cues (p. 71):** An avenue of trees showing interposition, relative size and linear perspective in a single image.
- **Fig. 4.12 — Texture gradient (p. 72):** Stones increasing in density and decreasing in size with distance — a strong monocular pictorial cue.
- **Fig. 4.13 — Müller-Lyer illusion (p. 74):** Line A appears shorter than line B though both are equal — Westerners are most susceptible.
- **Fig. 4.14 — Vertical-Horizontal illusion (p. 74):** Vertical line perceived as longer than equal horizontal line — African subjects are most susceptible.

2.4 Common confusions / NTA trap points

- Confusing absolute threshold (minimum stimulus to be detected) with difference threshold (minimum change between two stimuli). Both are defined at the 50% criterion.
- Mixing up the theorists — Broadbent (Filter, 1956), Triesman (Filter-attenuation, 1962), Johnston & Heinz (Multimode, 1978). NTA loves matching items here.
- Treating motion parallax as a pictorial monocular cue. NCERT explicitly says it is a kinetic monocular cue, hence NOT pictorial (p. 72).

- Bottom-up vs. top-down — bottom-up = parts → whole (data-driven); top-down = whole → parts (perceiver-driven). Distractors often swap these.
- The two "deep senses" are kinesthetic and vestibular — students sometimes wrongly add olfaction or balance as separate.
- Cross-cultural illusion finding: African subjects → greater horizontal-vertical illusion; Westerners (carpentered world) → greater Müller-Lyer illusion. Often inverted in MCQs.
- **Gestalt psychologists** are Köhler, Koffka and Wertheimer — students sometimes wrongly include Wundt or Titchener.
- **Field dependent = holistic** (sees the whole picture), **field independent = analytic** (extracts parts) — the labels can feel counter-intuitive.
- Convergence is muscular (eye muscles turning inward); accommodation is also muscular (ciliary muscle changing lens thickness); disparity is purely geometric (two slightly different retinal images). NTA mixes these.
- Phi-phenomenon ≠ stroboscopic motion in general use here; it specifically refers to apparent movement from still images in succession.

2.5 Thinkers and theories at a glance

Name	Theory / Contribution	Key idea	NCERT page
Donald Broadbent	Filter theory of selective attention (1956)	Bottleneck filter allows only one stimulus through at a time	64
Anne Treisman	Filter-attenuation theory (1962)	Unattended stimuli are weakened, not fully blocked	64-65
Johnston & Heinz	Multimode theory (1978)	Selection occurs at three stages — sensory, semantic, conscious	65
George Miller	Magic number 7 ± 2 (span of attention)	Span of immediate attention is about seven items, plus or minus two	65
Wolfgang Köhler	Co-founder of Gestalt psychology	Perception is of organised wholes; insight learning of chimpanzees	69
Kurt Koffka	Co-founder of Gestalt psychology	Application of pragnanz to perception and development	69
Max Wertheimer	Founder of Gestalt psychology	Pragnanz/good figure law; demonstrated apparent motion (phi-phenomenon)	69
James Gibson	Bottom-up processing	Recognition is data-driven, starting from parts to build the whole	67
Richard Gregory	Top-down processing	Recognition is concept-driven; expectations guide perception	67

Name	Theory / Contribution	Key idea	NCERT page
Segall, Campbell & Herskovits	Cross-cultural studies of illusions	African subjects more susceptible to vertical-horizontal illusion; Westerners to Müller-Lyer — perceptual habits are learnt	74-75

🎯 Practice MCQs

📊 PYQ Alignment

Sensory, attentional and perceptual processes is among the most consistently tested chapters in CUET Psychology — roughly 6–8 MCQs per year across CUET 2023–25, typically as definition recall (AL, DL, pragnanz), theorist-matching (Broadbent/Triesman/ Johnston–Heinz; Köhler/Koffka/Wertheimer), cue classification (monocular vs. binocular; pictorial vs. kinetic) and assertion-reason items on Gestalt principles and socio-cultural influences on illusions.

CUET 2024 — Actual PYQs from this chapter

Q.4 (CUET 2024) Which characteristic does not determine the effect of noise on task performance?

- A) Intensity B) Luminance C) Predictability D) Controllability Tests: Environmental influences — noise (Class XI link, but Variations chapter covers env stress — actually noise is in Variations? — UNCERTAIN, mapping to kepy104) Answer: Not in extracted key