WEAVE SPRINT · PAPER I

# General & Developmental Psychology

*The mind studied as theory: how each school explained perception, memory, thought, motivation and emotion; how each theory fixed the last one and left the next question open; and how the great developmental thinkers mapped a life from the first months to the settled self. One complete set of notes, built so you can tell the theories apart.*

CONTENTS


- Foundations
- General psychology
- The three depth-psychology schools
- Developmental psychology
- Discriminate
- Apply and consolidate



Dr. Wilfred D'souza · Dr. Niharika Reddy

WEAVE · CENTRE FOR INTEGRATIVE PSYCHIATRY

Weave
Centre for Integrative Psychiatry

WEAVE SPRINT
PSYCHIATRY OUTREACH PROGRAMME

# Psychiatry that listens before it prescribes.

*Therapy-informed psychiatry for adults, children, couples and families. Online across India, in person in Mumbai.*





## Assessments

ADHD, autism and developmental. Anxiety, mood, attention and personality patterns.



## Consultations and sessions

Psychiatric consultations, therapy sessions, medication review and couples sessions.



## Family Library

Free plain-language guides for families, in five languages.

`weave.clinic/family`

REFER, OR SEND SOMEONE OUR WAY

## Your patient contacts Weave directly and decides whether to book.

You remain the referring clinician. Any coordination between clinicians happens with the patient's permission.

CONTACT

`weave.clinic/contact`
`WhatsApp +91 7625004229`

Dr. Niharika Reddy and Dr. Wilfred D'souza, Consultant Psychiatrists. Runwal Forests Clinic, Kanjurmarg West, Mumbai, and online.

WEAVE.CLINIC

Routine referrals only. This is not an emergency route.

# Contents

Concept / rule  Key number  Trap


**Foundations** 4

1 Orientation: the schools of psychology as a map 4

**General psychology** 9

2 Perception and attention 9

3 Memory: types, processes and forgetting 18

4 Thinking, problem-solving and intelligence theories 26

5 Motivation theories 34

6 Emotion theories and neural circuits 41

7 Consciousness and altered states 47

8 Creativity and divergent thinking 56

9 Emotional intelligence 65

10 Sensory deprivation and the mind-body problem 70

**The three depth-psychology schools** 77

11 Freud and psychoanalysis 77

12 Adler and individual psychology 82

13 Jung and analytical psychology 89

**Developmental psychology** 95

14 Erikson psychosocial stages 95

15 Piaget cognitive development, Vygotsky and theory of mind 100

16 Kohlberg moral development 105

17 Attachment theory: Bowlby, Ainsworth and Harlow 110

18 Temperament: Thomas and Chess 117

19 Mahler separation-individuation 123

20 Language and motor developmental milestones 129

**Discriminate** 136

21 Discriminate: the theories side by side 136

**Apply and consolidate** 142

22 Apply: four psychology vignettes 142

23 Consolidate: mnemonic, retrieval and synthesis 148

**Previously asked** 154

**Quick review** 156

**References** ..... 159

**Index** ..... 161

# General & Developmental Psychology

Six sections · 23 topics · one complete notes document

Psychology is a Paper-1 staple because examiners test the *logic of the theories*, not just their conclusions. These notes are built to make each theory tell its own story: for every cognitive and affective topic you get the same shape, so the structure itself becomes a memory aid.

**Learn how the idea evolved, not just where it landed.** First the schools of thought as a map, then the general-psychology functions (perception, memory, thinking and intelligence, motivation, emotion, consciousness, creativity, emotional intelligence, the mind-body question), each told as a history: the early theory, what the next theory fixed and what it still argued about, the mechanism now accepted, its neural correlate and a worked example. Then the three great depth-psychology schools (Freud, Adler, Jung) and the developmental theorists (Erikson, Piaget, Kohlberg, attachment, temperament, Mahler, milestones), and finally the payoff figure that lays the stage theories side by side down one shared age axis. The examinable skill throughout is discrimination: telling James-Lange from Cannon-Bard, Piaget from Vygotsky, Freud from Jung, and reading a child by stage.

**HOW TO USE THESE NOTES**

Every general-psychology topic follows one fixed flow: the idea in brief, then the **theories in the order they appeared** (what each fixed, what stayed debated), then the **currently accepted mechanism**, then its **neural correlate**, then a worked example. Figures declare one axis and code it in colour and shape: **petrol** marks structure and the neutral relay, **coral** marks conflict, pathology or the point of debate, and **marigold** highlights the accepted answer. Watch for the boxes marked **Good to remember**: they gather every named theorist, stage, age and hard classification in one place so the reference facts sit apart from the reasoning.

## Foundations

### 1 · Orientation: the schools of psychology as a map

General and developmental psychology begins with a single most useful thing to fix before any of the detail, the **map**: psychology is not one theory of the mind but a small set of competing **lenses,** each of which explains behaviour by looking at a different **unit of analysis**. A biologist looks at the brain, a cognitivist at information flow, a behaviourist at the observable response, a psychodynamicist at the unconscious, a humanist at the striving self. The paper does not usually ask you to pick which school is *correct*; it asks you to recognise which lens a given claim, therapy, or experiment belongs to, and to know whose name sits under it. Almost every later topic on these notes (perception, memory, thinking, motivation, emotion, then the developmental theorists) is a special case of one or more of these lenses (Kaplan & Sadock 2024).

The second orienting idea, and the spine that recurs across these notes, is that the schools appeared in a **historical sequence** in which each usually fixed a gap the last one left open. Introspection could not be verified, so behaviourism banished the inner world and studied only

stimulus and response; behaviourism could not explain language or memory, so the cognitive revolution reopened the mind as information processing; none of the laboratory schools spoke to meaning or suffering, which is where the psychodynamic and humanistic traditions had always lived. Hold that as an *evolution of theories*, because most functions on these notes are best learned as the theory that came first, what it fixed, what it left debated, then the currently accepted account and its neural correlate. This orientation topic lays out the five lenses and previews the developmental theorists; the topics that follow pay them off.

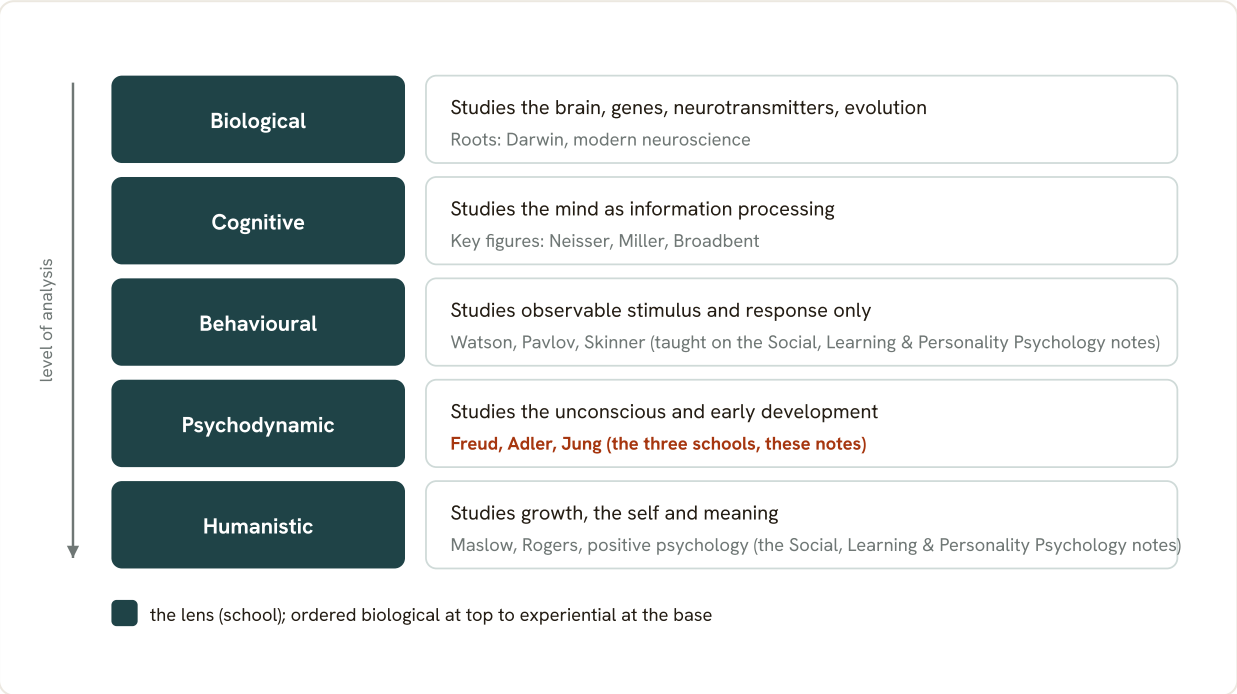



**Fig 4.1** The five schools of psychology as one map. Each lens defines its own unit of analysis and answers a different question about the same mind, and each historically arose partly to fix what the previous lens left out: behaviourism against introspection, the cognitive revolution against radical behaviourism, humanistic psychology against both. These notes teach the three depth-psychology schools (Freud, Adler, Jung) in full and the developmental theorists; behaviourism, social psychology and the rest of personality theory are the Social, Learning & Personality Psychology notes.

## 1.1 Why a map, not a list: the mind through competing lenses

**Each school is defined by its unit of analysis.** The reason five schools coexist rather than one replacing all others is that they answer different questions about the same behaviour, and each is strongest exactly where the others are silent. A useful discipline for the viva is to ask, of any statement about the mind, "at what level is this explanation pitched?": molecules and circuits (biological), representations and computations (cognitive), observable contingencies (behavioural), unconscious conflict and early development (psychodynamic), or growth, agency and meaning (humanistic). The same clinical fact, say a patient's low mood, is a serotonergic and limbic-circuit story to the biological lens, a negative cognitive schema to the cognitive lens, a loss of reinforcement to the behavioural lens, an unresolved loss turned inward to the psychodynamic lens, and a blocked need for self-actualisation to the humanistic lens. None is wholly wrong; the exam skill is naming the lens (Kaplan & Sadock 2024; Companion to Psychiatric Studies 2010).

## 1.2 The five lenses as a map

**Bind each school to its unit of analysis and its key figures.** This is the schema for the whole set of notes: read the school, hold its unit of analysis (what it counts as data), and attach the names examiners expect. Behaviourism gets its full treatment on the Social, Learning & Personality Psychology notes (learning theory, social and personality psychology); the humanistic school and its modern descendant, positive psychology, are also opened deeper on the Social, Learning & Personality Psychology notes.

### Biological (biopsychology)

Unit of analysis: the mind *as brain*. Behaviour is explained by genes, neurotransmitters, hormones, neural circuits, and evolutionary pressures. Data are physiological. This lens underwrites the whole of the Neurochemistry, Neuroendocrinology, Neuroimaging & Basic Psychopharmacology notes and the Psychiatric Genetics notes (neuroanatomy, neurochemistry, genetics) and the neural-correlate step of every function. Key roots: Darwin (evolution), Sherrington and the neurophysiologists; in psychiatry it is the dominant explanatory frame.

### Cognitive

Unit of analysis: the mind *as information processing*. The mind takes input, encodes, stores, retrieves and transforms it, and produces output, on the deliberate analogy of a computer (the **computer metaphor**). Key figure: Ulric Neisser, whose *Cognitive Psychology* (1967) named and consolidated the field. Underwrites perception, attention, memory, thinking and language, and the cognitive model of therapy.

### Behavioural

Unit of analysis: *only observable stimulus and response*. The inner mind is treated as a black box; learning is the lawful change in behaviour produced by conditioning. Key figures: John B. Watson (who launched behaviourism in 1913 and demanded psychology study only observable behaviour) and B. F. Skinner (operant conditioning). Fuller treatment on the Social, Learning & Personality Psychology notes.

### Psychodynamic

Unit of analysis: *unconscious drives and early development*. Behaviour is driven by conflict among unconscious forces laid down in childhood. Key figures: Sigmund Freud (psychoanalysis, the structural and psychosexual models), Alfred Adler (individual psychology, inferiority and striving), Carl Jung (analytical psychology, the collective unconscious and archetypes). Underwrites psychodynamic formulation and defence mechanisms.

### Humanistic

Unit of analysis: *growth, meaning and the self*. The person is an agent striving toward self-actualisation, studied from the inside (phenomenology) rather than reduced to reflexes or drives. Key figures: Abraham Maslow (hierarchy of needs, self-actualisation) and Carl Rogers (client-centred therapy, unconditional positive regard). Its modern scientific descendant is **positive psychology** (Martin Seligman), which studies well-being, strengths and flourishing. Deeper on the Social, Learning & Personality Psychology notes.

RULE **Name the lens, not the verdict.** The paper rarely asks which school is correct; it asks which unit of analysis a given claim, therapy or experiment belongs to, and whose name sits under it.

HOLD THIS

**Five lenses, five units of analysis, five images.** Biological = brain, cognitive = computer, behavioural = black box, psychodynamic = iceberg, humanistic = growing self. Attach the right image and lead name and you have placed the school.

PEARL

The five lenses in one line: the biological lens sees a *brain*, the cognitive lens sees a *computer*, the behavioural lens sees a *black box*, the psychodynamic lens sees an *iceberg*, and the humanistic lens sees a *growing self*. If you can attach the right image and the right lead name to a claim, you have placed the school.

### 1.3 The schools appeared in order, each fixing the last one's gap

**Read the schools as an evolution, not a menu.** The historical arc is itself examinable and it explains why the field looks as it does. The earliest scientific psychology (Wundt's 1879 Leipzig laboratory, and the introspectionism and structuralism of Wundt and Titchener) tried to catalogue conscious experience by trained self-report; it foundered because introspection could not be independently verified. Behaviourism (Watson 1913, then Skinner) fixed that by refusing to talk about the unobservable mind at all and studying only stimulus and response, which bought rigour at the cost of ignoring meaning, memory and language. The **cognitive revolution** of the 1950s to 1960s (crystallised by Neisser 1967) reopened the black box, arguing that the mind can be studied scientifically *as* information processing without abandoning rigour. Running alongside the laboratory tradition, the psychodynamic school (Freud, from the 1890s) had always addressed the unconscious and development, and the humanistic school (Maslow and Rogers, mid-twentieth century) arose as an explicit "third force" reacting against both behaviourism's mechanism and psychoanalysis's pessimism, insisting on agency and growth. Positive psychology (Seligman, from 1998) is the humanistic impulse rebuilt on empirical method (Kaplan & Sadock 2024).

### 1.4 The developmental theorists, previewed side by side

**Four stage theorists run down one age axis.** The second half of this material is developmental psychology, and its core is a small set of theorists who each carved the lifespan into stages, but along *different dimensions*. Previewing them together now prevents the commonest error, which is blurring one theorist's stage into another's at the same age. Freud staged **psychosexual** development by the body zone of libidinal focus; Erikson restaged the whole lifespan as **psychosocial** crises, each a tension to be resolved; Piaget staged **cognitive** development by how the child constructs knowledge; Kohlberg extended Piaget into **moral** reasoning. They share an age scaffold but measure different things, and the discriminate topic later on makes you place a described behaviour with the correct theorist. Attachment (Bowlby and Ainsworth), temperament (Thomas and Chess), and separation-individuation (Mahler) sit alongside them as the relational and constitutional strands.

| ROUGH AGE | FREUD (PSYCHOSEXUAL) | ERIKSON (PSYCHOSOCIAL) | PIAGET (COGNITIVE) | KOHLBERG (MORAL) |
|---|---|---|---|---|
| **Infancy (0 to ~1.5 yr)** | **Oral** | Trust vs mistrust | **Sensorimotor** | (pre-moral) |
| **Toddler (~1.5 to 3 yr)** | **Anal** | Autonomy vs shame and doubt | Sensorimotor into preoperational | Preconventional |
| **Preschool (~3 to 6 yr)** | **Phallic (Oedipal)** | Initiative vs guilt | **Preoperational** | Preconventional |
| **School age (~6 to 11 yr)** | Latency | Industry vs inferiority | **Concrete operational** | Conventional |
| **Adolescence (~12 yr on)** | Genital | **Identity vs role confusion** | **Formal operational** | Postconventional |
| **Adulthood** | Genital (mature sexuality) | **Intimacy, then generativity, then integrity** | (formal operational persists) | Postconventional |

The developmental theorists on one age axis: same scaffold, different dimensions (body zone, social crisis, cognition, moral reasoning). Exact stage boundaries and full descriptions are paid off in the developmental topics; here, hold the parallelism.

### 1.5 How these notes is wired to the rest of the paper

**Know where each thread is finished.** This orientation deliberately opens more than it closes, so keep the cross-references straight. Behaviourism (classical and operant conditioning, learning theory), social psychology and personality theory are given full treatment on the Social, Learning & Personality Psychology notes; the humanistic school and positive psychology also go deeper there. Psychological testing, intelligence measurement and the psychometric properties of scales are the Psychometry, Assessment and Descriptive Psychopathology notes. In these notes, the general-psychology functions (perception, memory, thinking and intelligence, motivation, emotion) each run as an evolution of theories ending in the currently accepted mechanism and its neural correlate, and the developmental theorists each run as a stage model ending in a good-to-remember box. Treat this topic as the index page you flip back to whenever a later claim needs placing on the map.

MNEMONIC

**Big Cats Bite Prey Hungrily**

The five lenses in appearance-and-argument order: **B**iological, **C**ognitive, **B**ehavioural, **P**sychodynamic, **H**umanistic. Big (Biological, the brain) Cats (Cognitive, the computer) Bite (Behavioural, the black box) Prey (Psychodynamic, the iceberg) Hungrily (Humanistic, the growing self). This is the master mnemonic for these notes: every general-psychology function can be interrogated through these five, in this order, and the letters also seed the structure of the material.

**GOOD TO REMEMBER**

- **Biological lens:** unit = the brain (genes, neurotransmitters, circuits, evolution); roots in Darwin and neurophysiology; the dominant frame in psychiatry.
- **Cognitive lens:** unit = information processing; the computer metaphor; Ulric Neisser, *Cognitive Psychology* (1967).
- **Behavioural lens:** unit = observable stimulus and response; John B. Watson (behaviourism launched 1913) and B. F. Skinner (operant conditioning); full treatment the Social, Learning & Personality Psychology notes.
- **Psychodynamic lens:** unit = unconscious drives and early development; Sigmund Freud (psychoanalysis), Alfred Adler (individual psychology, inferiority), Carl Jung (analytical psychology, archetypes).
- **Humanistic lens:** unit = growth, meaning and the self; Abraham Maslow (hierarchy of needs) and Carl Rogers (client-centred therapy); modern descendant = positive psychology (Martin Seligman); deeper the Social, Learning & Personality Psychology notes.
- **Positive psychology:** Seligman, from 1998; empirical study of well-being, strengths and flourishing.
- **Historical arc:** Wundt's first psychology laboratory, Leipzig 1879; introspection to behaviourism (Watson 1913) to the cognitive revolution (Neisser 1967); humanistic school as the "third force".
- **Freud (psychosexual):** oral, anal, phallic, latency, genital; staged by body zone of libidinal focus.
- **Erikson (psychosocial):** eight stages of paired crises across the whole lifespan (e.g. trust vs mistrust in infancy, identity vs role confusion in adolescence).
- **Piaget (cognitive, 1896 to 1980):** sensorimotor, preoperational, concrete operational, formal operational.
- **Kohlberg (moral):** preconventional, conventional, postconventional; an extension of Piaget into moral reasoning.
- **Relational and constitutional strands:** attachment (Bowlby and Ainsworth), temperament (Thomas and Chess), separation-individuation (Mahler).

## General psychology

### 2 · Perception and attention

Perception is the exam's most philosophically loaded psychological function, and the one whose theory maps most directly onto psychopathology. The theme of the whole topic is a single argument that runs across a century: whether what we perceive is *read off* the world (data-driven, **bottom-up**) or *constructed* by the brain from expectation (concept-driven, **top-down**), a debate that resolves, in the currently accepted view, into perception as a prediction. That resolution is not academic trivia; it is the mechanistic spine of the modern account of the **hallucination**, which is why this topic carries a dedicated theories-of-hallucinations block at its close. **Learn the debate, and the hallucination theories fall out of it.**

The topic follows the standard evolution-of-theories flow: first the psychophysics that quantified sensation, then the perceptual theories in the order they appeared, each fixing a flaw in the last, then the currently accepted predictive account, its neural correlate in the sensory-association cortex and the two visual streams, a worked example, and finally the parallel evolution of hallucination theory. Attention is folded in as its own theory-sequence, because in the modern

view attention is precisely the mechanism that weights bottom-up against top-down. Ground text is Kaplan and Sadock (2024) and the New Oxford Textbook of Psychiatry for the descriptive scaffold.

### 2.1 Sensation versus perception: the two-stage definition

**Sensation.** Sensation is the transduction of physical energy at a receptor into a neural signal: light on the retina, pressure on the skin, molecules at the olfactory epithelium. It is bottom-up by definition and largely passive. **Perception** is the active organisation and interpretation of those raw sensations into a meaningful representation of objects and events. The classic exam line is that *sensation is what the sense organ registers, perception is what the mind makes of it*. The distinction matters clinically because the disorders divide along it: a sensory deficit (deafness) sits at the sensation stage, whereas an illusion or hallucination is a disorder of the perceptual stage with the sensory apparatus often intact (Kaplan and Sadock 2024).

**Sensation**
Receptor-level transduction of a physical stimulus into a neural signal; passive, bottom-up, modality-specific.

**Perception**
Active organisation and interpretation of sensory data into meaningful percepts; combines bottom-up input with top-down knowledge.

**Percept**
The finished mental representation of an object or event, the output of perception.

### 2.2 Psychophysics I: absolute and difference thresholds, Weber-Fechner

Psychophysics, founded by Gustav Fechner in 1860, is the quantitative study of the relation between physical stimulus magnitude and perceived sensation. Two thresholds anchor it. The **absolute threshold** is the smallest stimulus intensity detectable 50 per cent of the time (the criterion of half the trials is the examinable detail, since detection is probabilistic, not all-or-none). The **difference threshold**, or just-noticeable difference (JND), is the smallest change in a stimulus that can be detected 50 per cent of the time.

**Weber's law (1834).** Ernst Weber found the JND to be a constant fraction of the baseline stimulus, not a fixed absolute amount: the ratio of the change to the baseline (delta-I over I) equals a constant k, the Weber fraction, specific to each sensory dimension. Adding 50 grams to a 1 kg weight is just noticeable; on a 100 gram weight the same 50 grams is glaring, because the fraction, not the absolute amount, governs detection. **Fechner's law** then integrated Weber's law to state that sensation grows as the logarithm of stimulus intensity, so equal ratios of stimulus produce equal steps of sensation. The examinable refinement is **Stevens's power law (1957)**, which replaced the logarithm with a power function that fits a wider range of modalities, expanding for pain and contracting for brightness. What Weber-Fechner fixed was the naive assumption of a linear stimulus-to-sensation map; what it left debated was whether a fixed threshold even exists, a question signal detection theory answered next.

### 2.3 Psychophysics II: signal detection theory, d-prime and criterion

**Signal detection theory** (Green and Swets 1966) is the single most important quantitative idea in this topic and a recurring exam favourite, because it dissolves the notion of a fixed threshold. Its claim is that every detection is a decision made against a noisy background, so performance factors into two independent components: *sensitivity* and *bias*. On each trial the observer's internal signal falls somewhere on a continuum; the observer sets a decision **criterion** and says "signal present" whenever the internal evidence exceeds it. This yields the four-cell outcome that must be reproducible on demand: a *hit* (signal present, said yes), a *miss* (present, said no), a *false alarm* (absent, said yes), and a *correct rejection* (absent, said no).

| MEASURE | WHAT IT CAPTURES | MOVED BY |
|---|---|---|
| **d-prime (d')** | **Sensitivity: the separation between the signal and noise distributions, a pure measure of the perceptual system's discriminability** | Stimulus strength, acuity, attention, fatigue; NOT by motivation |
| **Criterion (beta or c)** | **Response bias: where the observer places the yes/no cut-off, independent of sensitivity** | Payoffs, expectations, base rates; a liberal criterion raises hits and false alarms together, a conservative one lowers both |

The two orthogonal parameters of signal detection theory: d-prime is what the system can discriminate, criterion is how willing the observer is to say yes.

The clinical payoff is large. A patient who reports faint voices may have a genuine perceptual change (raised d-prime for that content) or merely a lowered criterion (a bias to say "yes, I hear it"), and the two demand different formulations. Signal detection theory fixed the fixed-threshold error of classical psychophysics and, crucially, was the first framework to make the perceiver's *expectation and bias* a formal, measurable part of perception, prefiguring the top-down and predictive theories that follow.

**TRAP** d-prime is **sensitivity** (moved by stimulus strength, acuity, attention, not motivation); criterion is **response bias** (moved by payoffs, expectations, base rates). Do not let a lowered criterion be mistaken for a genuine perceptual change.

### 2.4 Theory era 1: Wundt, structuralism and introspection

Scientific perception research begins with Wilhelm Wundt's Leipzig laboratory (1879) and the school of **structuralism** (formalised by his student Titchener). Its method was *introspection*: trained observers reported the elementary sensations, images and feelings composing a conscious experience, on the assumption that perception could be decomposed into atomic sensory elements, much as chemistry decomposes compounds. What structuralism fixed was the pre-scientific vagueness of the mind, giving psychology a laboratory method. What it left fatally debated was reliability and reductionism: introspective reports could not be verified between observers, and, more damagingly, perception plainly showed properties that were not present in any of the parts, an objection the Gestalt school turned into a whole movement.

### 2.5 Theory era 2: Gestalt organisation, the whole over the parts

**Gestalt psychology** (Wertheimer, Kohler and Koffka, from 1912) is the highest-yield perception theory for the exam and must be reproducible with its laws. Its founding claim, against structuralism, is that *the whole is different from the sum of its parts*: a percept is an emergent, integrated configuration (a Gestalt) that the brain organises spontaneously by self-organising field forces. The master principle is the **law of Prägnanz** (the minimum principle): the perceptual system settles into the simplest, most stable, most regular organisation the stimulus allows. From it descend the grouping laws.

#### Figure-ground

The visual field is split into a bounded figure and a receding ground; the reversible Rubin vase shows the split is perceptual, not in the stimulus.

#### Proximity

Elements near one another are grouped together.

#### Similarity

Elements alike in colour, shape or size are grouped together.

#### Closure

The system completes incomplete contours into whole, closed figures.

#### Good continuation

Elements arranged along a smooth line or curve are grouped as a continuous form.

#### Common fate

Elements moving together in the same direction are grouped together.

What Gestalt fixed was structuralism's atomism, establishing that perception is actively organised and that organisation follows lawful rules. What it left debated was mechanism: the "global field forces" were never specified and the minimum principle could not be quantified or made to yield testable predictions, so the school declined through the 1950s and 1960s. The unresolved question, then, was the source of the organising rules, and it split into two opposed answers: are they built into the incoming stimulation (Gibson) or imposed by the brain's knowledge (Gregory)? That is the bottom-up versus top-down fork, and it is the heart of the topic.

### 2.6 Theory era 3a: Gibson's direct, bottom-up perception (affordances)

James Gibson's **ecological theory of direct perception** (1966, 1979) is the purest **bottom-up**, data-driven position. Gibson argued that the optic array reaching the eye is already so rich in structure (texture gradients, optic flow, invariants that stay constant as the observer moves) that perception needs no inference, no hypothesis and no stored knowledge: the information is *directly picked up* from the environment. His signature concept is the **affordance**, the action possibility an object offers an organism directly and without deliberation: a chair affords sitting, a handle affords grasping, a cliff-edge affords falling. What Gibson fixed was the poverty-of-the-stimulus assumption that had made perception seem to require guesswork; he showed the ambient array is information-rich and that behaviour in the natural world is often immediate. What he left debated was the equally obvious fact that perception is frequently wrong,

ambiguous or illusory, that we can see two things in one figure, and that expectation demonstrably shapes what we see, all of which a purely direct theory struggles to explain.

### 2.7 Theory era 3b: Gregory's constructivist, top-down perception (perception as hypothesis)

Richard Gregory's **constructivist theory** (1970, 1980) takes the opposite, **top-down**, concept-driven view, reviving Helmholtz's nineteenth-century idea of perception as *unconscious inference*. Gregory's claim is that the retinal image is impoverished and ambiguous, so perception must be an active construction: the brain forms a *perceptual hypothesis*, its best guess about the distal cause, using prior knowledge and expectation, and the percept is that hypothesis, not the raw data. His strongest evidence is precisely the phenomena Gibson could not handle: visual illusions (the Müller-Lyer, the Ponzo, the hollow-mask illusion where a concave face is seen as convex because faces are always convex in experience), and the way a percept flips when the hypothesis changes. What Gregory fixed was the inability of direct perception to explain error, ambiguity and the manifest influence of knowledge on seeing. What he left debated was the reverse problem: if perception is all hypothesis, why is it so fast, so accurate and so stable in the ordinary rich world where Gibson is clearly right? The enduring debate, bottom-up data versus top-down concept, is not resolved by choosing a side but by combining them, which is the modern answer.

### 2.8 Attention: the theories in time, from early filter to capacity

Attention is the selection and prioritisation of some information for deeper processing at the expense of the rest, and its theory ran a parallel evolution over exactly where in the processing stream selection happens. The exam wants the four models in order with their author and their locus of selection.

| MODEL (AUTHOR, YEAR) | LOCUS OF SELECTION | WHAT IT FIXED / LEFT OPEN |
|---|---|---|
| **Broadbent early-filter (1958)** | **Early, before meaning: a bottleneck filters by physical features (ear, pitch) and unattended input is blocked before semantic analysis** | Explained selective listening; could not explain why your own name breaks through from the unattended channel (the cocktail-party effect) |
| **Treisman attenuation (1964)** | **Early but graded: the filter attenuates rather than blocks the unattended channel; high-salience words with low thresholds still get through** | Fixed Broadbent's leak; left unclear how much late semantic processing really occurs |
| **Deutsch and Norman late-selection (1963, 1968)** | **Late, after meaning: all input is analysed for meaning, and selection happens only at the response/memory stage** | Accounted for semantic breakthrough; criticised as metabolically wasteful and hard to reconcile with clear early limits |
| **Kahneman capacity/resource (1973)** | **Not a fixed locus at all: attention is a limited pool of mental effort flexibly allocated; selection is early or late depending on load and arousal** | Dissolved the early-late war into a resource question; foreshadowed load theory (Lavie) |

The attention sequence: the debate migrated from where the filter sits (Broadbent to Deutsch-Norman) to how much resource is available (Kahneman), the modern framing.

**The clinical taxonomy of attention** layered on top: *selective* attention (focusing on one stream and ignoring distractors, the cocktail party), *divided* attention (splitting resources across tasks, degraded by load), and *sustained* attention or vigilance (holding focus over time, the deficit probed by the Continuous Performance Test and impaired in ADHD and delirium). In the predictive framework below, attention is reconceived as the mechanism that sets the *weight* given to incoming sensory evidence relative to prior expectation, which ties the attention story directly into perception.

### 2.9 Currently accepted: perception as prediction (predictive processing)

The **currently accepted** account, predictive processing or the Bayesian-brain framework (Friston 2010; Clark 2013), synthesises the whole century of debate. The brain is a hierarchical prediction machine: higher levels continuously generate *top-down predictions* (priors) about the causes of sensory input, these predictions are compared against the actual *bottom-up sensory signal*, and only the mismatch, the **prediction error**, is passed up to revise the model. Perception is the brain's best hypothesis (Gregory) constrained by the rich sensory array (Gibson), settling on the interpretation that best explains the data with the least error (a formalisation of Gestalt's Prägnanz as maximising the Bayesian posterior). The relative influence of prior and evidence is set by their *precision* (reliability), and precision-weighting is exactly what attention does: attending to a stimulus raises the precision, and therefore the gain, of its sensory prediction error. This single framework absorbs signal detection theory (criterion is the prior, d-prime is precision-weighted evidence), the bottom-up/top-down fork (both, hierarchically combined), and the attention models (precision allocation), which is why it has become consensus.

RULE **Perception is precision-weighted prediction.** The brain balances bottom-up evidence against top-down priors, and attention is exactly the precision-weighting that sets which one wins.

### 2.10 Neural correlate: primary versus association cortex, the two streams

The **neural correlate** of the sensation-to-perception pipeline maps cleanly onto the cortical hierarchy. *Primary sensory cortex* (striate cortex V1 for vision, Heschl's gyrus A1 for hearing, postcentral gyrus S1 for touch) performs the first, feature-level, bottom-up analysis: orientation, edges, frequency. *Association (secondary and higher) cortex* integrates these features across modalities and with memory into meaningful percepts; a lesion here produces an *agnosia*, a failure to recognise with intact primary sensation. Above V1 the visual pathway splits into the two anatomically and functionally distinct streams first described by Ungerleider and Mishkin (1982):

#### Ventral "what" stream

Occipitotemporal, V1 to inferotemporal cortex: object identity, recognition, form and colour. Its damage yields visual agnosia and prosopagnosia.

#### Dorsal "where/how" stream

Occipitoparietal, V1 to posterior parietal cortex: spatial location, motion, and the visual guidance of action. Its damage yields optic ataxia and, with wider parietal injury, hemispatial neglect.

In the predictive scheme, feedforward connections up the hierarchy carry prediction error while feedback connections carry top-down predictions, and the salience network (anterior insula and dorsal anterior cingulate) with striatal dopamine sets the precision or salience assigned to signals, the node that fails in psychosis (Kaplan and Sadock 2024).

### 2.11 Worked example: the hollow-mask and a footstep on the stairs

Two everyday demonstrations make the predictive account concrete. **The hollow-mask illusion.** Look at the concave (hollow) back of a face mask and you see it as a normal convex face bulging toward you. The bottom-up sensory data (shading, disparity) correctly specify a hollow surface, but the lifelong prior that "faces are convex" is so strong and high-precision that it overrides the evidence: perception goes with the hypothesis, a direct visualisation of top-down priors winning. The examinable clinical hook is that people with schizophrenia are notably *less* susceptible to this illusion, seeing the true hollow shape, consistent with weakened perceptual priors, which is the mechanism the hallucination theories exploit. **The footstep at night.** Home alone, expecting no one, a creak on the stairs is heard as footsteps and a heart-pounding percept of an intruder; the same creak by day is nothing. Identical sensory input, different prior (and a lowered criterion under fear, in signal detection terms), yielding a different percept, which is perception as prediction in one sentence.

### 2.12 Theories of hallucinations and their evolution

A **hallucination** is a percept arising without a corresponding external stimulus, experienced with the full force and clarity of a true perception and located in external (objective) space. The full descriptive taxonomy of the disorders of perception (illusions, the pseudohallucination, functional, reflex, extracampine and autoscopic phenomena, and the modality-specific patterns) belongs to the Psychometry, Assessment and Descriptive Psychopathology notes and is treated there in detail (cross-ref: Descriptive Psychopathology, Disorders of Perception). What belongs *here*, as the culmination of the perception theories above, is the mechanism and how the explanation of the hallucination evolved, each theory fixing a defect in the last, ending in the same predictive framework that closed the perception debate.

**1. Perceptual-release theory (Hughlings Jackson 1889; West 1962).** The oldest neurological account. John Hughlings Jackson proposed a hierarchy in which higher centres normally inhibit lower ones; when higher control is lost (release), lower-level activity is disinhibited and emerges into consciousness. Louis JWest (1962) developed this into the perceptual-release hypothesis: normally, a steady stream of sensory input suppresses stored perceptual traces (memories, images) from reaching awareness; when either sensory input falls (sensory deprivation, eye disease, deafness) or arousal-gating fails, these stored images are *released* and experienced as hallucinations. It elegantly explains the Charles Bonnet hallucinations of the blind, hypnagogic imagery, sensory-deprivation and peduncular hallucinations. What it fixed was the naive idea that a hallucination needs an abnormal stimulus. What it left debated was the specifically psychotic hallucination, where sensory input is intact, and the question of *why* a released image is misattributed to the outside world.

**2. Source-monitoring failure (Frith 1992).** The cognitive account for psychosis. Christopher Frith proposed that the auditory verbal hallucination is inner speech (subvocal self-talk) that the patient fails to recognise as self-generated. The failure is one of *source monitoring*: a breakdown of the efference-copy or corollary-discharge signal by which the brain normally tags its own motor and cognitive acts as self-produced, so that self-generated inner speech is misattributed to an external agent. This is why the classic hallucinated voice is in the second or third person and often commenting: it is the patient's own thought, disowned. What it fixed was perceptual release's silence on intact-input psychosis, giving a specific self-versus-other mechanism. What it left debated was the emotional charge and the compelling reality of the voice, and it fit awkwardly with non-verbal and visual hallucinations.

**3. Dopaminergic aberrant salience (Kapur 2003).** The neurochemical bridge from biology to phenomenology. Building on the finding that midbrain dopamine neurons code reward prediction error and thereby assign *incentive salience* to stimuli (Schultz 1997), Shitij Kapur proposed that in psychosis dysregulated striatal dopamine fires chaotically and assigns **aberrant salience** to internal and external stimuli that do not merit it. Neutral events, thoughts and percepts become urgently, inexplicably significant; hallucinations are the direct experience of aberrant salience attached to a percept, and delusions are the cognitive effort to explain that unbidden significance. It powerfully unifies the pharmacology (antipsychotics are D2 blockers), the prodromal "delusional mood," and the salience of psychotic symptoms. What it fixed was the mechanistic gap between the dopamine hypothesis and lived experience. What it left debated was the finer computational question of *why* salience becomes aberrant, answered by the next account.

**4. Predictive-coding / predictive-processing account (Fletcher and Frith 2009; Corlett, Powers, Sterzer, and colleagues, 2010s).** The **currently accepted**, integrative mechanism, and the one to lead with. Within the Bayesian-brain framework of 2.9, a hallucination is a percept dominated by an *over-weighted prior*: when top-down predictions are given excessive precision relative to bottom-up sensory evidence, the brain "hears" or "sees" what it expects even in the absence of, or against, the sensory data. Powers and Corlett's conditioned-hallucination experiments demonstrate this directly, showing that people prone to hallucinations over-rely on priors. This single account subsumes its predecessors: perceptual release is the special case where *weak* sensory input lets priors dominate; source-monitoring failure is a miscomputed prediction about the agency of self-generated signals (a failed forward model); and aberrant salience is aberrant precision-weighting of prediction errors driven by dopamine. The hollow-mask finding (2.11), reduced illusion susceptibility in schizophrenia, is the same story seen from the perceptual side. Perception is prediction; the hallucination is prediction unmoored from evidence.

- **Perceptual release** - Hughlings Jackson 1889, West 1962; reduced input plus lost gating releases stored images.
- **Source-monitoring failure** - Frith 1992; inner speech misattributed as external via failed efference copy.
- **Aberrant salience** - Kapur 2003; dysregulated dopamine assigns undue salience; antipsychotics are D2 blockers.

- **Predictive coding** - Fletcher and Frith 2009; over-weighted priors override evidence; the currently accepted account that unifies the earlier three.

HOLD THIS

**The hallucination is an over-weighted prior overriding sensory evidence.** The four theories are a historical progression (perceptual release, source-monitoring failure, aberrant salience, predictive coding), not rivals, and predictive coding unifies them.

COMMON TRAP

Do not conflate the four hallucination theories as rivals to be chosen between; the exam rewards showing they are a *historical progression* that the predictive-coding account finally unifies. Also keep the two "Friths" straight in your head: the source-monitoring model is Christopher Frith's cognitive theory; the predictive-coding synthesis is Fletcher and Frith (2009), same Chris Frith, later work. And note perceptual release predicts hallucinations from *reduced* input (blindness, deafness), the opposite of what a naive "overstimulation" guess would say.

PEARL

The whole topic is one idea told twice. In normal perception the brain balances bottom-up evidence against top-down priors, weighted by precision (attention). In hallucination that balance tips toward the prior. Every theory on the page, from signal detection's criterion to Kapur's aberrant salience, is a statement about where that balance sits and what moves it. If you can say "perception is precision-weighted prediction, and psychosis is a precision failure," you can reconstruct the rest.

**GOOD TO REMEMBER**

- **Fechner (1860):** founded psychophysics; absolute threshold = detected 50% of the time.
- **Weber (1834):** JND is a constant fraction of the baseline stimulus (delta-I / I = k, the Weber fraction).
- **Fechner's law:** sensation grows as the logarithm of stimulus intensity; Stevens (1957) refined it to a power law.
- **Signal detection theory (Green and Swets 1966):** d-prime = sensitivity; criterion = response bias; hit / miss / false alarm / correct rejection.
- **Wundt (1879), Titchener:** structuralism, introspection, elementary sensations; failed on reliability and reductionism.
- **Gestalt (Wertheimer, Kohler, Koffka, 1912):** whole differs from the sum of parts; law of Prägnanz; figure-ground, proximity, similarity, closure, good continuation, common fate.
- **Gibson (1966/1979):** direct, bottom-up perception; affordances; optic array is information-rich.
- **Gregory (1970):** constructivist, top-down perception; perception as unconscious inference and hypothesis; explains illusions.
- **Broadbent (1958):** early-filter attention (physical features, before meaning).
- **Treisman (1964):** attenuation (unattended channel dampened, not blocked).
- **Deutsch and Norman (1963/1968):** late selection (all input analysed for meaning, selection at response).
- **Kahneman (1973):** capacity/resource model of attention (limited effort, flexibly allocated).
- **Attention types:** selective (cocktail party), divided (load-limited), sustained (vigilance, CPT, ADHD/delirium).
- **Predictive processing (Friston 2010; Clark 2013):** currently accepted; hierarchical priors vs prediction error, precision-weighting = attention.
- **Neural correlate:** primary sensory cortex (V1/A1/S1) = features; association cortex = meaning (lesion = agnosia); ventral "what" (occipitotemporal) vs dorsal "where/how" (occipitoparietal), Ungerleider and Mishkin (1982).
- **Perceptual release (Hughlings Jackson 1889; West 1962):** lost higher inhibition + reduced sensory input releases stored images (Charles Bonnet, sensory deprivation).
- **Source-monitoring failure (Frith 1992):** inner speech misattributed as external via failed efference copy.
- **Aberrant salience (Kapur 2003):** dysregulated dopamine assigns undue salience; delusion explains it; antipsychotics = D2 block.
- **Predictive-coding hallucination (Fletcher and Frith 2009; Corlett, Powers, Sterzer):** over-weighted priors override sensory evidence; unifies the earlier three.

## 3 · Memory: types, processes and forgetting

Memory is the set of processes by which experience is **encoded**, held over time (**storage**), and later brought back into use (**retrieval**). It is not one faculty but a family of dissociable systems, and the history of the field is the story of that family being progressively subdivided: from Ebbinghaus measuring one homogeneous "memory" as a decaying trace, to the boxes-and-arrows stores of the multi-store model, to the componential working memory that replaced the single short-term box, to Tulving's taxonomy of long-term systems that a single amnesic brain can double-dissociate. **Read the topic as an evolution, not a list.** Each model is best understood by what it fixed in its predecessor and what it left unsettled for the next, and the whole argument is anchored in one patient whose surgery in 1953 proved the divisions are real in tissue.

For the exam, the payload is fourfold: the ordered theories with their named authors and the specific findings that forced each revision; the taxonomy of long-term memory (episodic, semantic, procedural; declarative versus non-declarative; explicit versus implicit); the four mechanisms of forgetting plus the modern twist that retrieval itself destabilises a memory (reconsolidation, the misinformation effect); and the neural correlate that maps each memory system onto a distinct structure. The functions cross-refer directly to the Functional Neuroanatomy & Neurophysiology notes synaptic plasticity: the cellular basis of the encoding described here is long-term potentiation in the hippocampus.

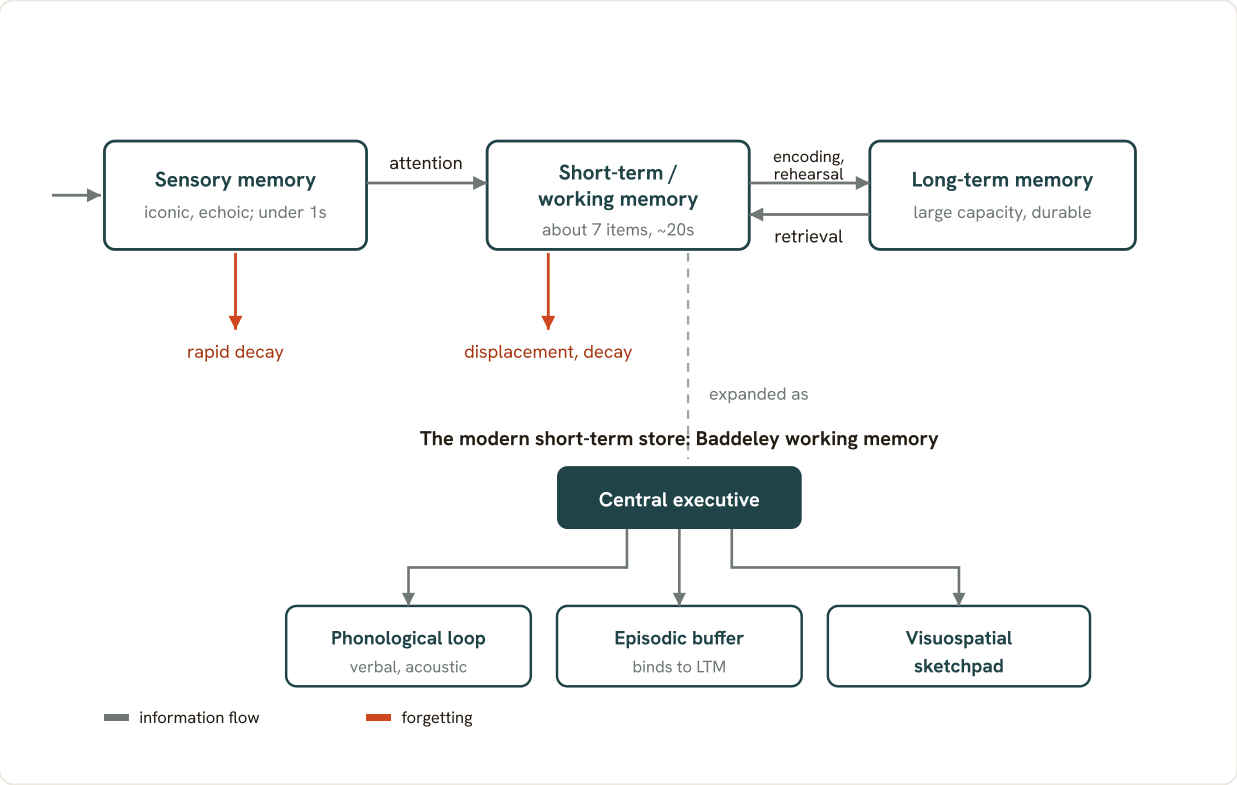



**Fig 4.2** The memory system: the Atkinson-Shiffrin multi-store model (top) reads left to right, with attention passing sensory traces into a limited short-term store and rehearsal encoding them into a durable long-term store, from which material is retrieved back. Information is lost by rapid decay from sensory memory and by displacement or decay from the short-term store (coral). Baddeley and Hitch reconceived the short-term store as working memory (below): a central executive directing a phonological loop, a visuospatial sketchpad and an episodic buffer that binds information and links to long-term memory.

### 3.1 Ebbinghaus: forgetting as a measurable curve, and the savings method

**The first quantitative theory.** Hermann Ebbinghaus (1885), experimenting on himself with lists of meaningless three-letter *nonsense syllables* (chosen to strip out prior meaning), turned memory into a measurable quantity for the first time. His two enduring contributions are the **forgetting curve**, showing that retention falls steeply in the first hours after learning and then flattens into a long slow tail, and the **savings method**, his index of retention: even when a list can no longer be recalled, relearning it to the original standard takes fewer trials than learning it fresh, and that saving in trials quantifies the memory that survives below the threshold of conscious recall. He also first described the *spacing effect* (learning distributed over time beats massed cramming) and the *serial position* advantage. **What it fixed.** It replaced philosophical introspection about memory with a reproducible curve. **What it left debated.** It treated memory as one undifferentiated store

decaying with time, so it could describe the rate of forgetting but said nothing about its architecture or its cause, the very questions the next century answered (Kaplan and Sadock 2024).

### 3.2 Atkinson and Shiffrin: the multi-store (modal) model and its three stores

**The boxes-and-arrows model.** Atkinson and Shiffrin (1968) proposed the **multi-store** model (the "modal model") in which information flows sequentially through three structurally separate stores, gated by attention and rehearsal. Incoming stimulation first enters **sensory memory**, a modality-specific register of very large capacity and sub-second duration (iconic for vision, echoic for hearing); whatever is *attended* passes into **short-term** store; and material that is *rehearsed* is transferred into **long-term** store. The stores differ on three axes: encoding, capacity, and duration. Short-term store holds roughly seven items (Miller's 7 plus or minus 2, 1956) for about 15 to 30 seconds and codes mainly acoustically; long-term store is effectively unlimited in capacity and duration and codes mainly semantically. Crucially, Atkinson and Shiffrin distinguished the fixed *structural* stores from flexible *control processes* (rehearsal, coding, retrieval strategies) that the person deploys within them.

**What it fixed.** It gave forgetting an architecture, explaining why a phone number vanishes in seconds yet a childhood address lasts decades, and it accounted for the serial-position curve: the primacy effect reflects rehearsed items already in long-term store, the recency effect reflects the last items still sitting in short-term store (Glanzer and Cunitz 1966 abolished only the recency limb with a filled delay). **What it left debated.** Two weaknesses forced the next models. First, it treated short-term store as a single passive holding box, yet neuropsychological patients showed the box had parts. Second, it made rehearsal the sole route into long-term memory, which is empirically false: depth of meaning matters more than repetition, the gap that levels-of-processing filled (Kaplan and Sadock 2024).

| <2 s | 7 ± 2 | 15 to 30 s |
|---|---|---|
| SENSORY MEMORY | SHORT-TERM ITEMS (MILLER) | SHORT-TERM DURATION |

### 3.3 Baddeley and Hitch: working memory replaces the single short-term box

**From passive store to active workspace.** Baddeley and Hitch (1974) showed that the unitary short-term box could not be right: participants could hold a string of digits *and* simultaneously reason or comprehend prose, which is impossible if a single limited store does both. They replaced it with **working memory**, a multi-component system for the temporary holding *and manipulation* of information. In the model, a limited-capacity *central executive* (an attentional controller, not a store) supervises two modality-specific slave systems: the *phonological loop* for speech-based and acoustic material (a store that decays in about two seconds unless refreshed by articulatory rehearsal) and the *visuospatial sketchpad* for visual and spatial material. Baddeley (2000) later added a fourth component, the *episodic buffer*, a general store that binds information across the two slave systems and links it to long-term memory, explaining how we integrate what we see and hear into a single remembered scene.

**What it fixed.** It explained dual-task performance (two tasks in the same code interfere, two in different codes do not) and made rehearsal optional rather than the only mechanism, and it mapped cleanly onto brain lesions in a way the single box never did. **What it left debated.** The central executive stayed a poorly specified "homunculus," and the number and independence of the components remained contested, so rival accounts followed (Cowan's embedded-processes model treats working memory as the activated portion of long-term memory plus a focus of attention). This is where the field currently sits (Kaplan and Sadock 2024).

### 3.4 Craik and Lockhart: levels of processing, from structure to depth

**Not where you store it, how deeply you process it.** Craik and Lockhart (1972) attacked the multi-store assumption that retention depends on *how long* an item sits in a store. They argued instead that durability depends on the *depth* of processing at encoding along a shallow-to-deep continuum: *shallow* structural processing (the word's typeface) and phonemic processing (its sound) leave weak traces, whereas *deep* semantic processing (its meaning, its links to what you already know) leaves durable ones. This reframed Atkinson and Shiffrin's rehearsal: mere *maintenance rehearsal* (rote repetition) keeps material available briefly but transfers little to long-term memory, whereas *elaborative rehearsal* (giving it meaning and associations) is what actually encodes it. **What it fixed.** It explained the store-model's key failure, why meaningful material is remembered far better than repeated-but-meaningless material, and it grounds every effective study technique. **What it left debated.** "Depth" was circular (we call processing deep because it is well remembered), and the framework describes encoding without specifying the storage systems themselves, which Tulving supplied (Kaplan and Sadock 2024).

RULE **Depth of meaning beats duration in a store.** Elaborative (semantic) rehearsal encodes; maintenance (rote) rehearsal only holds material briefly and transfers little to long-term memory.

### 3.5 Tulving: the taxonomy of long-term memory

**Long-term memory is plural.** Tulving (1972, 1985) subdivided long-term store into dissociable systems, the taxonomy the exam tests most heavily. The master division is **declarative** (explicit) memory, available to conscious recollection and expressible in words, versus **non-declarative** (implicit) memory, expressed through performance without conscious access. Declarative memory splits into *episodic* memory (personally experienced events tagged with time and place, "remembering") and *semantic* memory (context-free general facts and knowledge, "knowing"). Non-declarative memory is a heterogeneous family: *procedural* memory (motor and cognitive skills and habits, riding a bicycle), *priming* (facilitated processing of a recently encountered stimulus), simple *classical conditioning*, and *non-associative* learning (habituation, sensitisation). The defining claim is that these are separable in the brain, not merely conceptual labels.

**CLINICAL ANCHOR**

The declarative/non-declarative line is the single most useful memory distinction in clinical work. Amnesia (from medial temporal or diencephalic damage) devastates declarative memory while leaving non-declarative memory intact, which is why an amnesic patient can learn a mirror-drawing skill perfectly across days yet swear each morning they have never done it. The mirror image is Alzheimer disease, where declarative (especially episodic) memory fails first because the pathology begins in the medial temporal lobe.

## 3.6 The four mechanisms of forgetting

**Why memories fail.** Four classical mechanisms are distinguished, and they are not mutually exclusive.

### Decay (trace decay)

The memory trace fades with the mere passage of time if not used (Thorndike's law of disuse). Best supported for sensory and short-term stores; heavily disputed for long-term memory, where critics (McGeoch; Nairne 2002) argue it is the intervening events, not time itself, that cause the loss.

### Interference

Other learning competes with the target memory. *Proactive* interference: older learning disrupts newer (your old phone number intrudes on the new one). *Retroactive* interference: newer learning disrupts older (learning Spanish erodes your French). The single commonest cause of everyday long-term forgetting.

### Retrieval failure (cue-dependent forgetting)

The trace is intact but inaccessible because the right retrieval cue is absent; the memory returns when the cue is restored. The tip-of-the-tongue state is the everyday case; encoding-specificity and context-dependent and state-dependent recall are its corollaries. Recall (cue-free) is the most sensitive retrieval test, recognition easier, relearning (savings) the most sensitive of all.

### Motivated forgetting

Emotionally threatening material is kept out of awareness, whether by active suppression or by unconscious repression (the psychodynamic account). Invoked for the amnesia of trauma; the most theoretically contested of the four.

**TRAP** **Pro**active interference = **old** learning disrupts new (old phone number intrudes); **retro**active interference = **new** learning disrupts old (Spanish erodes French). The prefix names what is disrupted, not what does the disrupting.

## 3.7 Reconsolidation and the misinformation effect: memory as reconstruction

**Retrieval changes the memory.** The modern correction to every box model is that a stored memory is not a fixed recording played back unchanged. On retrieval a consolidated memory returns to a labile state and must be restabilised, a process called *reconsolidation*, during which it can be updated, strengthened, or corrupted before it is re-fixed. This makes memory reconstructive rather than reproductive, and it is the mechanism behind Loftus's **misinformation effect**: post-event information, especially a subtly leading question, is incorporated into the original memory so that eyewitnesses confidently report details they never

saw (Loftus and Palmer 1974 showed the verb in "how fast were the cars going when they smashed / hit each other" shifted both speed estimates and later false memories of broken glass). **Why it matters.** It undermines the reliability of confident eyewitness testimony and recovered memories, and reconsolidation is now an active treatment target, using the reactivation window to weaken maladaptive fear memories in PTSD (Kaplan and Sadock 2024).

### 3.8 The currently accepted synthesis

**A componential working memory feeding a distributed, systems-organised long-term memory.** The *currently accepted* account is not any single historical model but their integration. A limited-capacity working memory (a componential attentional workspace, whether framed as Baddeley's components or as the activated portion of long-term memory in Cowan's embedded-processes model) selects and manipulates incoming information; material processed deeply and elaboratively is *consolidated* into long-term memory, a hippocampus-dependent process that gradually transfers the memory to distributed neocortical stores where it becomes independent of the hippocampus (systems consolidation). Long-term memory is not one store but the parallel taxonomy of dissociable systems (declarative and non-declarative), and forgetting is chiefly cue-dependent retrieval failure and interference rather than passive decay, with retrieval itself capable of updating the trace through reconsolidation (Kaplan and Sadock 2024).

### 3.9 The neural correlate: one structure per memory system

**The systems map onto tissue.** The strongest evidence that Tulving's taxonomy is biologically real is that each system has a distinct **neural correlate** and can be lost in isolation.

| MEMORY SYSTEM | CRITICAL STRUCTURE(S) | EVIDENCE / NOTE |
|---|---|---|
| **Declarative encoding and consolidation** | **Hippocampus and the wider medial temporal lobe (entorhinal, perirhinal, parahippocampal cortex); medial diencephalon (mammillary bodies, dorsomedial thalamus)** | Bilateral MTL damage causes anterograde amnesia (HM, EP); CA1-restricted lesions give milder amnesia (RB); diencephalic version is Korsakoff. Cellular basis is hippocampal LTP (cross-ref the Functional Neuroanatomy & Neurophysiology notes). |
| **Working memory** | **Prefrontal cortex (dorsolateral PFC for manipulation, ventrolateral for maintenance), with parietal cortex** | Frontal lesions impair manipulation, monitoring and retrieval strategy; fMRI shows PFC engagement scaling with memory load. |
| **Procedural / skill and habit learning** | **Basal ganglia (striatum), with cerebellum and motor cortex** | Preserved in MTL amnesia; degraded in Parkinson and Huntington disease. |
| **Classical conditioning of motor responses** | **Cerebellum (deep nuclei and cortex)** | Cerebellar lesions abolish the conditioned eyeblink response while sparing the reflex. |
| **Emotional (fear) conditioning** | **Amygdala (with hippocampus for context)** | Amygdala attaches affect to stimuli; model for anxiety disorders. PFC drives extinction. |
| **Remote consolidated memory** | **Distributed neocortex** | Old memories survive hippocampal loss (temporally graded retrograde amnesia); slow-wave sleep aids declarative consolidation via hippocampal replay. |

The double dissociation across these rows, declarative lost while procedural is spared, is the anatomical proof that "memory" is plural.

**COMMON TRAP**

Do not equate "short-term memory" with "working memory," and do not call the hippocampus the store of memories. The hippocampus is required to *encode and consolidate* new declarative memories, not to store old ones: consolidated remote memories live in distributed neocortex, which is why HM kept childhood memories while forming no new ones. Working memory (an active PFC workspace) is a superset of the older passive short-term store.

### 3.10 Worked example: patient HM and the amnesic dissociation

**The case that founded the field.** Henry Molaison (patient HM) underwent bilateral medial temporal lobectomy by William Scoville in 1953 for intractable epilepsy, removing much of both hippocampi and adjacent cortex. The result, documented over decades by Brenda Milner, was a clean dissociation that no single-store model could accommodate. HM had a dense *anterograde amnesia*: he could not form new declarative memories, failing to learn new facts or events and never recognising his caregivers or learning that his parents had died. Yet three functions were

preserved, and each proves a separate system. His *short-term / working memory was intact* (he could hold a number in mind and converse normally), proving short-term and long-term stores are separate. His *remote memories from before surgery were largely spared*, proving the hippocampus is needed to *form* declarative memories, not to *store* consolidated ones. And most strikingly, he could *learn new motor skills* (mirror-drawing improved across sessions) while insisting each time he had never attempted the task, proving non-declarative (procedural) memory is independent of the medial temporal lobe. **One patient, three dissociations.** HM is the empirical bridge from the abstract boxes of Atkinson and Shiffrin to the tissue-level taxonomy of Tulving, and Atkinson and Shiffrin themselves cited his profile to justify the short-term versus long-term split (Kaplan and Sadock 2024).

HOLD THIS

**HM proves memory is plural: one patient, three dissociations.** Intact short-term memory (STM separate from LTM), spared remote memory (hippocampus forms but does not store declarative memory), and preserved mirror-drawing (procedural memory is independent of the medial temporal lobe).

GOOD TO REMEMBER

- **Ebbinghaus (1885):** forgetting curve (steep early loss then a tail) and the savings method (relearning is faster); used nonsense syllables; also the spacing effect.
- **Atkinson and Shiffrin (1968):** multi-store / modal model, three stores: sensory, short-term, long-term; attention gates the first transfer, rehearsal the second; structural stores versus control processes.
- **Sensory memory:** modality-specific, huge capacity, under about 2 seconds; iconic (visual) and echoic (auditory).
- **Short-term store:** about 7 plus or minus 2 items (Miller 1956), about 15 to 30 seconds, mainly acoustic coding.
- **Long-term store:** effectively unlimited capacity and duration, mainly semantic coding.
- **Baddeley and Hitch (1974) working memory:** central executive (attentional controller) plus phonological loop and visuospatial sketchpad; episodic buffer added by Baddeley (2000).
- **Craik and Lockhart (1972):** levels of processing; depth (semantic) beats shallow (structural/phonemic); elaborative rehearsal beats maintenance rehearsal.
- **Tulving (1972, 1985):** declarative (explicit) = episodic + semantic; non-declarative (implicit) = procedural, priming, conditioning, non-associative.
- **Serial position:** primacy (long-term store, rehearsed) plus recency (short-term store); recency abolished by a filled delay (Glanzer and Cunitz 1966).
- **Four types of forgetting:** decay, interference (proactive = old disrupts new; retroactive = new disrupts old), retrieval failure / cue-dependent, motivated forgetting (suppression/repression).
- **Loftus (misinformation effect):** post-event leading information corrupts the memory; basis of unreliable eyewitness testimony; mechanism is reconsolidation of a labile trace on retrieval.
- **Neural correlates:** hippocampus and medial temporal lobe = declarative encoding (LTP, the Functional Neuroanatomy & Neurophysiology notes cross-ref); prefrontal cortex = working memory; basal ganglia and cerebellum = procedural; cerebellum = conditioned motor responses; amygdala = fear conditioning; distributed neocortex = remote consolidated memory.
- **Patient HM (Henry Molaison):** bilateral medial temporal lobectomy, Scoville 1953, studied by Milner; dense anterograde amnesia with intact short-term memory, spared remote memory, and preserved procedural (mirror-drawing) learning.

## 4 · Thinking, problem-solving and intelligence theories

This topic pairs the two ends of higher cognition the exam most reliably tests together: the *process* of thinking (how the mind forms concepts, reasons, and solves problems, and how that process fails through bias) and the *capacity* for it (intelligence, and the century-long fight over whether it is one thing or many). The first half is a toolkit of named effects (heuristics, biases, mental set, insight) that recur in cognitive psychology, in cognitive-behavioural therapy, and in the psychopathology of thought. The second half is a clean evolution-of-theories story, from Spearman's single **g** to the modern **CHC** consensus, that rewards the candidate who can lay the models out in time and say what each one fixed. **One process, one capacity, one debate: is intelligence unitary or plural?**

The intelligence half follows the standard evolution-of-theories flow: a definition, then the theories in the order they appeared, each fixing a flaw in the last, then the currently accepted model (CHC), its neural correlate (the parieto-frontal integration theory and processing speed), and a worked example. Note the deliberate split from the Psychometry, Assessment and Descriptive Psychopathology notes: the theories of intelligence are taught here, but the instruments that operationalise them (Binet-Simon, the Wechsler scales, deviation IQ, the diagnostic bands) are taught on the Psychometry, Assessment and Descriptive Psychopathology notes (cross-ref: Psychometry and assessment, IQ testing). Ground text is Kaplan and Sadock (2024) and the New Oxford Textbook of Psychiatry, with the historical chronology cross-checked against the standard intelligence literature (Carroll 1993; Warne 2023).

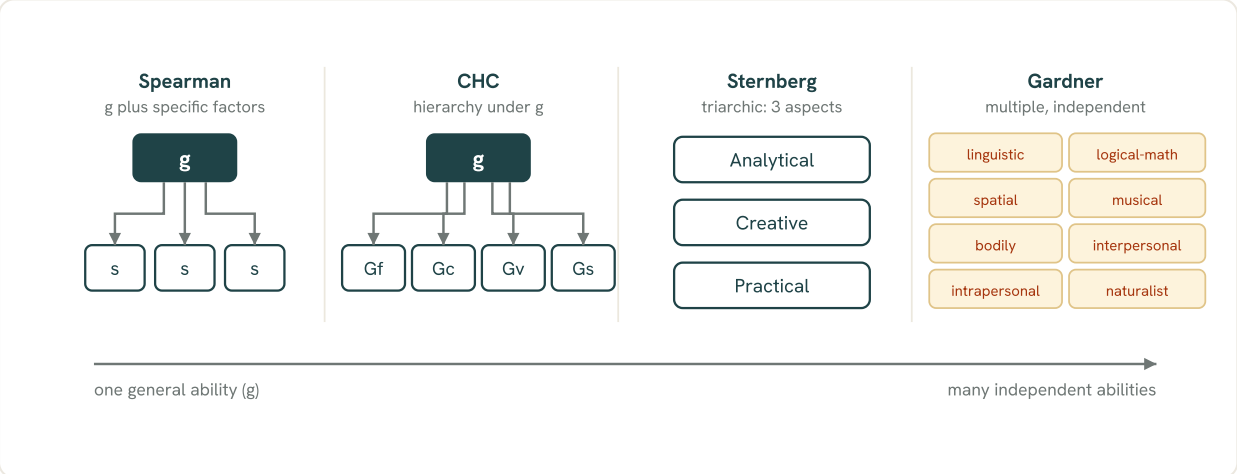



**Fig 4.3** The theories of intelligence read as one argument: is intelligence a single thing or many? Spearman's positive manifold pointed to a general factor g with task-specific factors; the Cattell-Horn-Carroll model keeps g but organises the broad abilities (fluid Gf, crystallised Gc, visual Gv, processing speed Gs and more) beneath it, and is the modern working consensus. Sternberg's triarchic model and Gardner's multiple intelligences push toward the plural end, valuing abilities that classic IQ tests miss. Intelligence testing itself is taught on the Psychometry, Assessment and Descriptive Psychopathology notes.

### 4.1 Thinking and concept formation: the units of thought

**Thinking** is goal-directed mental manipulation of internal representations (images, words, concepts, propositions) to reach a conclusion, form a judgement, or solve a problem. Its basic unit is the **concept**, a mental category that groups objects, events, or ideas by shared features, letting the mind treat many particulars as one kind and so economise on cognitive effort. **Concept**

**formation** proceeds in two classic ways. On the *classical* view a concept is defined by a set of necessary and sufficient features (a bachelor is unmarried and male and adult). On the more psychologically accurate *prototype* view (Rosch 1975), a concept is organised around a best example or prototype, and membership is graded by family resemblance: a robin is a more prototypical bird than a penguin, and the mind classifies faster the closer an instance sits to the prototype. Clinically, the breakdown of concept formation, the loss of the capacity to abstract and a slide into concrete, over-inclusive, or literal categorisation, is a core sign in schizophrenia and in the frontal and organic states, and is probed by proverb interpretation and card-sorting.

### 4.2 Reasoning: deductive and inductive

**Reasoning** is thinking directed at drawing a conclusion from premises, and it comes in two forms the exam contrasts. **Deductive reasoning** moves from general premises to a specific, logically certain conclusion: if all premises are true and the form is valid, the conclusion *must* be true (all humans are mortal; Socrates is human; therefore Socrates is mortal). It is truth-preserving but adds no new content. **Inductive reasoning** moves the other way, from specific observations to a general, probable conclusion: every swan I have seen is white, so swans are probably white. It is content-expanding but not certain, since a single black swan refutes it, and it is the engine of hypothesis-generation and everyday learning. Human reasoning departs systematically from formal logic, as the Wason selection task shows (people fail abstract logical versions but succeed on concrete social ones), which sets up the study of the biases that follow.

### 4.3 Problem-solving: algorithms versus heuristics

Problem-solving is the sequence of operations that moves a start state to a goal state, and it runs on two contrasting strategies. An **algorithm** is an exhaustive, step-by-step procedure that is *guaranteed* to find the solution if one exists (checking every permutation of a lock, following long division): it is reliable but often slow and effortful, sometimes computationally impossible for large problems. A **heuristic** is a mental shortcut or rule of thumb that reduces a hard problem to a manageable one and usually delivers a good-enough answer fast, at the cost of no guarantee and a systematic vulnerability to error (working backward from the goal, means-ends analysis, hill-climbing). The trade-off is the whole point: algorithms buy certainty with effort, heuristics buy speed with the risk of bias. The specific heuristics Tversky and Kahneman identified are the bridge to the next subtopic.

#### Algorithm

Exhaustive rule-based procedure guaranteeing a solution; reliable but slow and effortful.

#### Heuristic

Shortcut or rule of thumb; fast and low-effort but not guaranteed and prone to systematic bias.

#### Means-ends analysis

A heuristic that repeatedly reduces the difference between the current state and the goal by setting subgoals.

### 4.4 The Tversky and Kahneman heuristics and biases

The **heuristics-and-biases programme** (Tversky and Kahneman 1974) is the single most examinable block in this half of the topic, because the same biases reappear as cognitive distortions in CBT and as reasoning errors in delusion and depression. The claim is that judgement under uncertainty is governed by a few economical heuristics that are usually useful but produce predictable, replicable errors. Three are core.

| HEURISTIC | THE SHORTCUT | THE BIAS IT PRODUCES |
|---|---|---|
| **Availability** | **Judge probability by how easily instances come to mind** | Vivid, recent, or emotionally charged events are over-estimated (fear of plane crashes over car crashes; a doctor over-diagnoses the condition last seen) |
| **Representativeness** | **Judge probability by resemblance to a prototype, ignoring base rates** | The base-rate fallacy and the conjunction fallacy (the "Linda problem"); a shy tidy man judged more likely a librarian than a farmer despite farmers being far more numerous |
| **Anchoring and adjustment** | **Start from an initial value (the anchor) and adjust insufficiently** | Estimates stay pulled toward an arbitrary starting number, even a plainly irrelevant one; the basis of negotiation and pricing effects |

The three core Tversky and Kahneman heuristics: each is a serviceable shortcut whose failure mode is a named, reproducible bias.

Two allied effects round out the block and are worth naming. **Framing**: the same option is chosen or rejected depending on whether it is described in terms of gains or losses (the surgery "90 per cent survive" versus "10 per cent die"), a violation of the invariance that rational choice requires and a cornerstone of prospect theory (Kahneman and Tversky 1979). **Confirmation bias**: the tendency to seek, weight, and recall evidence that supports a prior belief and to discount evidence against it, the reasoning engine behind the maintenance of delusions and the negative schemas of depression.

**TRAP** **Availability** judges by ease of recall (vivid/recent events over-estimated); **representativeness** judges by resemblance to a prototype and ignores base rates (the Linda / base-rate fallacy). Do not swap them.

### 4.5 Dual-process theory: System 1 and System 2

The heuristics-and-biases findings are organised by **dual-process theory** (Stanovich and West 2000; popularised as *Thinking, Fast and Slow*, Kahneman 2011), the currently dominant framework for reasoning. It holds that two systems generate judgements. **System 1** is fast, automatic, effortless, parallel, emotional, and unconscious: it runs the heuristics and produces intuitions and snap judgements. **System 2** is slow, deliberate, effortful, serial, logical, and conscious: it can monitor and override System 1 but is lazy and capacity-limited, so it often

endorses System 1's output unchecked. Most biases are System 1 intuitions that System 2 failed to catch. The clinical resonance is direct: CBT can be read as training System 2 to interrupt and re-appraise the automatic, System 1 negative thoughts that drive emotional disorder.

### 4.6 Barriers to problem-solving: mental set, functional fixedness, insight

Three classic obstacles and their resolution are high-yield, drawn from the Gestalt tradition of problem-solving. **Mental set** (Einstellung) is the tendency to persist with a strategy that worked before even when a simpler or better one is available, demonstrated by Luchins's water-jar problems, where subjects keep using a laborious learned formula after a one-step solution appears. **Functional fixedness** is a special case: the inability to see that an object can be used for a function other than its usual one, shown in Duncker's candle problem, where subjects fail to use the tack-box as a candle-holder because they fix on its role as a container. The escape from both is **insight**, the Gestalt phenomenon of a sudden, complete restructuring of the problem, the "aha" experience described by Kohler in his chimpanzees (Sultan stacking boxes to reach a banana): the solution appears abruptly and whole rather than by gradual trial and error, marked by a felt click of comprehension. Insight problems are solved all-at-once; incremental problems are solved by heuristic search.

**Mental set (Einstellung)**
Persisting with a previously successful strategy when a better one exists (Luchins's water-jar task).

**Functional fixedness**
Failing to use an object in a novel function because its usual function dominates (Duncker's candle problem).

**Insight**
Sudden, complete perceptual restructuring of a problem; the Gestalt "aha" (Kohler's apes).

### 4.7 Intelligence defined, and the one-versus-many debate

**Intelligence** is the global capacity to think rationally, act purposefully, and deal effectively with the environment (Wechsler's classic definition), or more operationally the aggregate ability to learn from experience, reason abstractly, and adapt to novel and complex situations (Kaplan and Sadock 2024). Every theory below is an answer to one question that has run for over a century and is *still* formally open: is intelligence a single general capacity, or a set of separate abilities? Kaplan and Sadock (2024) state it plainly, that whether intelligence is best regarded as a single general capacity, the **g** proposed by Spearman in 1904, or a range of modular capabilities as first proposed by Thurstone in 1938, remains an open question with no consensus. Hold that debate as the spine: each theorist moves the count of "how many intelligences" and each is judged against one stubborn empirical fact, the *positive manifold*, that scores on almost all cognitive tests are positively correlated.

### 4.8 Spearman's two-factor theory: g and s, the positive manifold

Charles **spearman** (1904, 1927), inventing factor analysis to do it, made the founding observation: performance on any one mental test correlates positively with performance on almost every other, a pattern he named the **positive manifold**. To explain it he proposed the

**two-factor theory**: every cognitive performance draws on a single *general* factor, **g**, common to all tasks and representing overall mental energy or power, plus a *specific* factor, *s*, unique to that particular task. A person high in g tends to do well across the board; the s factors explain why they are nonetheless better at some tasks than others. What Spearman *fixed* was the pre-scientific vagueness of "intelligence," giving it a measurable, statistically derived core (g) and the tool (factor analysis) that all successors would use. What he *left debated* was whether one general factor could really account for the full diversity of human ability, and whether g was a real entity or a statistical artefact of how tests are built.

### 4.9 Thurstone's primary mental abilities: the plural challenge

Louis L. **thurstone** (1938), using a more advanced (multiple-factor) form of factor analysis, rejected a single dominant g and argued instead for several independent **primary mental abilities**, identifying seven: verbal comprehension, word fluency, number facility, spatial visualisation, perceptual speed, associative memory, and inductive reasoning. On his account an overall IQ score misleads, because a person is a profile of distinct strengths, not one number. What Thurstone *fixed* was Spearman's reductionism, insisting that ability is multidimensional and that the profile matters. What he *left debated*, and eventually conceded, was that his seven abilities were themselves positively intercorrelated and, when factored again, yielded a higher-order g. The debate thus did not resolve so much as move up a level: both a general factor and specific abilities seemed to be real, which is exactly what the hierarchical models would later formalise.

### 4.10 Cattell and Horn: fluid versus crystallised intelligence

Raymond **cattell** and John Horn (1960s) split g itself into two broad, empirically separable intelligences, the distinction the exam wants most from this era. **Fluid intelligence (Gf)** is the capacity to reason, see relationships, and solve novel problems independent of acquired knowledge, largely biological and content-free (matrix reasoning, novel puzzles). **Crystallised intelligence (Gc)** is the store of acquired knowledge, vocabulary, and skills built up through education and culture (general knowledge, word meanings). Their evidence came from outside factor analysis, in the aging data: the two follow different lifespan trajectories, with **fluid** intelligence peaking in early adulthood and declining from around the third to fourth decade, while **crystallised** intelligence rises through life and is maintained into old age. This dissociation is clinically vital, because it is the basis of "hold" versus "no-hold" tests in dementia assessment: preserved vocabulary (Gc) against declining novel problem-solving (Gf) estimates premorbid ability and flags decline. What Cattell and Horn *fixed* was the monolithic g, showing it fractionates into meaningfully different, differently-ageing components. What they *left debated* was, again, that Gf and Gc are themselves correlated and combine into a general factor, so the one-versus-many question persisted.

RULE **Fluid falls, crystallised holds.** Fluid intelligence (Gf, novel reasoning) peaks in early adulthood and declines from the third to fourth decade; crystallised intelligence (Gc, acquired knowledge) is preserved into old age, which is the basis of "hold" tests in dementia.

### 4.11 The Cattell-Horn-Carroll (CHC) three-stratum model: the synthesis

John Carroll's survey of over 460 factor-analytic datasets (1993) resolved the century-old dichotomy by making it a hierarchy, and merging with the Cattell-Horn work gave the **chc** (Cattell-Horn-Carroll) theory, the great synthesis. It is a **three-stratum model**: at the top (Stratum III) sits general intelligence, g; the middle (Stratum II) holds around eight to ten *broad abilities* (fluid reasoning Gf, crystallised knowledge Gc, short-term/working memory, long-term retrieval, visual processing, auditory processing, processing speed, and others); the bottom (Stratum I) holds many *narrow abilities* (Thurstone's primary factors sit here). What CHC *fixed* was the false either-or of Spearman versus Thurstone: g and multiple abilities are not rivals but different levels of one nested structure, so the positive manifold (a real g) and profile diversity (real broad and narrow abilities) are both accommodated. It is the model that underlies most modern intelligence tests, which is why they report both a global IQ and index scores. The debate it *leaves* is now a matter of detail (the exact number and boundaries of the broad abilities), not of principle.

### 4.12 Gardner's multiple intelligences: the outward expansion

Howard **gardner** (1983, *Frames of Mind*) pushed hardest against g, proposing that intelligence is not one or a few abilities but a set of largely *independent* intelligences, each with its own developmental course and neural substrate, and each capable of dissociating (as in savant syndrome or focal brain injury). He named seven, later expanded to eight, with a ninth proposed: linguistic, logical-mathematical, spatial, musical, bodily-kinaesthetic, interpersonal, intrapersonal, and naturalistic (with existential intelligence suggested). What Gardner *fixed*, or tried to, was the narrowness of the "book-smart" tradition, giving academic status to musical, bodily, and social talents that IQ tests ignore, which is why his theory is so popular in education. What he *left* deeply *debated*, and where the exam expects the critique, is the evidence: his core claim that the intelligences are independent contradicts the single most robust finding in the field, the positive manifold, since these abilities are in fact positively correlated. The "learning styles" industry that grew from his theory is likewise unsupported by research. Gardner is best remembered as the boldest pluralist whose reach exceeded the data.

### 4.13 Sternberg's triarchic theory: intelligence for real-world success

Robert **sternberg** (1985, *Beyond IQ*) offered a smaller, more defensible pluralism aimed at what predicts success in life, not just in school. His **triarchic theory** names three intelligences. **Analytical** intelligence is the academic, problem-solving ability that traditional IQ tests measure (close to g). **Creative** (experiential) intelligence is the ability to deal with novelty and generate new ideas, the capacity IQ tests neglect. **Practical** (contextual) intelligence is "street smarts," the tacit, unspoken know-how for adapting to, shaping, and selecting real-world environments. What Sternberg *fixed* was the exclusion of creativity and practical adaptation from the concept of intelligence, and he was the first to bring creativity formally inside the tent. What he *left debated* is that practical intelligence has not been shown to be a single unified ability transferring across domains, and traditional IQ (which he cast as merely academic) in fact predicts a wide range of real-world outcomes well, undercutting the sharp separation his theory draws.

### 4.14 Currently accepted: CHC as the working consensus

The **currently accepted** position in intelligence research is the **chc** (Cattell-Horn-Carroll) model (4.11). It is the mainstream because it is the one framework that honours both halves of the century-old debate: a genuine general factor g at the apex (vindicating Spearman and explaining the positive manifold) sitting above a rich layer of broad and narrow abilities (vindicating Thurstone, Cattell, and Horn and explaining ability profiles). Gardner's and Sternberg's pluralist theories, though influential in education and useful for widening what we value, are held to sit outside the empirical mainstream precisely because they deny or minimise g, which the data will not allow. The practical upshot is that modern tests are built on CHC: they yield a full-scale IQ (the g estimate) alongside index scores that map onto the broad abilities.

HOLD THIS

**Every intelligence theory lives or dies on the positive manifold.** Because cognitive scores all correlate positively, the pluralist theories that deny g (Gardner, Sternberg) cannot be the consensus, and CHC can, by nesting g over broad over narrow abilities.

### 4.15 Neural correlate: the P-FIT model and processing speed

The **neural correlate** of general intelligence is captured by the **parieto-frontal integration theory (P-FIT)** (Jung and Haier 2007), the leading neurobiological account and the current consensus on the biology of g. Its claim is that intelligence is not localised to one region but reflects the *efficiency of a distributed network*, chiefly the dorsolateral prefrontal cortex, the inferior and superior parietal lobules, the anterior cingulate, and the white-matter tracts (notably the arcuate fasciculus) that connect frontal to parietal cortex. On this model, sensory information is elaborated in temporal and occipital cortex, integrated and abstracted in the parietal lobe, evaluated and problem-solved in the prefrontal cortex, with the parieto-frontal loop generating the solution, and the integrity and speed of the connecting white matter set the ceiling on performance. Two robust biological correlates support it: **processing speed** (faster, more efficient neural conduction, indexed behaviourally by reaction time and biologically by white-matter integrity, correlates with higher g) and the *neural efficiency hypothesis* (higher-ability brains recruit *less*, not more, activation for a given task, working more economically). Overall brain volume correlates modestly with IQ (roughly r = 0.3 to 0.4), but network efficiency, not size, is the operative variable (Kaplan and Sadock 2024).

### 4.16 Worked example: reading the debate in one candidate

Consider a medical student who reasons brilliantly through an unseen clinical problem, has an encyclopaedic command of facts, plays the sitar beautifully, and is socially adept on the ward. Each theory reads her differently, and seeing the same person through each lens fixes the models. **Spearman**: her across-the-board excellence is high g, one general capacity lifting every performance (the positive manifold in a person). **Thurstone**: she is a profile, strong verbal, numerical, and spatial primary abilities. **Cattell and Horn**: her novel problem-solving is fluid intelligence (Gf), her stored medical knowledge is crystallised intelligence (Gc), and if we tested her at seventy the Gc would still be intact while the Gf had slipped. **Gardner**: her sitar is musical intelligence and her ward manner interpersonal intelligence, talents an IQ test would miss,

though the critic notes these still correlate with her academic ability. **Sternberg**: her exam ability is analytical, her novel formulations creative, her ward-management practical intelligence. **CHC**: all of it nests, a high g at the apex expressed through strong broad abilities (Gf, Gc, and others). **P-FIT**: the shared substrate is an efficient, fast, well-connected fronto-parietal network. The one candidate, six readings, one nested truth.

**COMMON TRAP**

Do not present Gardner and Sternberg as the "modern, correct" theories because they feel inclusive and appealing: the exam rewards the opposite, that both sit outside the empirical mainstream because they deny or minimise g, and the currently accepted model is CHC. Equally, do not put IQ testing here: Binet-Simon, the Wechsler scales, deviation IQ, and the diagnostic bands are assessment-day material (cross-ref: Psychometry and assessment). And keep the pairing straight, fluid intelligence *declines* with age while crystallised intelligence is *preserved*, which is the direction that grounds "hold" tests in dementia.

**PEARL**

The entire intelligence half is one axis: how many intelligences are there, and what does the positive manifold allow? Spearman said one (g), Thurstone said seven, Cattell and Horn said two (Gf and Gc), Gardner said eight or nine, Sternberg said three, and Carroll's CHC said all of them at once by stacking g over broad over narrow abilities. Every theory lives or dies on the positive manifold, the fact that cognitive scores intercorrelate, which is why the pluralist theories that deny g cannot be the consensus and the hierarchical CHC can.

**GOOD TO REMEMBER**

- **Concept:** mental category grouping particulars; classical (necessary/sufficient features) vs prototype (Rosch 1975, best example).
- **Deductive reasoning:** general to specific, logically certain, truth-preserving. **Inductive:** specific to general, probable, content-expanding.
- **Algorithm:** exhaustive, guaranteed, slow. **Heuristic:** shortcut, fast, not guaranteed, bias-prone.
- **Tversky and Kahneman (1974):** availability (ease of recall), representativeness (resemblance, ignores base rates), anchoring and adjustment (pulled to a starting value).
- **Framing (prospect theory, Kahneman and Tversky 1979):** gain vs loss wording flips choice. **Confirmation bias:** seeking belief-consistent evidence.
- **Dual-process (Stanovich and West 2000; Kahneman 2011):** System 1 fast/automatic/intuitive vs System 2 slow/deliberate/logical.
- **Mental set (Einstellung):** Luchins's water-jars. **Functional fixedness:** Duncker's candle. **Insight:** Gestalt "aha," Kohler's apes.
- **Spearman (1904/1927):** two-factor theory, g (general) + s (specific); positive manifold; invented factor analysis.
- **Thurstone (1938):** seven primary mental abilities (verbal comprehension, word fluency, number, spatial, perceptual speed, memory, reasoning); the plural challenge.
- **Cattell and Horn (1960s):** fluid (Gf, novel reasoning, declines with age) vs crystallised (Gc, acquired knowledge, preserved with age).
- **Carroll / CHC (1993):** three-stratum hierarchy, Stratum III = g, Stratum II = broad abilities, Stratum I = narrow abilities; the synthesis, currently accepted.
- **Gardner (1983):** multiple intelligences, seven then eight (linguistic, logical-mathematical, spatial, musical, bodily-kinaesthetic, interpersonal, intrapersonal, naturalistic); critique: contradicts positive manifold.
- **Sternberg (1985):** triarchic, analytical + creative + practical; brought creativity into intelligence.
- **Currently accepted:** CHC (Cattell-Horn-Carroll), g over broad over narrow.
- **Neural correlate:** P-FIT (Jung and Haier 2007), efficient fronto-parietal network (DLPFC, parietal, anterior cingulate, arcuate fasciculus); processing speed and neural efficiency; brain volume r approx 0.3 to 0.4.

## 5 · Motivation theories

Motivation is the internal process that *energises*, *directs* and *sustains* goal-directed behaviour: it answers not what an organism can do but why it does it now, in this direction, with this persistence. For the exam the topic is best read as a single argument that runs across the twentieth century, from a purely biological push (behaviour as the discharge of a bodily deficit) to a psychological pull (behaviour as the pursuit of value and meaning), and finally to the recognition that neither alone suffices and the mind runs several motivational systems in parallel.

**Learn the sequence and you can place any scenario stem.**

The topic follows the standard evolution-of-theories flow: the theories in the order they appeared, each fixing a flaw in the last, from instinct through **drive**-reduction, arousal and **incentive** to the humanistic and cognitive-need theories, then the currently accepted multi-system view, its **neural correlate** in the mesolimbic dopamine reward pathway and the hypothalamic feeding centres, and a worked example. The single organising question is the one drive-reduction could not answer: if all behaviour serves homeostasis, why does a well-fed, safe,

warm person still read, explore, climb and strive? Ground text is Kaplan and Sadock (2024), the New Oxford Textbook of Psychiatry, and Tasman (2015) for the developmental placement of Maslow.

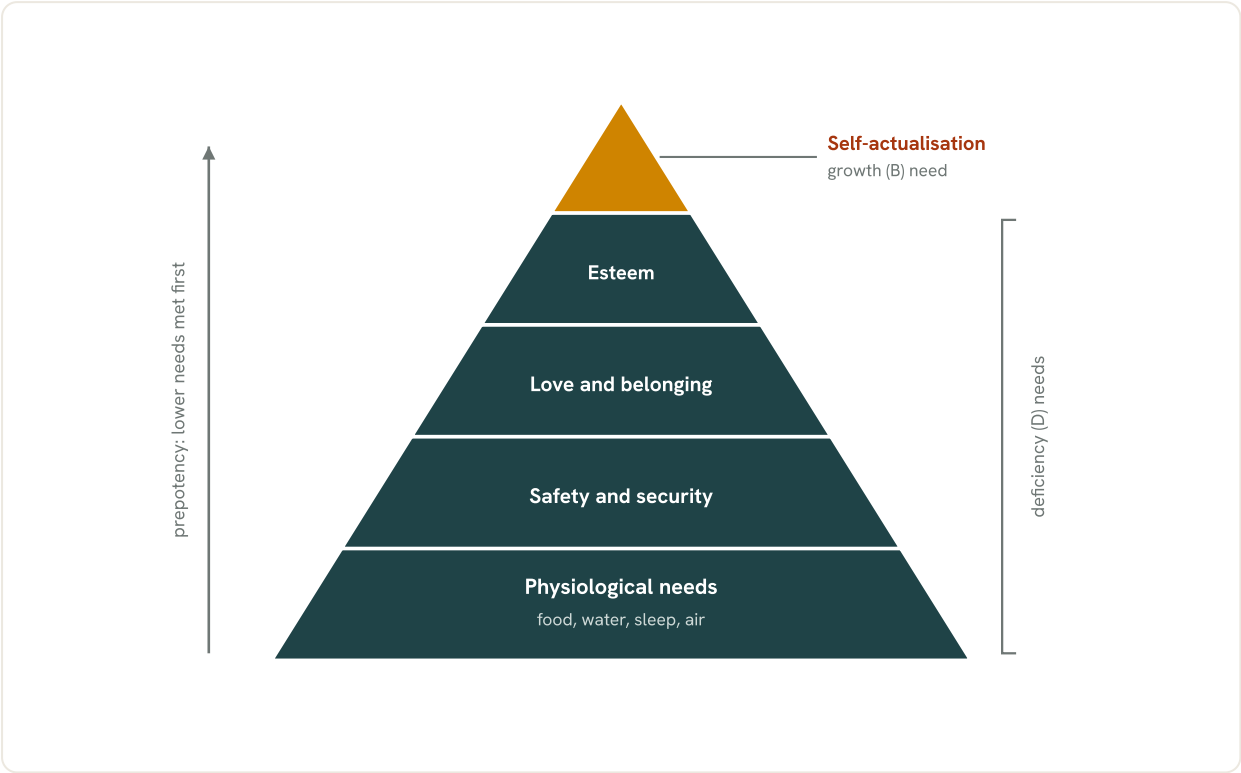



**Fig 4.4** Maslow's hierarchy of needs. Needs are arranged by prepotency: the lower, deficiency (D) needs (physiological, safety, belonging, esteem) generally press for satisfaction before the higher growth (B) need of self-actualisation becomes the person's motive. The model captures why homeostatic drive-reduction cannot be the whole story of motivation, since a fed and safe person still strives; later revisions loosen the strict ordering and add cognitive, aesthetic and self-transcendence needs.

## 5.1 Definition and the three questions motivation must answer

**What a motivation theory must deliver.** A complete account of motivation must specify three things about a behaviour: its *activation* (what initiates it and how much energy it commands), its *direction* (why this goal and not another), and its *persistence* (why it continues against obstacles). The classic distinction is between the *push* of internal states (a need or drive that shoves behaviour out) and the *pull* of external goals (an incentive that draws behaviour toward it). The whole history below is the field discovering that human behaviour needs both, plus a layer of higher goals that neither push nor pull can capture (Kaplan and Sadock 2024).

### Need

A physiological or psychological deficit or requirement (food, safety, belonging).

### Drive

The aroused, tension-like internal state that a need produces and that energises behaviour to reduce it; the engine of the "push" theories.

### Incentive

An external stimulus or goal whose anticipated value pulls behaviour toward it, independent of any internal deficit.

### Motive

A relatively stable, often learned, disposition that gives behaviour a characteristic direction (achievement, affiliation, power).

### 5.2 Instinct theory: McDougall and the innate-programme account

**The first theory.** The earliest scientific account, from William James and above all **William McDougall (1908)**, held that behaviour, like animal behaviour, is driven by **instincts**: innate, biologically fixed, purposive dispositions inherited by every member of a species and triggered by specific stimuli. McDougall catalogued human instincts (flight, curiosity, pugnacity, gregariousness, parental care) and argued each carried its own emotion. In the animal literature the same idea became the ethologists' *fixed action pattern* (Lorenz, Tinbergen): a stereotyped, unlearned behavioural sequence released by a sign stimulus, such as the greylag goose rolling any round object back to the nest or the stickleback attacking any red-bellied shape. **What it fixed.** It rooted motivation in biology and made it heritable and species-general, a genuine advance on faculty psychology. **What it left debated.** The list exploded: within two decades psychologists had named thousands of contradictory "instincts" with no unifying principle and no way to falsify any of them, and the theory could not explain the sheer flexibility of human behaviour. Naming an instinct merely re-described the behaviour rather than explaining it, and the school collapsed, though its evolutionary logic survives in modern evolutionary psychology.

### 5.3 Drive-reduction theory: Hull, homeostasis and the tension model

**The homeostatic engine. Clark Hull (1943)** replaced the unfalsifiable instinct list with a mechanistic learning theory built on **homeostasis**, the body's tendency to hold its internal milieu at a stable set point (a concept from Cannon and Bernard). A biological need (food deprivation) creates an aversive internal tension, the **drive**; behaviour that reduces the drive is reinforced and learned; once the need is met and homeostasis restored, the drive falls and motivation subsides until the next deficit. Hull distinguished *primary drives*, unlearned and biological (hunger, thirst, sex, sleep, temperature, pain-avoidance), from *secondary drives*, acquired by conditioned association with primary ones (money, status, achievement become motivating because they predict primary reinforcement). His formula made behaviour a multiplicative product of drive and learned habit strength. **What it fixed.** It grounded motivation in measurable physiological need and tied it rigorously to learning and reinforcement, giving the field a testable engine. **What it left debated.** The fatal gap, and the pivot of the whole topic, is that drive-reduction explains only *deficit*-driven behaviour and cannot explain behaviour that *raises* arousal or serves no homeostatic deficit at all: curiosity, exploration, play, sensation-seeking, and the pursuit of achievement. A monkey solves puzzles for no food reward; a sated, safe person reads a novel or rides a rollercoaster, deliberately increasing tension. Homeostasis has no account of this, and its failure spawned the arousal and incentive theories (Kaplan and Sadock 2024).

RULE **The curiosity problem is the pivot of the whole topic.** Drive-reduction explains only deficit-driven behaviour; that a sated, safe person still explores, plays and strives is what forces arousal, incentive and higher-need theories.

### 5.4 Arousal and optimal-level theory: the Yerkes-Dodson inverted-U

**Fixing the curiosity problem.** Arousal (optimal-level) theory answered drive-reduction's central failure by proposing that organisms are motivated not to *minimise* arousal but to maintain an *optimal level* of it: too little arousal is aversive (boredom drives us to seek stimulation, which is why curiosity and exploration exist), and too much is also aversive (we withdraw to calm down). The quantitative core is the **Yerkes-Dodson law (1908)**: performance relates to arousal as an inverted U, rising with arousal to a peak then falling as high arousal degrades performance. The examinable refinement is that the optimum *shifts with task difficulty*: simple, well-learned tasks have a high optimal arousal, whereas complex or novel tasks have a low optimum, so anxiety wrecks a hard exam but barely dents a routine drill. **What it fixed.** It explained the exploratory and stimulation-seeking behaviours that homeostasis could not, and it linked motivation directly to emotion and performance. **What it left debated.** It described the level of arousal sought but said little about the *direction* of behaviour or why a specific goal is chosen, which the pull theories addressed next.

### 5.5 Incentive and expectancy theory: the pull of anticipated reward

**From push to pull.** Incentive theory shifted the locus of motivation from an internal deficit to the external goal itself: behaviour is drawn by the anticipated *value* of a reward (or the threat of a punishment), so that a stimulus can motivate even with no bodily need, which is why we eat an appealing dessert when already full. This is the conceptual home of *extrinsic motivation*. **Expectancy theories** then made the pull cognitive: what motivates is not the reward alone but the product of how much the person *values* the outcome and how strongly they *expect* their effort to attain it. Tolman's early work on purposive behaviour and cognitive maps, Vroom's *expectancy-value* model in organisational psychology, and Atkinson's expectancy-value theory of achievement all share this form: motivation equals value multiplied by expectancy, so a prize you cannot realistically win, or a trivial prize you easily could, both fail to motivate. **What it fixed.** It accounted for goal-directedness, choice between goals, and the power of external rewards, and it introduced the person's beliefs and expectations as motivational variables. **What it left debated.** It still treated the person as reactive to external payoffs and said little about the higher, self-generated needs that dominate a secure human life, which the humanistic theory placed at the summit.

### 5.6 Maslow's hierarchy of needs: deficiency versus growth motivation

**The humanistic summit.** Abraham Maslow (1943, 1970) interpreted the whole person in motivational terms and arranged human needs in an ascending **hierarchy of needs**, usually drawn as a pyramid, in which lower needs must be reasonably satisfied before higher ones become the salient motivators. The five classic levels, bottom to top, are *physiological* (food, water, sleep, sex), *safety* (security, protection, order), *love and belonging* (affection, intimacy, group membership), *esteem* (self-respect and the respect of others, competence, recognition), and *self-actualisation* (the realisation of one's unique potential) at the apex. The master distinction is between the lower four as **deficiency needs** (D-needs), which are driven by lack and quieten once met, and self-actualisation as a **growth need** (B-need, being-need), which is never sated and

grows with fulfilment. Maslow later placed the fleeting, transcendent *peak experience* at the top and argued psychology had been too fixated on pathology, calling for a focus on positive mental health, a direct ancestor of positive psychology. **What it fixed.** It captured the higher, self-generated strivings that push and pull theories miss, and it explained the ordering of human concerns (the starving man risks danger and ostracism for food, but the well-fed man is dominated by esteem and meaning). Its exam-relevant caveats are that the strict order is not rigidly followed (Maslow himself noted creators who skip lower levels straight to self-actualisation, and in late life the hierarchy can invert per Tasman 2015), and the theory resists tidy empirical test. **What it left debated.** It is a taxonomy of *what* we want, not a mechanism of *how* a need moves behaviour, and its needs are broad classes rather than testable processes, gaps the next two theories addressed.

### 5.7 Murray's needs and McClelland: achievement, affiliation and power

**Making needs measurable.** Henry Murray (1938) proposed a long list of *psychogenic needs* and the method to measure them, the *Thematic Apperception Test* (TAT), in which the stories a person tells to ambiguous pictures reveal their dominant motives. **David McClelland (1961)** distilled Murray's list into three learned social motives that account for most individual differences in striving, assessed projectively and each with a characteristic behavioural signature.

#### Need for achievement (nAch)

The drive to meet standards of excellence and master challenges; high-nAch people prefer tasks of moderate, calculated difficulty (where effort, not luck, decides the outcome) and seek concrete performance feedback.

#### Need for affiliation (nAff)

The drive for warm, close interpersonal relationships and social acceptance; high-nAff people prioritise harmony and belonging over competition.

#### Need for power (nPow)

The drive to influence, control or have impact on others; splits into personalised power (dominance for self) and socialised power (influence for collective ends), the latter linked to effective leadership.

**What it fixed.** It turned Maslow's abstract higher needs into specific, measurable, individually varying motives and showed that these motives are learned and predict real-world behaviour (entrepreneurship, leadership). **What it left debated.** It described the *content* of human motives but not the underlying process that makes any activity feel self-driven versus coerced, the question self-determination theory finally formalised.

### 5.8 Self-determination theory: Deci and Ryan, intrinsic versus extrinsic

**The process of autonomous motivation.** **Self-determination** theory (SDT), developed by Edward Deci and Richard Ryan (1985, 2000), is the dominant contemporary framework and the most exam-relevant of the modern theories. Its central claim is that the *quality* of motivation matters more than its quantity, and quality depends on how self-endorsed the behaviour is. SDT distinguishes *intrinsic motivation* (acting for the inherent interest, enjoyment and satisfaction of the activity itself, the "loves the activity for its own sake" pole) from *extrinsic motivation* (acting for a separable outcome such as a reward, grade, or the avoidance of punishment). Crucially,

extrinsic motivation lies on a continuum of *internalisation*, from purely external regulation, through introjected and identified regulation, to fully integrated regulation that feels autonomous even though the goal is instrumental. SDT roots all of this in three innate, universal *basic psychological needs*: **autonomy** (a sense of volition and self-authorship), **competence** (feeling effective and masterful), and **relatedness** (feeling connected to and cared for by others). Contexts that satisfy the three needs foster intrinsic motivation, well-being, persistence and creativity; contexts that thwart them breed control, ill-being and, in the extreme, forms of psychopathology. The signature empirical finding is the *overjustification effect*: paying people to do something they already enjoy can *undermine* their intrinsic motivation, because an external reward shifts the perceived locus of causality from inside to outside. **What it fixed.** It supplied the missing mechanism, why the same behaviour can be vitalising or draining depending on need satisfaction, and it reconciled the earlier incentive theories (extrinsic pull) with the humanistic emphasis on growth (autonomy and self-actualisation), unifying the field's push, pull and higher-need strands.

### 5.9 Currently accepted: a multi-system view of motivation

The **currently accepted** position is not a single winning theory but an explicitly *multi-system* account, because the century of debate showed each theory captures a genuine and partly separable component. Contemporary affective neuroscience holds that motivation is generated by several interacting systems: *homeostatic drives* that defend biological set points (the truth in Hull), a *reward and incentive-salience* system that assigns motivational pull to cues and goals (the truth in incentive theory, now with a precise neural substrate), and *higher cognitive goal systems* in the prefrontal cortex that pursue self-generated, value-laden aims and can override the lower systems (the truth in Maslow, McClelland and SDT). The modern refinement, from Berridge's work, is the dissociation of *wanting* (the dopaminergic motivational pull toward a reward, incentive salience) from *liking* (the opioid-mediated hedonic pleasure of consuming it), which explains why addicts intensely want a drug they no longer like. Motivation, on this view, is the moment-to-moment arbitration between competing systems, which is why a dieter genuinely wants both the cake (incentive plus homeostatic hunger) and the goal weight (a higher cognitive value), and either can win.

### 5.10 Neural correlate: mesolimbic dopamine and the hypothalamic centres

**The neural correlate** of motivation maps onto two levels that mirror the push-versus-pull divide of the theories. The *homeostatic drives* are governed by the **hypothalamus**, and the feeding example is the exam classic: the **lateral hypothalamus** is the "hunger" or feeding-on centre, so its stimulation elicits eating and its lesion produces *aphagia* (the lateral hypothalamic syndrome, animal stops eating and starves), whereas the *ventromedial hypothalamus* is the "satiety" or feeding-off centre, so its lesion produces *hyperphagia* and obesity (the ventromedial hypothalamic syndrome). This dual-centre feeding model is cross-referenced to the hypothalamus and drive states covered on the biological-bases days (cross-ref: the Functional Neuroanatomy & Neurophysiology notes, Neuroanatomy of the hypothalamus; the Neurochemistry, Neuroendocrinology, Neuroimaging & Basic Psychopharmacology notes, Homeostasis and drive

states). The *incentive and reward* system, the neural home of "wanting", is the **mesolimbic dopamine pathway**, projecting from the *ventral tegmental area* to the *nucleus accumbens* (ventral striatum), with input to and from the prefrontal cortex and amygdala. Schultz (1997) showed these midbrain dopamine neurons fire in proportion to *reward prediction error* (better-than-expected outcomes), the teaching signal that assigns **incentive salience** to cues, and Berridge showed this dopaminergic signal codes wanting rather than the pleasure (liking) of reward. This is the same aberrant-salience system implicated in psychosis and the common final pathway hijacked by every drug of addiction, tying motivation directly to psychopathology (Kaplan and Sadock 2024).

HOLD THIS

**Lateral hypothalamus = hunger-on (lesion causes aphagia); ventromedial = satiety (lesion causes hyperphagia and obesity).** On the reward side, mesolimbic dopamine codes *wanting* (incentive salience), not *liking* (opioid pleasure).

### 5.11 Worked example: the medical student before the exit exam

A single scenario shows every theory operating at once, and shows how a scenario stem is decoded. A resident revising for the exit exam skips lunch (a **drive-reduction** and homeostatic hunger signal builds, driven by the lateral hypothalamus, and eventually pulls attention off the books). The looming pass or fail is an **incentive** whose motivational force is the product of how much the resident values passing and how much they expect their effort to secure it (**expectancy-value**): a certain pass or a hopeless one both demotivate, moderate odds motivate most. Exam-day anxiety illustrates the **Yerkes-Dodson inverted-U**: a little arousal sharpens recall, but panic past the optimum (low, because the task is complex) collapses performance. In **Maslow's** terms the resident cannot focus on the esteem-level goal of qualifying if safety or belonging needs are unmet, and the drive to master the material is an **achievement** motive (nAch) in McClelland's sense, best sustained on challenges of moderate difficulty. Finally, whether the studying feels vitalising or grinding turns on **self-determination**: a resident who studies because medicine genuinely fascinates them (intrinsic, autonomous, competence-satisfying) persists and performs better than one grinding only to avoid the shame of failure (controlled extrinsic regulation), the practical payoff of the whole topic.

MNEMONIC

**"I Drove A Incentive to Maslow's Mountain, Met McClelland, and Self-Determined."**

The theories in historical order: **I**nstinct (McDougall), **D**rive-reduction (Hull), **A**rousal (Yerkes-Dodson), **Incentive** and expectancy, **Maslow's** hierarchy, **McClelland** (Murray's needs), and **Self-Determination** (Deci and Ryan). Read the list as push, then pull, then higher needs, then the modern process account.

**COMMON TRAP**

Do not confuse **drive-reduction** with **arousal** theory: drive-reduction is about *lowering* tension to restore homeostasis after a deficit, so it cannot explain curiosity; arousal theory is about seeking an *optimal* level, which is precisely why it can. Second trap: intrinsic motivation is not always stronger than extrinsic. The *overjustification effect* shows adding a reward to an already-enjoyed activity can *reduce* intrinsic motivation. Third: on the neural correlate, dopamine codes *wanting* (incentive salience), not *liking* (hedonic pleasure), a Berridge dissociation examiners favour.

**GOOD TO REMEMBER**

- **Instinct theory (McDougall 1908):** behaviour driven by innate, fixed, purposive instincts; animal parallel is the fixed action pattern.
- **Drive-reduction (Hull 1943):** a biological need creates a drive; behaviour reduces it to restore homeostasis; primary vs secondary drives. Cannot explain curiosity.
- **Arousal / optimal-level (Yerkes-Dodson 1908):** organisms seek an optimal arousal; inverted-U of arousal versus performance; optimum is lower for complex tasks.
- **Incentive and expectancy (Tolman; Vroom; Atkinson):** behaviour pulled by anticipated reward value; motivation equals value multiplied by expectancy.
- **Maslow's hierarchy of needs (1943, 1970):** physiological, safety, love/belonging, esteem, self-actualisation; deficiency needs vs the growth need at the apex; peak experience.
- **Murray (1938):** psychogenic needs, measured by the Thematic Apperception Test (TAT).
- **McClelland (1961):** three learned motives, need for achievement (nAch, prefers moderate-difficulty tasks), affiliation (nAff), and power (nPow).
- **Self-determination theory (Deci and Ryan 1985, 2000):** intrinsic vs extrinsic motivation on an internalisation continuum; three basic needs, autonomy, competence, relatedness; overjustification effect.
- **Currently accepted:** a multi-system view, homeostatic drives plus incentive salience plus higher cognitive goals; wanting (dopamine) dissociated from liking (opioid).
- **Neural correlate:** mesolimbic dopamine (ventral tegmental area to nucleus accumbens) for incentive salience and reward prediction error; lateral hypothalamus = hunger/feeding-on centre (lesion causes aphagia); ventromedial hypothalamus = satiety centre (lesion causes hyperphagia and obesity).

## 6 · Emotion theories and neural circuits

An **emotion** is a brief, intense, object-directed affective response with three coupled components: a felt subjective experience, a physiological (autonomic and endocrine) change, and an expressive-behavioural output, all triggered by an appraised event. It is distinguished from **mood**, which is a more prolonged, less intense, and often objectless affective background. The whole topic is best read as one long argument about *sequence*: given a bear on the path, which comes first, the pounding heart or the fear? **Body-first or cognition-first.** Every named theory is a different answer to that single question, and each one fixed a specific hole in the theory before it.

For the exam the payload is fourfold: the ordered theories with their authors and the one claim each is remembered for; the body-first versus cognition-first axis that organises them; the currently accepted synthesis (appraisal plus interoception plus construction); and the neural correlate that grounds it all, the limbic system and the Papez circuit, the amygdala with LeDoux's

two roads, and the insula for interoception. The anatomy has its deep home in the Functional Neuroanatomy & Neurophysiology notes; here it is the substrate for the psychology. Structure the answer as an evolution, not a list.

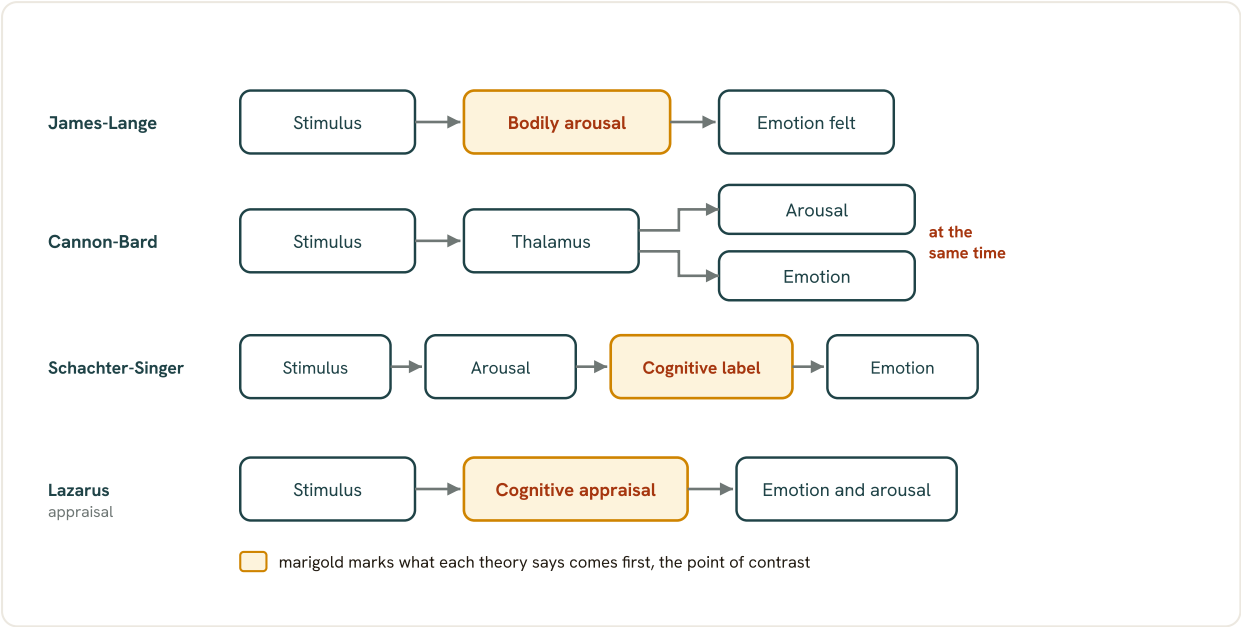



**Fig 4.5** The four classic theories of emotion differ over the ORDER of arousal, cognition and feeling. James-Lange puts the bodily change first and reads emotion as the perception of it; Cannon-Bard makes arousal and feeling simultaneous outputs of the thalamus; Schachter and Singer's two-factor theory needs undifferentiated arousal plus a cognitive label; Lazarus makes an appraisal the trigger. The enduring debate is body-first versus cognition-first, which modern appraisal, interoception and constructed-emotion accounts largely reconcile.

### 6.1 Darwin: emotions as evolved, universal, adaptive expressions

**The starting point.** Charles Darwin (1872), in *The Expression of the Emotions in Man and Animals*, made the first scientific claim about emotion: that emotional expressions are innate, evolved, and serve adaptive communicative and preparatory functions, and that the same core expressions (the bared teeth of anger, the recoil of fear) appear across human cultures and are continuous with those of other animals. **What it fixed.** It moved emotion out of philosophy and theology and into biology, framing it as a product of natural selection rather than a moral or spiritual state. **What it left debated.** Darwin described the *output* (the expression) and its evolutionary purpose, but said nothing about the internal *mechanism*: what actually generates the felt emotion inside the organism, and in what order its parts arise. That mechanistic question is what the next century fought over (Kaplan and Sadock 2024).

### 6.2 James-Lange: the body changes first, emotion is its perception

**The bodily-feedback theory.** William James (1884) and, independently, the Danish physiologist Carl Lange proposed the counter-intuitive **james-lange** theory: an emotion is not the cause of bodily change but the *perception* of it. James put it in his famous inversion of common sense: we do not tremble because we are afraid, we are afraid because we tremble. In his own words, "we meet a bear, are frightened and run . . . the more rational statement is we feel afraid because we tremble" (James 1884). The sequence is therefore: stimulus, then bodily and autonomic response (racing heart, sweating, fleeing), then perception of that response, which *is* the emotion. A strong prediction follows: each distinct emotion must have a distinct bodily signature, since the feeling

is nothing but the read-out of the body. **What it fixed.** It gave Darwin's output an internal mechanism and made emotion an embodied, testable process rather than a disembodied mental event. **What it left debated.** It required different emotions to map onto reliably different visceral patterns, and it made the body the sole source of feeling, both of which the next theory attacked head-on (Kaplan and Sadock 2024).

### 6.3 Cannon-Bard: body and feeling arise together, driven by the thalamus

**The central (thalamic) theory.** Walter Cannon (1927), later developed by his student Philip Bard, mounted three empirical objections to james-lange and replaced it with the **cannon-bard** theory. His evidence: surgically isolating the viscera from the brain did not abolish emotional behaviour in animals; artificially inducing visceral changes (for example an adrenaline injection) did not by itself produce a genuine emotion; and autonomic responses are too slow and too uniform to account for the speed and variety of felt emotion. Cannon concluded that an emotional stimulus produces *two parallel outputs*: the thalamus (in modern terms, the thalamus and hypothalamus) simultaneously and independently sends one signal up to the cortex, producing the conscious feeling, and one signal down to the body, producing the autonomic arousal. The sequence is therefore: stimulus, then feeling and bodily change *at the same time*, neither causing the other. **What it fixed.** It broke the requirement for unique bodily signatures and located emotion in the brain rather than the periphery, giving it a neuroanatomical seat. **What it left debated.** By making arousal and feeling wholly parallel and independent, it left no role for how the arousal is *interpreted*, the very gap the next theory exploited (Kaplan and Sadock 2024).

### 6.4 Schachter-Singer: two factors, arousal plus a cognitive label (the adrenaline study)

**The two-factor (arousal-cognition) theory.** Stanley Schachter and Jerome Singer (1962) proposed that an emotion requires *two* ingredients: undifferentiated physiological arousal, plus a cognitive **label** that interprets that arousal in light of the situation. The same racing heart is felt as fear in a threatening context and as euphoria in a joyful one; the arousal supplies the intensity, the cognition supplies the identity. Their classic **schachter** experiment tested this: participants were injected with adrenaline (epinephrine) or saline and then placed with a confederate who acted either euphoric or angry. Crucially, some were correctly informed of the drug's arousing effects, some were told nothing, and some were misinformed. Those who had an *unexplained* arousal (told nothing or misinformed) took on the emotion modelled by the confederate, describing themselves as euphoric or angry to match; those who could correctly *attribute* their pounding heart to the injection did not. The arousal was constant; only the available cognitive explanation varied the emotion. This is the origin of *misattribution of arousal*. **What it fixed.** It reconciled james-lange and cannon-bard: the body supplies the arousal (james-lange) but is too undifferentiated to specify the emotion alone (cannon-bard's critique), so cognition does the specifying. **What it left debated.** It treated the cognitive label as a post-hoc read of an already-present arousal, and never fully specified *when* and *how* the appraisal happens, which the next debate addressed (Kaplan and Sadock 2024).

**TRAP** Schachter-Singer is **not** cognition-first. The undifferentiated arousal comes first and is then labelled by context, so it is body-first with cognition supplying only the identity; the same racing heart is fear beside a threat and euphoria beside joy.

### 6.5 Lazarus versus Zajonc: does appraisal come before feeling, or can affect be primary?

**The cognition-first theory and its challenger.** Richard Lazarus (1966, 1991) pushed cognition all the way to the front with the cognitive **appraisal** (cognitive-mediational) theory: an appraisal, an evaluation of the event's meaning for the self, is *necessary and prior*, and it determines both the emotion and the bodily response that follow. The **lazarus** sequence is: stimulus, then appraisal, then emotion (and its physiology) together. He distinguished *primary* appraisal (is this relevant and is it a threat, harm, or benefit to me?) from *secondary* appraisal (can I cope with it?), and it is the appraisal, not the event, that explains why the same lecture invitation delights one student and frightens another. Magda Arnold (1960) had first introduced "appraisal"; Lazarus built the full model. **The counter.** Robert Zajonc (1980, 1984) argued for *affective primacy*: some affect arises fast, automatically, and *independently of, or prior to,* full cognitive appraisal ("preferences need no inferences"), as when we flinch at a sudden loud sound or feel an instant, unexplained liking. This Lazarus-Zajonc debate is the classic exam contrast. **What it fixed and left open.** Lazarus explained individual and cultural differences in emotion to the same event; Zajonc showed appraisal cannot be the whole story because affect can outrun it. The tension between them, fast automatic affect versus slower deliberate appraisal, was resolved neurally rather than psychologically, by LeDoux's two roads (6.8), and both are folded into the modern synthesis (Kaplan and Sadock 2024).

### 6.6 Basic-emotion versus dimensional and constructed-emotion accounts

**The modern structural debate: how many emotions, and are they given or built?** Two rival modern camps carry Darwin's legacy forward.

#### Basic (discrete) emotion: Ekman

Paul Ekman (1970s onward), extending Darwin, holds that a small set of *basic emotions* are innate, biologically hard-wired, and universally recognised from the face across cultures, each with its own program and expression. The classic six are anger, disgust, fear, happiness, sadness, and surprise (later expanded to include contempt and others). Emotions are natural kinds the brain comes equipped with.

#### Dimensional (circumplex): Russell

James Russell (1980) argued emotions are not discrete categories but points in a continuous two-dimensional space, the *circumplex model*, whose axes are *valence* (pleasant to unpleasant) and *arousal* (activated to deactivated). Fear and excitement share high arousal but differ in valence; contentment and depression share low arousal. Emotion words label regions of this space rather than separate machines.

#### Constructed emotion: Barrett

Lisa Feldman Barrett (2017) advanced the *theory of constructed emotion*: emotions are not triggered but *constructed* in the moment by the brain, which uses concepts and past experience to make meaning of raw interoceptive and sensory signals (core affect) via predictive processing. The identical churning stomach becomes "hunger" in a bakery and "dread" in a waiting room, depending on the brain's

prediction. This is the current cutting edge and directly extends the two-factor idea: arousal is given, the categorising concept builds the emotion.

Ekman says emotions are discrete and given by evolution; Russell and Barrett say they are constructed from underlying dimensions of affect.

### 6.7 The currently accepted account: appraisal plus interoception plus construction

**Not one theory but their integration.** The *currently accepted* view is that no single classical theory is right and each captured a real piece. An emotional episode begins when an event is *appraised* for its significance to the self (Lazarus), often through a fast automatic route that can precede conscious appraisal (Zajonc); this appraisal drives an autonomic and endocrine *bodily* response whose sensing, *interoception*, is a genuine constituent of the feeling (the modern vindication of james-lange, via Damasio's *somatic marker hypothesis*, in which bodily signals bias decision-making); and the brain then *constructs* the specific, named emotion by categorising this core affect using learned concepts and context (Schachter-Singer's label, formalised by Barrett's constructed emotion within a predictive-processing framework). In short: appraisal sets it off, interoception gives it its felt body, and conceptual construction gives it its identity. This synthesis dissolves the body-first versus cognition-first war by making both continuously and reciprocally involved (Kaplan and Sadock 2024).

### 6.8 Neural correlate: the limbic system and the Papez circuit

**The historical anatomical model.** The neural correlate of emotion begins with the **limbic** system. James **papez** (1937, formalised 1939), building on Cannon's work, proposed that emotion is generated by a specific reverberating circuit, the *Papez circuit*: hippocampus, then via the fornix to the mammillary bodies of the hypothalamus, then via the mammillothalamic tract to the anterior thalamic nuclei, then to the cingulate gyrus (the seat of conscious emotional experience in his scheme), and back to the hippocampus, closing the loop. Paul MacLean (1949, 1952) extended this into the modern *limbic system* as the "visceral brain," adding the **amygdala**, the septal area, and the orbitofrontal and prefrontal cortex. The Papez circuit's clinical footprint is memory as much as emotion: lesions anywhere along it (classically the mammillary bodies and dorsomedial thalamus in Korsakoff syndrome) produce amnesia, tying this topic to the Functional Neuroanatomy & Neurophysiology notes anatomy (Kaplan and Sadock 2024).

### 6.9 Neural correlate: the amygdala (LeDoux's low and high roads) and the insula

**The fear hub and its two routes.** The single most important structure for emotion, especially fear, is the **amygdala**. Joseph LeDoux (1996) mapped how a threat reaches it by two parallel pathways from the sensory thalamus. The *low road* is a fast, direct, "quick and dirty" thalamo-amygdala projection that triggers a defensive response on a crude sketch of the stimulus before the cortex has finished processing it, the neural basis of Zajonc's affective primacy and of jumping at a stick that might be a snake. The *high road* is a slower thalamo-cortico-amygdala route that delivers a detailed cortical analysis which either confirms the threat and sustains the response or cancels it as a false alarm, the neural basis of Lazarus's appraisal. This two-road architecture resolves the appraisal-versus-primacy debate anatomically: both routes are real and run in parallel. The amygdala also tags experiences for emotional memory (why emotionally

charged events are remembered vividly) and is hyperresponsive in PTSD and anxiety disorders. Alongside it, the *insula* (insular cortex) is the cortical hub for *interoception*, mapping the internal bodily state, and is the neural home of the james-lange and Barrett strand: it is central to disgust and to the felt bodily quality of emotion. The *orbitofrontal and ventromedial prefrontal cortex* integrate emotion with value and regulate the amygdala (Damasio's somatic-marker substrate); the *ventral striatum and mesolimbic dopamine* system carries reward and positive affect (Kaplan and Sadock 2024, Companion to Psychiatric Studies 2010).

HOLD THIS

**LeDoux's two roads settle the appraisal-versus-primacy debate anatomically.** The fast low road (thalamo-amygdala) fires before the cortex finishes (Zajonc's primacy); the slow high road (thalamo-cortico-amygdala) delivers the appraisal (Lazarus). Both run in parallel.

CLINICAL ANCHOR

The amygdala model is directly clinical. In PTSD the low road becomes sensitised: trauma reminders drive an exaggerated amygdala response with deficient prefrontal (high-road) regulation, so the fear fires before appraisal can veto it. The Kluver-Bucy syndrome (bilateral amygdala and anterior temporal damage) shows the mirror image: loss of fear and rage, placidity, hyperorality and hypersexuality, proving the amygdala is necessary to attach threat-value to stimuli. Panic disorder and specific phobia are understood as amygdala-centred fear circuits, and exposure therapy works by strengthening prefrontal extinction of that response.

COMMON TRAP

Do not confuse the two "simultaneous" theories with the sequential ones. James-lange is strictly body-first (arousal, then feeling); cannon-bard is simultaneous-and-independent (arousal and feeling together, neither causing the other); schachter-singer is arousal-then-label (body-first but needs cognition to name it); lazarus appraisal is cognition-first (appraisal, then feeling and body together). A frequent error is to call schachter-singer "cognition-first": it is not, the arousal comes first and is then interpreted. Also, Papez proposed the *circuit*; MacLean coined and extended the *limbic system* and added the amygdala.

### 6.10 Worked example: the snake on the path

**One stimulus, read by every theory.** You are walking and a coiled shape lunges at your foot. *Darwin:* your face and body throw an evolved, universal fear display (widened eyes, recoil) that readies you and warns others. *James-lange:* your body jerks back and your heart pounds first, and it is your perception of that pounding-and-fleeing body that *is* the fear. *Cannon-bard:* the thalamus fires two signals at once, so you feel fear and your heart races simultaneously and independently. *Schachter-singer:* you feel a surge of undifferentiated arousal and, reading the context (a snake), you label it "fear"; the same surge on a rollercoaster you would label "thrill." *Lazarus appraisal:* a lightning appraisal ("that thing can harm me") comes first and generates both the fear and the racing heart; had you appraised it as a garden hose, no fear would arise. *Zajonc and LeDoux, resolved neurally:* the low road fires the amygdala and yanks your foot back before you consciously know what it is (affective primacy); a heartbeat later the high road delivers the

cortex's verdict, "only a rope," and the prefrontal cortex quenches the amygdala and the fear subsides. *Currently accepted synthesis:* the fast appraisal via the amygdala, the interoceptive body-signal sensed by the insula, and the concept "snake-fear" that your brain constructs from context together make the single experience you would call terror. **Same snake, one integrated fear, assembled from appraisal, body, and construction.**

**GOOD TO REMEMBER**

- **Darwin (1872):** emotional expressions are innate, evolved, adaptive and universal across cultures and species; describes the output, not the mechanism.
- **James-Lange (James 1884, Lange):** body-first; emotion is the *perception* of bodily/autonomic change ("we are afraid because we tremble"); predicts a unique bodily pattern per emotion.
- **Cannon-Bard (Cannon 1927, Bard):** thalamic theory; arousal and feeling occur *simultaneously and independently*; critiqued james-lange (visceral isolation preserves emotion, arousal too slow and uniform).
- **Schachter-Singer (1962):** two-factor = physiological arousal + cognitive label; the adrenaline (epinephrine) and confederate study; origin of *misattribution of arousal*.
- **Lazarus (1966, 1991):** cognitive appraisal (cognitive-mediational) theory; appraisal is prior and necessary; primary appraisal (threat/harm/benefit) and secondary appraisal (coping). Arnold (1960) first named "appraisal."
- **Zajonc (1980):** affective primacy; some affect precedes/bypasses cognition ("preferences need no inferences"); the classic counter to Lazarus.
- **Ekman:** basic (discrete) emotions, innate and universal from the face; classic six = anger, disgust, fear, happiness, sadness, surprise.
- **Russell (1980):** circumplex / dimensional model; two axes = valence (pleasant-unpleasant) and arousal (activated-deactivated).
- **Barrett (2017):** theory of constructed emotion; emotions are built from core affect plus concepts via predictive processing; current cutting edge.
- **Currently accepted:** appraisal (Lazarus) + interoception (james-lange revived; Damasio somatic markers) + construction (Schachter-Singer label, Barrett); dissolves body-first vs cognition-first.
- **Papez circuit (Papez 1937/1939):** hippocampus, fornix, mammillary bodies (hypothalamus), mammillothalamic tract, anterior thalamic nuclei, cingulate gyrus, back to hippocampus. Lesions cause amnesia (Korsakoff). Cross-ref the Functional Neuroanatomy & Neurophysiology notes.
- **MacLean (1949):** named the limbic system ("visceral brain"); extended Papez to add the amygdala, septal area and prefrontal cortex.
- **Amygdala (LeDoux 1996):** fear hub; *low road* = fast thalamo-amygdala (primacy); *high road* = slow thalamo-cortico-amygdala (appraisal); tags emotional memory; hyperactive in PTSD; Kluver-Bucy = its loss.
- **Insula:** interoceptive cortex, felt bodily quality of emotion and disgust; the modern seat of the james-lange/Barrett strand.

## 7 · Consciousness and altered states

Consciousness is the most slippery construct in the whole of psychology and the one the exam most reliably rewards for clean structure. The single organising move, without which nothing else makes sense, is to split the word in two. **Level versus content.** **Level of consciousness** is *arousal*: the global on-off dimension that runs from alert wakefulness down through drowsiness, clouding, stupor, and coma, and is a property of brainstem and thalamic machinery. **Content of consciousness** is *awareness*: the actual perceptions, thoughts, and feelings present to the mind at

a given moment, a property of the cortex. The two are dissociable, which is exactly why the distinction earns its keep: the vegetative-state patient has arousal (eyes open, sleep-wake cycles) with no demonstrable content, while REM-sleep dreaming and vivid hallucination are rich content at a reduced or altered level (Parvizi and Damasio 2001).

For the exam the payload is fourfold and this fragment follows the standard evolution-of-theories spine. First the definitions and the philosophical problem that frames the field. Then the theories *in the order they appeared*, each fixing what its predecessor left unexplained: James's stream, the psychodynamic topography, and the two modern cognitive accounts, Global Workspace and Integrated Information. Then the *currently accepted* position and its **neural correlate**, the ascending reticular activating system, thalamocortical loops, and the default-mode network. Finally the map of **altered states**, from normal sleep and dreaming (sleep architecture proper is the Functional Neuroanatomy & Neurophysiology notes, cross-refer there) through hypnosis, meditation, and drug states to the clinical altered states, delirium, dissociation, and the disorders of consciousness (coma, vegetative and minimally conscious states).

### 7.1 Definitions: the two axes, and the hard problem

**Consciousness has a quantity and a quality.** The clinically indispensable framing (Parvizi and Damasio 2001) is that consciousness varies along two orthogonal axes. *Level* (arousal, wakefulness) is the quantitative dimension graded from full alertness to coma; it is generated subcortically and is what a Glasgow Coma Scale measures. *Content* (awareness) is the qualitative dimension, the specific things one is conscious *of*; it is generated by the cortex. Normally the two rise and fall together, but disorders of consciousness are precisely the states where they come apart.

#### Level (arousal)

The global degree of wakefulness. A single continuum: alert, drowsy, clouded, stuporous, comatose. Subcortical (reticular activating system, thalamus).

#### Content (awareness)

The set of things present to experience at a moment, the "buzzing, booming stream" (James's phrase, quoted approvingly by Kaplan and Sadock 2024). Cortical, and highly differentiated.

#### Self-awareness (reflexive)

Awareness that *it is I* who am experiencing: the higher-order sense of a subject. Selectively disrupted in depersonalisation and dissociation.

#### The "hard problem"

Chalmers's (1995) term for the question that survives every mechanistic advance: why is there *something it is like* to be conscious at all, why does information processing generate subjective experience (qualia)? He contrasted it with the "easy problems" (explaining discrimination, integration, report), which are hard in practice but conceptually tractable. The distinction marks the boundary of what any neuroscience can currently claim to have solved.

RULE **Split the word first: level versus content.** Level is arousal (subcortical, coma-to-alert); content is awareness (cortical). They are dissociable, which is the whole point of the distinction.

### 7.2 William James: the stream of consciousness

**The first psychological description.** William James, in *The Principles of Psychology* (1890), gave consciousness its founding characterisation as a **stream of consciousness**, a continuous, ever-changing, personal flow rather than a chain of discrete "ideas." He fixed four properties that still anchor phenomenological accounts: consciousness is *personal* (always belonging to a self), *continuous* (no gaps felt from within, even across sleep), *constantly changing* (never twice the same state), and *selective* (attention foregrounds some contents and lets the rest fall away). **What it fixed.** It replaced the atomistic "ideas" of the British associationists with a lived, flowing process, and put selective attention at the centre. **What it left debated.** It was pure introspective description with no mechanism and no account of the unconscious, and introspection itself was soon attacked as unreliable, the gap the next tradition filled from the clinic (Kaplan and Sadock 2024).

### 7.3 The psychodynamic topography: conscious, preconscious, unconscious

**Most of the mind is out of view.** Freud's topographic model (1900, 1915) reframed consciousness as only the surface of the mind, and did so by dividing mental content by its *accessibility to awareness*. The **conscious** system holds what is in awareness now. The **preconscious** holds material not currently in mind but readily retrievable by directing attention (your mother's name a second before you are asked). The **unconscious** holds material actively barred from awareness by repression, dynamic rather than merely dormant, and knowable only through its derivatives: dreams (the "royal road"), slips of the tongue (parapraxes), symptoms, and free association. **What it fixed.** It gave introspection's blind spots a systematic cause and made the inaccessible mind a legitimate object of study, and it grounds the whole clinical use of dreams and defences. **What it left debated.** The topography was later folded into the structural model (id, ego, superego, the Freud and psychoanalysis topic), and the dynamic unconscious remains empirically contested; cognitive science kept the idea of non-conscious processing while discarding the repression mechanism (Kaplan and Sadock 2024).

### 7.4 Global Workspace theory (Baars): consciousness as broadcast

**Consciousness is a stage that broadcasts.** Baars's (1988) **Global Workspace theory** was the first cognitive-science account to specify a *function* for consciousness rather than merely describe it. The mind runs a vast number of specialised, parallel, unconscious processors; most of their work never becomes conscious. A given content becomes conscious when it wins the competition for access to a limited-capacity *global workspace* and is then *broadcast* widely, making it available to all the other processors at once (the "theatre" metaphor: a spotlight of attention on a stage, broadcasting to a dark auditorium of unconscious modules). Consciousness, on this view, is what integration and global availability look like from inside. Dehaene's *global neuronal workspace* (2001 onward) gave it a neural implementation: conscious access corresponds to a sudden, all-or-none "ignition" of long-range fronto-parietal networks. **What it fixed.** It made consciousness a testable information-processing function (global availability) and predicted the empirical signature of conscious versus unconscious stimuli. **What it left debated.** It arguably explains *access* consciousness (report, availability) while sidestepping Chalmers's hard problem of *why*

broadcast should feel like anything, the gap the next theory attacks head-on (Kaplan and Sadock 2024).

### 7.5 Integrated Information theory (Tononi): consciousness as integrated information

**Consciousness is how much a system integrates information.** Tononi's (2004 onward) **Integrated Information theory** (IIT) inverts the usual approach: it starts from the felt properties of experience and asks what a physical system must be like to have them. Its claim is that consciousness *is* integrated information, quantified as **phi** (the "i"-with-a-line symbol Tononi used), the amount of information a system generates *as a unified whole* over and above the information of its parts considered separately. A system is conscious to the degree that it is both highly *differentiated* (many possible states) and highly *integrated* (irreducible to independent parts). **What it fixed.** It offers, in principle, a measure that explains why the thalamocortical system is conscious while the cerebellum (equally many neurons, but modular and feed-forward) is not, and it motivated the clinically promising perturbational complexity index used to detect covert awareness. **What it left debated.** Phi is effectively incomputable for real brains, and IIT's willingness to attribute graded consciousness to any sufficiently integrated system (a panpsychist flavour) draws sharp criticism; it remains a rival to, not a replacement of, workspace accounts (Kaplan and Sadock 2024).

### 7.6 The currently accepted position

**A pragmatic convergence, not a solved problem.** There is no settled theory of consciousness, and the honest exam answer says so. The *currently accepted* working position combines three things. First, the level/content distinction is treated as foundational and clinically decisive. Second, at the mechanistic level the field converges on the idea that conscious content requires *large-scale integration and global availability* across the cortex (Global Workspace and IIT are the two leading, competing formalisations of that single intuition), gated by a functioning arousal system. Third, the "easy problems" of access, report, and integration are regarded as tractable and actively yielding to neuroscience, while Chalmers's hard problem of subjective experience is acknowledged as unresolved. In short: consciousness is operationally split into arousal (a brainstem-thalamic level) plus awareness (a cortical, integrated, globally broadcast content), and that operational split, not any single grand theory, is what current clinical and research practice runs on (Kaplan and Sadock 2024).

### 7.7 The neural correlate: arousal system, thalamocortical loops, default-mode network

**Level and content have different substrates.** The neurobiology maps cleanly onto the two axes, which is why the correlates are worth memorising as a pair.

#### Arousal (level): the ascending reticular activating system

The **ascending reticular activating system** (ARAS), a network of brainstem tegmental nuclei (cholinergic, noradrenergic, serotonergic, and the histaminergic tuberomammillary and orexinergic hypothalamic components) projecting up through the thalamus and basal forebrain to the cortex, sets the global level of wakefulness. Focal damage here, or to the paramedian thalamus it drives, abolishes arousal and produces coma; it is the on-switch for consciousness (the web-cache reviews call it the basic mechanism of awareness).

### Content (awareness): thalamocortical loops

Recurrent **thalamocortical** loops, the reciprocal circuits between specific and intralaminar thalamic nuclei and the cortex, are the substrate of conscious content and of its integration. Loss of thalamocortical integration (deep anaesthesia, slow-wave sleep, vegetative state) abolishes awareness even when some arousal persists; their integrity is what IIT's complexity measures probe.

### The self and internal awareness: the default-mode network

The **default-mode network** (medial prefrontal cortex, posterior cingulate and precuneus, and lateral parietal cortex) is most active during rest and internally directed cognition (mind-wandering, self-reference, autobiographical thought). Its activity tracks the self-related, narrative stream of content, is suppressed by demanding external tasks, and is characteristically disrupted in the altered states below (deep meditation, psychedelics, and disorders of consciousness).

## 7.8 Normal altered states: sleep, dreaming, and the transitional states

**The baseline already shifts nightly.** Not every altered state is exotic; the ordinary sleep-wake cycle is the reference case. An *altered state of consciousness* is a recognisable, marked departure from the ordinary waking baseline in perception, cognition, emotion, and sense of self (Vaitl 2012). Sleep is the paradigm: *non-REM* sleep is a low-arousal, low-content state, while *REM* sleep pairs a highly activated, "wake-like" brain with vivid, bizarre, poorly-remembered *dreaming*, the classic dissociation of high internal content from external disconnection. Between wake and sleep sit the brief *transitional* states: *hypnagogic* (falling asleep) and *hypnopompic* (waking) imagery, and everyday *daydreaming* and reverie. **Cross-reference.** The detailed sleep architecture, the NREM stages, the REM cycle, the EEG signatures, and the neurobiology of the sleep-wake switch, is covered in the Functional Neuroanatomy & Neurophysiology notes; here it functions only as the exemplar altered state (Kaplan and Sadock 2024).

## 7.9 Hypnosis: the state versus non-state debate and susceptibility

**A trance, or just role and expectancy?** Hypnosis is a state of focused, absorbed attention with heightened suggestibility and reduced peripheral awareness, naturally distributed through the population (Tasman 2015 describes it as "a natural state of attentive, focused concentration"). The central theoretical fault-line is whether it is a distinct altered state at all.

| POSITION | CORE CLAIM | KEY NAMES / EVIDENCE |
|---|---|---|
| **State (special-process) theories** | **Hypnosis is a genuinely altered state of consciousness, involving a real dissociation of control and monitoring from awareness** | Hilgard's *neodissociation* theory and the "hidden observer"; a divided consciousness in which one stream registers pain the reporting stream denies |
| **Non-state (socio-cognitive) theories** | **No special state is needed; effects arise from ordinary suggestion, expectancy, motivation, and role enactment** | Barber, Spanos, Sarbin; hypnotic responses reproducible in motivated non-hypnotised subjects |

The debate is unresolved; both camps agree on the phenomena and disagree on whether they require a distinct state.

**Susceptibility is the stable, measurable variable.** The best-replicated fact about hypnosis is that responsiveness (*hypnotisability* or hypnotic susceptibility) is a trait-like, roughly normally

distributed, and stable individual difference, measured by standardised scales, the *Stanford Hypnotic Susceptibility Scales* and the *Harvard Group Scale*. It correlates with the trait of *absorption* (the tendency to become fully immersed in imaginative experience) and predicts clinical response; a minority are highly hypnotisable, a minority essentially refractory, most intermediate (Tasman 2015; Kaplan and Sadock 2024).

### 7.10 Meditation and drug-induced states

**Two deliberate routes to an altered state.** **Meditation** is a family of self-regulation practices that intentionally alter consciousness through the control of attention; the two broad styles are *focused-attention* meditation (sustained concentration on a single object, the breath, a mantra) and *open-monitoring* or mindfulness meditation (non-reactive awareness of whatever arises). Its neural signature centres on altered *default-mode network* activity, reduced self-referential mind-wandering in experienced meditators, alongside changes in prefrontal and insular regulation of attention and interoception. **Drug-induced states** are altered states produced pharmacologically, understood by drug class and shared phenomenology: classic *psychedelics* (LSD, psilocybin, mescaline; serotonin 5-HT2A agonists) disorganise and reduce default-mode network integration, correlating with ego-dissolution; *dissociatives* (ketamine, PCP; NMDA antagonists) uncouple perception from self; sedatives and general anaesthetics collapse thalamocortical integration to abolish awareness. One influential integrative account is *transient hypofrontality* (Dietrich), which explains several altered states (the runner's high, flow, some drug and meditative states) as a temporary down-regulation of prefrontal function (Kaplan and Sadock 2024; ScienceDirect *Encyclopedia of Consciousness* 2009).

- **Psychedelics** - LSD, psilocybin, mescaline; 5-HT2A agonists; reduce default-mode network integration (ego-dissolution).
- **Dissociatives** - ketamine, PCP; NMDA antagonists; uncouple perception from self.
- **Sedatives / anaesthetics** - collapse thalamocortical integration to abolish awareness.

> **INDIA**
>
> The contemplative traditions the exam frames as "meditation" are indigenous to the subcontinent, dhyana and samadhi in the yogic tradition, vipassana in the Buddhist. Transcendental Meditation and mindfulness-based programmes now used clinically are secularised derivatives. Worth naming in a viva both for cultural literacy and because Indian psychiatry has an active research base in yoga-based interventions.

### 7.11 Clinical altered states: delirium and clouding of consciousness

**The commonest pathological altered state on the ward.** A reduction in the *level* of consciousness, short of coma, is the core of **delirium** and is described on a graded vocabulary the exam expects verbatim. **Clouding of consciousness** is the mildest: a state ranging from barely perceptible impairment to definite drowsiness in which the person reacts incompletely to stimuli, with impaired attention, concentration, and memory, disturbed orientation, and muddled thinking; it is the *defining feature of delirium* (Shorter Oxford, Harrison et al. 2018). Delirium adds to this clouding an acute onset, a *fluctuating* course (worst at night, "sundowning"), inattention as

the cardinal deficit, and perceptual disturbance (illusions and visual hallucinations, which are far more likely when the level of consciousness is reduced). It is the exemplar of an organic altered state and a medical emergency.

**COMMON TRAP**

"Stupor" is a false friend across specialties. In *psychiatry*, stupor means a state in which the patient is immobile, mute, and unresponsive but appears *fully conscious* (eyes open, following objects, reflexes normal), as in catatonia. In *neurology*, stupor implies an *impairment of the level* of consciousness, a state of reduced arousal from which the patient can be roused only by vigorous stimulation. State which sense you mean (Shorter Oxford, Harrison et al. 2018).

### 7.12 Clinical altered states: dissociation

**A splitting of content, not a lowering of level.** **Dissociation** is a disruption of the normal *integration* of consciousness, memory, identity, emotion, perception, and body awareness, with arousal typically preserved. Where delirium lowers the level, dissociation fragments the content: functions that normally stream together, the sense of self, the ownership of memories, the reality of perception, come apart. The clinical forms mark which integration has failed: *depersonalisation* (detachment from one's own self, "as if a robot") and *derealisation* (detachment from surroundings, "as if a film"), dissociative *amnesia* (loss of access to autobiographical memory), and, at the severe end, dissociative *identity* disorder. Trauma is the classic antecedent, and high hypnotisability links dissociation back to 7.9, the same capacity for absorbed, divided awareness underlies both (Kaplan and Sadock 2024).

### 7.13 Disorders of consciousness: coma, vegetative and minimally conscious states

**Where level and content dissociate completely.** Severe brain injury produces a graded family of disorders of consciousness that the level/content framework organises perfectly, running from no arousal and no awareness up to fluctuating awareness.

| STATE | AROUSAL (LEVEL) | AWARENESS (CONTENT) | HALLMARK |
|---|---|---|---|
| **Coma** | Absent | **Absent** | Eyes closed, no sleep-wake cycle, unrousable; ARAS or bilateral cortical failure. Time-limited (days to weeks), evolving to recovery, VS, or death. |
| **Vegetative state (unresponsive wakefulness)** | Present | **Absent** | Eyes open, sleep-wake cycles return, but no reproducible sign of awareness. The defining dissociation: arousal without content. "Persistent" if prolonged. |
| **Minimally conscious state** | Present | **Present but minimal and fluctuating** | Inconsistent but reproducible signs of awareness (command-following, visual tracking, appropriate emotion). Better prognosis than VS. |
| **Locked-in syndrome** | Present | **Fully present (not a disorder of consciousness)** | The trap: full awareness and arousal but near-total motor paralysis (ventral pons lesion), often only vertical eye movements. Consciousness is intact; the deficit is output. |

Coma is transient; the vegetative state is the pure dissociation of arousal from awareness; locked-in syndrome is intact consciousness misread as unconsciousness.

Level of consciousness at the bedside is quantified by the *Glasgow Coma Scale* (Teasdale and Jennett 1974), scoring eye-opening, verbal, and motor responses to a total of **3** (deepest coma) to **15** (fully alert). Emerging techniques (task-based fMRI, the perturbational complexity index derived from IIT) can now detect *covert* awareness in a subset of behaviourally unresponsive patients, the clinical pay-off of the integration theories above (Kaplan and Sadock 2024).

### 7.14 Worked example: the vegetative-state patient and the two axes

**One bedside picture that makes the whole topic cohere.** A young man survives a severe traumatic brain injury. After two weeks in coma (no eye-opening, unrousable, GCS 5) he begins to open his eyes and cycle between sleep and apparent wakefulness, yet he tracks nothing, follows no command, and shows no reproducible response to his family. He is in a *vegetative state*: his ascending reticular activating system has recovered enough to restore *arousal* (level), but his thalamocortical integration has not recovered enough to generate *awareness* (content). This single dissociation, eyes open but no one home, is the clinical proof that level and content are separate axes with separate substrates, and it is why the family's intuitive question ("he's awake, so is he

conscious?") has the counter-intuitive answer "awake is not the same as aware." Months later he begins, inconsistently, to squeeze a hand on request and to smile at his mother: fluctuating, reproducible signs of content have appeared, and he has crossed into the *minimally conscious state*, a better-prognosis category. A task-based fMRI showing him imagining playing tennis on command would be evidence of covert awareness, content detectable by the brain when behaviour cannot express it (Kaplan and Sadock 2024).

HOLD THIS

**The vegetative state is the pure dissociation: arousal present, awareness absent.** "Eyes open but no one home" is why awake is not the same as aware, and it proves level and content have separate substrates (ARAS versus thalamocortical loops).

**GOOD TO REMEMBER**

- **Level versus content (Parvizi and Damasio 2001):** level = arousal/wakefulness (subcortical, coma-to-alert); content = awareness (cortical). Dissociable; the master distinction.
- **Hard problem (Chalmers 1995):** why is there subjective experience (qualia) at all, versus the tractable "easy problems" (discrimination, integration, report).
- **William James (1890):** stream of consciousness; four properties: personal, continuous, constantly changing, selective.
- **Freud topographic model (1900, 1915):** conscious / preconscious (retrievable) / unconscious (repressed, dynamic; known via dreams, slips, symptoms).
- **Global Workspace theory (Baars 1988; Dehaene global neuronal workspace):** content becomes conscious by winning access to a limited workspace and being broadcast widely ("theatre/spotlight"); explains access consciousness.
- **Integrated Information theory (Tononi 2004):** consciousness = integrated information, measured as phi; needs differentiation plus integration; explains why cortex is conscious and cerebellum is not.
- **Currently accepted:** no single theory; convergence on integration plus global availability for content, gated by arousal; hard problem unresolved.
- **Neural correlate:** ascending reticular activating system (ARAS, brainstem-thalamus) = arousal/level; thalamocortical loops = content integration; default-mode network (mPFC, posterior cingulate/precuneus, lateral parietal) = self-referential internal content.
- **Altered state (Vaitl 2012):** marked departure from waking baseline in perception, cognition, emotion, self; sleep is the paradigm; hypnagogic/hypnopompic are transitional.
- **Hypnosis debate:** state (Hilgard neodissociation, "hidden observer") versus non-state / socio-cognitive (Barber, Spanos, Sarbin: suggestion, expectancy, role).
- **Hypnotisability:** stable, trait-like, roughly normally distributed; Stanford and Harvard scales; correlates with absorption.
- **Meditation:** focused-attention versus open-monitoring (mindfulness); alters default-mode network activity.
- **Drug states by class:** psychedelics (5-HT2A agonists, reduce DMN integration, ego-dissolution); dissociatives (NMDA antagonists, ketamine/PCP); sedatives/anaesthetics (collapse thalamocortical integration). Transient hypofrontality (Dietrich) as an integrative account.
- **Clouding of consciousness:** mild reduced level with impaired attention/orientation and muddled thinking; the defining feature of delirium; delirium adds acute onset, fluctuating course, inattention, visual hallucinations.
- **Stupor (false friend):** psychiatry = immobile/mute but fully conscious (catatonia); neurology = impaired level, rousable only by vigorous stimulation.
- **Dissociation:** failed integration of content with arousal preserved; depersonalisation, derealisation, dissociative amnesia, dissociative identity disorder; trauma-linked.
- **Disorders of consciousness:** coma (no arousal, no awareness; transient); vegetative/unresponsive wakefulness (arousal present, awareness absent); minimally conscious state (minimal, fluctuating awareness); locked-in syndrome (full consciousness, motor output lost, ventral pons).
- **Glasgow Coma Scale (Teasdale and Jennett 1974):** eye, verbal, motor; total 3 (deepest coma) to 15 (fully alert).

## 8 · Creativity and divergent thinking

Creativity is the general-psychology topic the exam most often pairs with intelligence, because the two capacities overlap but are not the same, and the discriminator (an intelligent person converges on the one right answer, a creative person generates many) is exactly what a viva examiner wants you to draw. It is worth teaching as its own clean evolution-of-theories story: a

definition, then the models in the order they appeared, each fixing something the last one missed, ending in the currently accepted componential and systems view, its neural correlate, and a clinical anchor. That clinical anchor is the reason creativity earns a place in a psychiatry syllabus at all, the century-old and much-abused "mad genius" question, and specifically the link between the bipolar spectrum and creative achievement, which the modern evidence reframes soberly rather than romantically. **One question runs through the whole topic: what kind of thinking produces something both new and useful, and does it sit near, or apart from, ordinary intelligence and ordinary mental health?**

Ground text for the psychological models is the standard creativity literature (Guilford 1950, 1967; Torrance 1974; Wallas 1926; Sternberg and Lubart 1991; Csikszentmihalyi 1996), synthesised from the general-psychology canon and cross-checked against the Simonton definition used in modern reviews (Simonton 2012). The clinical link is grounded in the DSM-5-TR (2022) and Kaplan and Sadock (2024), and the historical clinical literature (Andreasen 1987; Jamison 1993). The threshold hypothesis and the neuroscience are drawn from the contemporary creativity-neuroscience literature (Guilford; Carson and colleagues 2003; Beaty and colleagues 2016).

### 8.1 Creativity defined: novel and useful, and the surprise criterion

**Creativity** is the ability to produce work that is both *novel* (original, statistically rare, not an obvious derivation) and *useful* (valuable, appropriate to the task, or effective as a solution). This two-part definition is the one the exam wants, because either half alone fails: a bizarre response that solves nothing is odd, not creative, and a workable idea everyone already had is competent, not creative. The modern refinement (Simonton 2012), adapted from the three criteria the US Patent Office uses to grant a patent, adds a third quality, *surprise* (the idea should be nonobvious, not a step-by-step deduction from existing expertise). Crucially all three are quantitative, matters of degree with a zero point, and an idea scoring zero on any one criterion has zero creativity: reinventing the wheel is useful but not original, so it is not creative; a parachute made of reinforced concrete is original and surprising but useless, so again not creative. Hold the working definition as *novel and useful*, and add *surprising* for the fuller account.

#### Novelty (originality)

The idea is statistically rare or unique, low in prior probability; not an obvious derivation.

#### Usefulness (appropriateness)

The idea is valuable, effective, or fit for the problem; it actually works.

#### Surprise (nonobviousness)

The idea does not follow step by step from acquired expertise (Simonton 2012, from the patent criteria).

RULE **Creativity needs both novel and useful (add surprising).** Each criterion has a zero point, so a zero on any one means zero creativity: reinventing the wheel is useful but not original; a concrete parachute is original but useless.

### 8.2 Guilford's turn: divergent versus convergent thinking

The founding move of the scientific study of creativity is J. P. **guilford**'s 1950 American Psychological Association presidential address, which put creativity on the research map and located it in a distinctive kind of thinking. He contrasted two modes. **Convergent thinking** narrows many possibilities down to the single best or correct answer, the mode intelligence tests reward (there is one right response, and speed and accuracy in reaching it are scored). **Divergent thinking** does the opposite: it fans outward from a starting point to generate many varied possibilities, with no single correct answer, and it is the cognitive engine Guilford proposed underlies creative production. What Guilford *fixed* was the prior assumption that creativity was just a by-product of high IQ, giving it a separate cognitive definition (divergent generation) and a way to measure it. What he *left debated* is whether divergent-thinking scores actually predict real-world creative achievement, a validity question that still qualifies every divergent-thinking test.

| FEATURE | CONVERGENT THINKING | DIVERGENT THINKING |
|---|---|---|
| **Goal** | Reach the one correct or best answer | **Generate many varied possible answers** |
| **Direction** | Narrows inward to a single point | **Fans outward from a starting point** |
| **Right answer?** | Yes, one defined solution | **No, an open field of options of varying value** |
| **Measured by** | IQ tests; the Remote Associates Test (RAT) | Unusual Uses Task; Torrance Tests (TTCT) |
| **Scored on** | Accuracy and speed | Fluency, flexibility, originality, elaboration |
| **Maps to** | Intelligence (mostly) | **Creativity (the generative engine)** |

Guilford's core distinction: intelligence tests reward convergence on one answer, whereas creativity rests on divergence into many, which is why IQ tests systematically miss it.

### 8.3 The four scores of divergent thinking: fluency, flexibility, originality, elaboration

Guilford operationalised **divergent** thinking through open-ended tasks, the classic being the **Unusual Uses Task** (name as many uses as you can for a common object such as a brick), and he scored the output on four dimensions that every subsequent test inherits. This quartet is high-yield and worth memorising as a set.

#### Fluency

The sheer number of appropriate responses generated (how many uses for the brick).

#### Flexibility

The number of distinct conceptual categories the responses span (using the brick as a weight, a weapon, a building block, and an art object crosses more categories than five uses that are all "as a weight").

#### Originality

The statistical rarity or unusualness of the responses (an answer few other people give scores higher).

**Elaboration**
The amount of detail and development added to each idea (how fully the use is worked out).

A related and equally examinable measure is the **Remote Associates Test** (RAT, Mednick 1962), which frames creativity as the ability to link ideas that sit far apart conceptually: given three cue words (widow, bite, monkey) the respondent finds the single word that connects them all (spider). Note that the RAT is convergent in form (one right answer) but taps the associative reach that creativity theorists prize, which is why it survives alongside the divergent tasks.

TRAP The Remote Associates Test is **convergent in form** (one right answer), not a divergent test, even though it is used to probe creativity. Divergent tasks (Unusual Uses, TTCT) fan out to many answers.

### 8.4 Guilford's structure-of-intellect: where divergent thinking lives

**guilford** embedded divergent production in a larger and famously over-ambitious map of the mind, the **structure-of-intellect (SOI) model** (1967). It treats every intellectual ability as the crossing of three facets: *operations* (what the mind does, including cognition, memory, evaluation, and the two production types, convergent production and divergent production), *contents* (the material worked on, such as figural, symbolic, semantic, behavioural), and *products* (the form of the result, such as units, classes, relations, systems). Multiplying the facets yielded a large grid of distinct abilities (in its expanded form up to 150). What SOI *fixed* was the placing of creativity firmly inside a theory of intellect rather than treating it as a mysterious spark: divergent production is one operation among several, no more mystical than memory. What it *left debated*, and where it was ultimately rejected, is that the model was too fine-grained and its many hypothesised abilities were not empirically independent, so SOI is remembered chiefly for the enduring convergent-versus-divergent distinction it carried, not for its 150-cell grid.

### 8.5 Torrance: the tests that made divergent thinking measurable

E. Paul **torrance** translated Guilford's ideas into the field's most widely used instrument, the **Torrance Tests of Creative Thinking (TTCT, 1966, 1974)**. The TTCT comes in verbal and figural forms (the figural form asks the child or adult to complete or build pictures from incomplete figures) and is scored on the Guilford-derived dimensions, principally fluency, flexibility, originality, and elaboration, later refined to emphasise originality and elaboration plus qualities such as resistance to premature closure and abstractness of titles. What Torrance *fixed* was the practical measurement problem: he gave educators and researchers a standardised, normed, scorable creativity test suitable for children, and his longitudinal follow-ups offered some of the first evidence that early divergent-thinking scores relate to later creative achievement. What he *left debated* is the ceiling of that predictive validity (divergent-thinking scores correlate with, but are far from equal to, real creative accomplishment) and the persistent worry that timed tick-box scoring captures only a thin slice of what creativity means.

### 8.6 Wallas's four-stage creative process

Alongside the ability tradition runs a process tradition, asking not how much creativity a person has but what steps a creative act passes through. The canonical scheme is Graham **Wallas**'s four-

stage model (*The Art of Thought*, 1926), which still frames how the creative process is taught.

**Preparation**
Conscious, effortful work: defining the problem and saturating oneself in the relevant knowledge and attempted solutions.

**Incubation**
The problem is set aside and worked on unconsciously; no deliberate effort, often during rest or unrelated activity.

**Illumination**
The sudden "aha," the insight arriving whole into consciousness (the moment the solution appears).

**Verification**
Conscious testing, elaboration, and refinement to confirm the insight actually works and to render it usable.

What Wallas *fixed* was the naive view that creation is one instantaneous flash: he showed it is a sequence in which conscious preparation and unconscious incubation both do necessary work before the flash, and verification does the unglamorous work after. What he *left debated* is the mechanism of incubation (is it genuine unconscious processing, mere forgetting of misleading fixed sets, or spreading activation during the pause) and whether the stages are truly discrete or overlapping and recursive. Note the deliberate link to the thinking topic: Wallas's *illumination* is the same Gestalt *insight* ("aha," sudden restructuring) met under problem-solving (cross-ref: Thinking, problem-solving and intelligence, insight).

### 8.7 Investment and systems theories: creativity as more than a trait

By the 1990s the field had moved from asking "what mental ability is creativity" to "what constellation of factors, inside and outside the person, produces creative work," giving two influential accounts. Robert **Sternberg and Todd Lubart**'s **investment theory** (1991) uses a market metaphor: creative people "buy low and sell high," pursuing ideas that are novel and undervalued (out of favour), developing them, and moving on. It names six convergent resources a creative act requires, namely intellectual abilities, knowledge, thinking styles, personality (tolerance of ambiguity, willingness to take sensible risks), intrinsic motivation, and a supportive environment. Mihaly **Csikszentmihalyi**'s **systems model** (1988, 1996) goes further outward, arguing creativity is not a property of a person at all but of a system with three parts in interaction: the *individual* (who produces a variation), the *domain* (the body of knowledge and symbols, such as mathematics or music, that the individual draws on and changes), and the *field* (the gatekeepers, editors, critics, and experts who decide whether the variation is accepted into the domain). On this view an idea is creative only when the field validates it and the domain absorbs it. What these theories *fixed* was the individualistic narrowness of the ability tradition, showing creativity depends on motivation, personality, and above all social validation, not on divergent thinking alone. What they *leave debated* is measurement: systems and investment accounts are rich but far harder to quantify than a divergent-thinking score.

### 8.8 Csikszentmihalyi's flow: the subjective state of creative work

Csikszentmihalyi's second major contribution, distinct from the systems model but examinable alongside it, is the concept of **flow** (1975, 1990): the fully absorbed, optimal state of consciousness in which a person is completely immersed in an activity, action and awareness merge, self-consciousness and the sense of time fall away, and the activity becomes intrinsically rewarding (autotelic). Flow arises specifically at the balance point where the *challenge* of the task matches the person's *skill*: too much challenge for the skill breeds anxiety, too little breeds boredom, and only the matched zone produces flow. Flow is the phenomenology of engaged creative (and skilled) activity and connects the creativity literature to positive psychology and to the "engagement" pillar of well-being (cross-ref: Motivation and emotion; positive psychology).

### 8.9 The threshold hypothesis: how much intelligence creativity needs

The relationship between creativity and intelligence is not "more is always more," and the exam-relevant summary is the **threshold hypothesis** (associated with Guilford and elaborated by later work). It holds that intelligence and creativity are positively correlated up to a point, but only up to a threshold conventionally placed around an **IQ** of **120**: below the threshold, a certain baseline of general intelligence is genuinely necessary for creative achievement (you cannot be creative in a domain you lack the cognitive resources to grasp), so the two rise together. Above the threshold the correlation weakens or disappears: among already-bright people, further increases in IQ do not predict more creativity, which now depends on other factors (divergent thinking, personality, motivation, opportunity). The lesson to carry is that creativity requires *some but not maximal* intelligence: high intelligence is a near-necessary but not sufficient condition, and the most creative individuals are reliably above average in IQ but are not necessarily the very highest scorers. (The precise threshold value is contested and some large modern studies fail to find a clean cut-off, so treat 120 as the classically taught figure rather than a hard constant, flagged under gaps.)

> **COMMON TRAP**
>
> Do not equate creativity with intelligence, and do not treat the threshold hypothesis as saying "the smarter you are, the more creative you are." It says the opposite above the threshold: past roughly IQ 120 the correlation flattens, so the genius-level IQ is neither required nor predictive of creative output. Equally, do not confuse convergent with divergent thinking. Convergent thinking (and the RAT, which is convergent in *form*) narrows to one right answer; divergent thinking (Unusual Uses, TTCT) fans out to many. Intelligence tests measure mostly convergent ability, which is exactly why they miss creativity.

### 8.10 The creativity-psychopathology question: the "mad genius" debate, stated soberly

The oldest clinical claim about creativity, from Aristotle through the Romantics to Lombroso, is that genius and madness are linked. The modern evidence supports a real but *narrow and non-linear* association, concentrated on the **bipolar spectrum** rather than on severe mental illness in general, and it must be stated carefully to avoid both romanticisation and stigma. The landmark studies are Nancy **Andreasen**'s (1987) controlled interview study of the Iowa Writers' Workshop, which found substantially higher rates of mood disorder (especially bipolar and depressive

spectrum) among eminent writers than controls, and Kay Redfield **Jamison**'s (1989, 1993) work documenting elevated rates of mood disorder and creative productivity tied to mild elevations of mood. The plausible mechanism is that mild hypomania supplies exactly the ingredients divergent thinking needs: increased fluency and speed of thought, expansiveness, reduced need for sleep, heightened energy, confidence, and looser associations, all of which can raise idea generation, provided the mood elevation stays mild.

The sober qualifications are the examinable core, and the DSM-5-TR (2022) states them plainly. First, the relationship is *non-linear*: it is *milder* forms of bipolar disorder, not full severe mania, that associate with greater lifetime creative accomplishment (florid mania and depression are disorganising and disabling, and destroy productive work). Second, higher creativity is found in the *unaffected first-degree relatives* of people with bipolar disorder, which points to a shared genetic or temperamental substrate (a creative "endophenotype") rather than illness itself being the cause. Third, creativity is listed among the *trait-like features* associated with bipolar I (alongside hyperthymic and cyclothymic temperament and reward sensitivity), again framing it as a dispositional correlate, not a product of episodes. The clinically vital and non-obvious point the DSM adds: a patient's attachment to the heightened creativity of hypomania can drive ambivalence about treatment and poor adherence, because they fear that a mood stabiliser will flatten the creative edge (cross-ref: the Social, Learning & Personality Psychology notes bipolar disorder; and note the lithium-and-creativity adherence problem).

HOLD THIS

**The mad-genius link is real but narrow and non-linear.** It is *milder* bipolar forms, not full mania, that associate with creative accomplishment; higher creativity in unaffected first-degree relatives points to a shared substrate, not illness itself.

CLINICAL ANCHOR

A patient with bipolar II resists lithium, saying it "kills my writing." The evidence lets you answer honestly without either dismissing him or endorsing the romantic myth: the creativity that matters is linked to *mild* hypomanic states and to his underlying temperament, not to full episodes, which are disorganising; unaffected relatives share the creative edge, so it is not the illness "giving" him talent; and untreated mood swings threaten far more of his output than a stabiliser does. Framing treatment as protecting his productive capacity from the disorganising extremes, not confiscating his gift, is the adherence-preserving move the DSM-5-TR flags as the crux.

### 8.11 Currently accepted account: an interaction of process, person, and system

There is no single grand theory that has won the field the way CHC has won intelligence, but the *currently accepted* synthesis is a componential and interactionist one: creativity is best understood not as one ability but as the interaction of a cognitive process (divergent generation to produce candidate ideas, followed by convergent evaluation to select and refine the good ones), a set of personal resources (adequate but not maximal intelligence past the threshold, relevant domain knowledge, openness to experience, tolerance of ambiguity, sensible risk-taking, and intrinsic motivation), and a social system (the domain that supplies the material and the field that validates

the product, per Csikszentmihalyi). In short, the modern consensus keeps Guilford's divergent-convergent cycle at the cognitive core, wraps it in the investment theory's personal resources, and situates the whole thing in the systems model's social context. The practical upshot for assessment is that no single test captures creativity, and divergent-thinking scores (TTCT) are treated as one indicator among several, not a definitive measure.

### 8.12 Neural correlate: reduced latent inhibition and network dynamics

The **neural correlate** of creativity has two well-supported strands the exam can ask for by name. The first is **reduced latent inhibition**. Latent inhibition is the normal, adaptive brain process by which stimuli previously experienced as irrelevant are automatically filtered out of conscious attention. Carson, Peterson, and Higgins (2003) showed that *reduced* latent inhibition, a leakier filter that lets nominally irrelevant information into awareness, is associated with higher creative achievement, but specifically in people who *also* have high intelligence and working memory to manage the extra input. This is the mechanistic bridge to psychopathology: the same reduced filtering, without the cognitive resources to harness it, appears in the positive-symptom dimension of psychosis and in schizotypy, so creativity and psychosis-proneness may share a substrate (leaky filtering) whose outcome depends on the intellectual control brought to bear on it. Dopaminergic tone, particularly in the mesolimbic and prefrontal systems, is the leading neurochemical candidate for tuning this filter.

The second strand is **large-scale network dynamics** (Beaty and colleagues 2016 and after). Creative cognition is not localised to a "right brain" but emerges from the flexible cooperation of usually antagonistic networks: the *default-mode network* (medial prefrontal cortex, posterior cingulate, and associated regions), engaged in spontaneous, associative, self-generated idea production, and the *executive control network* (dorsolateral prefrontal and parietal regions), engaged in the goal-directed evaluation, constraint, and refinement of those ideas. The salience network (anterior insula, anterior cingulate) is thought to switch between them. Highly creative people show stronger and more flexible *coupling* between the default-mode (generative) and executive (evaluative) networks, the neural version of the generate-then-select cycle described in 8.11. The old "right-brain equals creative" claim is a myth; creativity is a whole-brain, between-network phenomenon.

### 8.13 Worked example: the brick, from generation to product

Trace one everyday act through the whole apparatus. Asked for unusual uses of a brick, a person who lists "doorstop, paperweight, weapon, bookend, garden border, art object, water-displacement in a cistern, ground into pigment" is doing *divergent* thinking, and each Guilford score is visible: eight responses (fluency), spanning several conceptual categories from tool to art to material (flexibility), including a rare answer like pigment (originality), and one worked out in detail (elaboration). The generation phase runs on default-mode associative activity with a relatively leaky attentional filter (reduced latent inhibition letting the odd "pigment" idea surface). Then convergent, executive evaluation selects which uses actually work and are worth reporting. Map the same brick onto Wallas: *preparation* is understanding the task, *incubation* is the pause where the pigment idea forms unbidden, *illumination* is its sudden arrival, *verification* is checking

that a ground brick really does make usable pigment. And the systems check: the idea counts as creative only if it is both novel and useful, and, for genuine domain-changing creativity, only once a relevant field accepts it. The brick test is trivial; the machinery it exercises is the whole topic.

MNEMONIC

### FFOE for the four divergent scores; "PI-IV" for Wallas

**FFOE** = **F**luency, **F**lexibility, **O**riginality, **E**laboration (the four Guilford / Torrance divergent-thinking scores). **Wallas** = **PI-IV**: **P**reparation, **I**ncubation, **I**llumination, **V**erification, in that order (the two "I" stages, incubation then illumination, sit in the middle).

GOOD TO REMEMBER

- **Creativity:** novel + useful (add surprising / nonobvious, Simonton 2012 from patent criteria); zero on any one criterion = zero creativity.
- **Guilford (1950 APA address):** founded the field; divergent (fans out, many answers) vs convergent (narrows to one right answer) thinking.
- **Four divergent scores (FFOE):** Fluency (number), Flexibility (categories), Originality (rarity), Elaboration (detail); measured by the Unusual Uses Task.
- **Remote Associates Test (Mednick 1962):** find the word linking three cues (widow/bite/monkey = spider); convergent in form, taps associative reach.
- **Guilford structure-of-intellect (1967):** operations x contents x products grid (up to 150 abilities); divergent production is one operation; rejected as over-fine but carried the convergent/divergent split.
- **Torrance Tests of Creative Thinking (TTCT, 1966/1974):** verbal + figural; scored on Guilford's dimensions; the standard creativity test, usable in children.
- **Wallas four stages (1926, PI-IV):** Preparation, Incubation, Illumination, Verification; illumination = the Gestalt insight / "aha."
- **Investment theory (Sternberg and Lubart 1991):** "buy low, sell high"; six resources = intellect, knowledge, thinking styles, personality, motivation, environment.
- **Systems model (Csikszentmihalyi 1988/1996):** individual x domain x field; the field (gatekeepers) validates, the domain absorbs.
- **Flow (Csikszentmihalyi 1975/1990):** total absorption; challenge matched to skill (too much = anxiety, too little = boredom); autotelic.
- **Threshold hypothesis:** intelligence and creativity correlate only up to about IQ 120; above it, creativity depends on other factors. Some, not maximal, intelligence needed.
- **Mad-genius / bipolar link:** Andreasen (1987, Iowa Writers' Workshop) and Jamison (1993); real but non-linear; *milder* bipolar forms associate with more creative accomplishment; higher creativity in unaffected relatives (shared substrate); a DSM-5-TR trait-like feature; attachment to hypomanic creativity harms treatment adherence.
- **Currently accepted:** creativity = interaction of process (divergent generation + convergent evaluation) + person (resources, above-threshold IQ, openness) + system (domain and field).
- **Neural correlate:** reduced latent inhibition (Carson et al. 2003; leaky filter, creative only if paired with high IQ; shared with psychosis-proneness; dopaminergic); flexible coupling of default-mode network (generation) with executive-control network (evaluation), salience network switching (Beaty et al. 2016). Not "right brain."

## 9 · Emotional intelligence

**Emotional intelligence** (EI, popularly EQ) is the capacity to perceive, understand, use, and regulate emotions, in oneself and in others, and to harness that emotional information to guide thinking and action. Salovey and Mayer, who coined the term in its modern scientific form, defined it as "the ability to monitor one's own and others' feelings and emotions, to discriminate among them, and to use this information to guide one's thinking and actions" (Salovey and Mayer 1990). It sits at the junction of intelligence and personality, and the whole topic is a single argument about which of those two it really is: an *ability* you can be tested on like IQ, or a cluster of *traits and dispositions* you can only self-report. **Ability or trait.** Every named model is a different answer, and each fixed a specific gap in the one before it.

For the exam the payload is fourfold: the ordered lineage of models with their authors and the one claim each is remembered for; the ability-versus-trait axis that organises them together with how each is measured (performance test versus self-report); the incremental-validity critique that is the field's central controversy; and the neural correlate, the "social brain" of ventromedial prefrontal cortex, amygdala, and insula. Structure the answer as an evolution, not a list, and end on where alexithymia and the therapeutic alliance make EI clinically real.

### 9.1 Thorndike: the first seed, "social intelligence"

**The starting point.** The idea long predates the term. Edward Thorndike (1920) distinguished, alongside abstract (academic) and mechanical intelligence, a **social intelligence**: "the ability to understand and manage men and women, boys and girls, to act wisely in human relations." **What it seeded.** It first proposed that the ability to read and handle people is a real form of intelligence, separate from the logical-verbal ability that IQ tests measure. **What it left debated.** Thorndike named the construct but could not operationalise or measure it, and social intelligence proved almost impossible to separate from general IQ with the tools of the day, so the idea lay largely dormant for decades (Salovey and Mayer 1990).

### 9.2 Gardner: intrapersonal and interpersonal intelligences within multiple intelligences

**Reviving the personal.** Howard Gardner (1983), in his theory of **multiple intelligences**, argued that the single general factor of traditional testing was too narrow and proposed several independent intelligences. Two of them are the direct ancestors of EI: *intrapersonal intelligence*, the capacity to access and understand one's own inner emotional life and use it to guide behaviour, and *interpersonal intelligence*, the capacity to read the moods, motives, and intentions of other people. **What it fixed.** It gave Thorndike's neglected social ability a formal place inside a serious theory of intelligence and split it into a self-facing and an other-facing half. **What it left debated.** Gardner's intelligences were broad and hard to measure empirically, and he never welded the two personal intelligences into a single testable emotion-specific construct, which is exactly what the next authors did (Kaplan and Sadock 2024).

### 9.3 Mayer and Salovey: the four-branch ability model

**The scientific core.** Peter Salovey and John Mayer (1990) fused Gardner's two personal intelligences into one and named it emotional intelligence, then refined it into the **four-branch**

**ability model** (Mayer and Salovey 1997), the model to know cold. EI is treated as a genuine cognitive ability, correlated with but distinct from general intelligence, built of four hierarchically arranged branches from lowest (most basic) to highest:

#### 1. Perceiving emotion

The most basic branch: accurately identifying emotion in faces, voices, pictures, music, and in oneself. The entry skill on which the others depend.

#### 2. Using (facilitating) emotion

Harnessing emotion to assist thought: letting mood prioritise attention, and using emotional states to aid reasoning, problem-solving, and creativity (for example, a positive mood widening idea generation).

#### 3. Understanding emotion

Grasping emotional knowledge: how emotions blend, progress, and transition (that contempt mixes anger and disgust, that grief can shade into anger), and reading their causes and vocabulary.

#### 4. Managing (regulating) emotion

The highest branch: regulating emotion in oneself and others to promote growth and reach goals, staying open to feeling while modulating it.

The four branches run lowest to highest: perceive, use, understand, manage. Mnemonic PUUM (see box).

**What it fixed.** It turned a loose popular idea into a precise, componential, and above all *measurable* ability that meets standard criteria for an intelligence (Mayer, Caruso and Salovey 1999). **What it left debated.** By insisting EI is a pure ability testable by performance, it drew a hard line that a rival tradition, treating EI as personality-like traits, would soon cross (Kaplan and Sadock 2024).

### 9.4 Goleman: the mixed (competency) model that popularised EI

**The bestseller model.** Daniel Goleman's 1995 book *Emotional Intelligence: Why It Can Matter More Than IQ* brought the concept to the world and made the striking claim that EI predicts life and career success better than IQ. Goleman built a **mixed model** (also called a competency model), so named because it mixes ability-type emotional skills with personality traits, motives, and social competencies. His framework distils to five domains (later reorganised into competency clusters): *self-awareness*, *self-regulation*, *motivation*, *empathy*, and *social skill* (Goleman 1998). **What it fixed.** It made EI intuitive, teachable, and workplace-relevant, driving a huge applied and training literature. **What it left debated.** By folding in motivation, optimism, and conscientiousness, the mixed model overlaps heavily with established personality traits and risks becoming an "everything but IQ that matters" grab-bag, the core of the incremental-validity critique in 9.7 (Kaplan and Sadock 2024).

### 9.5 Bar-On: the emotional-social intelligence (ESI) model and the EQ-i

**The other mixed model.** Reuven Bar-On, who is credited with the abbreviation "EQ," proposed a model of **emotional-social intelligence** (ESI): an array of interrelated emotional and social competencies, skills, and facilitators that determine how effectively we understand and express ourselves, understand and relate to others, and cope with daily demands (Bar-On 2006). His

model is organised into competency areas (intrapersonal, interpersonal, adaptability, stress management, and general mood) and is operationalised by the *Emotional Quotient Inventory (EQ-i)*, the first commercially published, peer-reviewed self-report EI test (Bar-On 1997). **What it fixed.** It gave the trait-and-competency tradition a well-validated, widely used self-report instrument and an explicit link to well-being and adaptation. **What it left debated.** Like Goleman's, it is a mixed model measured by self-report, so it inherits the same overlap-with-personality and self-report-bias problems (Kaplan and Sadock 2024).

### 9.6 The ability-versus-trait debate and its two measurement families

**The organising split.** Petrides and Furnham (2001) crystallised the field into two conceptually and psychometrically distinct constructs, distinguished chiefly by *how they are measured*.

| FEATURE | ABILITY EI | TRAIT EI |
|---|---|---|
| **Core claim** | EI is a cognitive ability, a form of intelligence | EI is a constellation of emotion-related self-perceptions and dispositions ("trait emotional self-efficacy") |
| **Where it sits** | Alongside cognitive abilities | **At the lower levels of the personality hierarchy** |
| **Key proponents** | Mayer, Salovey, Caruso | Petrides and Furnham; overlaps Goleman, Bar-On |
| **How measured** | **Maximum-performance test with correct answers (MSCEIT)** | **Self-report questionnaire (TEIQue, EQ-i, Goleman inventories)** |
| **Scoring truth-standard** | Consensus or expert scoring (there is a "right" answer) | No right answer; measures self-perception |
| **Correlation between them** | **Low; empirically they behave as two different constructs** | |

Ability EI is tested like IQ (right answers, performance); trait EI is self-reported and lives inside personality. The two correlate only weakly.

The flagship ability measure is the **MSCEIT** (Mayer-Salovey-Caruso Emotional Intelligence Test, V2.0), which scores actual performance on the four branches against consensus or expert norms (Mayer, Salovey, Caruso and Sitarenios 2003). The trait measures (EQ-i, Goleman's inventories, the TEIQue) are self-report and therefore assess belief about one's own emotional competence rather than demonstrated skill. A trait score can be inflated by social desirability or by the very lack of insight it claims to measure, the self-report paradox in emotion research (Kaplan and Sadock 2024).

RULE **Measurement decides the construct.** Ability EI is a performance test with right answers (MSCEIT); trait EI is self-report inside personality (EQ-i, TEIQue). The two correlate only weakly and behave as different constructs.

### 9.7 The incremental-validity critique

**The central controversy.** The sharpest scientific challenge to EI is whether it predicts anything *over and above* what we already measure cheaply with IQ and the Big Five personality traits, that is, whether it has **incremental validity**. Critics (notably Locke 2005; and Matthews, Zeidner and Roberts) argue that EI, especially the mixed and trait models, is conceptually overinflated and largely redundant: strip out general intelligence and the Big Five and little unique variance is left, so EI may be old constructs under a fashionable new name. The rebuttal is measurement-specific: performance-based ability EI (MSCEIT) shows the strongest case for genuine incremental prediction of social and clinical outcomes because it is not just relabelled personality, whereas self-report trait EI overlaps most with existing personality scales (Brackett and Mayer 2003). **The verdict for the exam.** EI is a real and useful construct, but its incremental validity is real chiefly when measured as an ability, and Goleman's popular claim that "EI matters more than IQ" is not supported at that strength (Kaplan and Sadock 2024).

> HOLD THIS
> **Salovey and Mayer coined and defined EI; Goleman only popularised it.** Ability EI has the strongest case for incremental validity beyond IQ and the Big Five; "EI matters more than IQ" is Goleman's claim, not established fact.

### 9.8 Neural correlate: the "social brain" of vmPFC, amygdala, and insula

**Where EI lives in the brain.** The *neural correlate* of emotional intelligence is a core "social brain" network, and the strongest evidence comes from lesion studies: damage to specific nodes selectively degrades EI while sparing general IQ (Hogeveen, Salvi and Grafman 2016). Three structures anchor it. The **ventromedial prefrontal cortex** (vmPFC), including the orbitofrontal cortex, integrates emotion with value and social meaning and regulates the limbic system; its lesions produce the classic dissociation of preserved abstract IQ with collapsed emotional and social decision-making (the Phineas Gage and Damasio vmPFC pattern), impairing the "using" and "managing" branches. The **amygdala** is the hub for perceiving emotional salience, especially detecting fear and threat in faces, the neural basis of the perceiving-emotion branch; amygdala damage impairs recognition of fearful expressions. The **insula** is the cortical seat of *interoception*, the sensing of one's own bodily-emotional state, and is central to empathy and to feeling disgust, grounding self-awareness and the perception of emotion in the body. Together, vmPFC (integration and regulation), amygdala (salience and perception), and insula (interoception and empathy) form the substrate on which the four branches are built (Hogeveen et al. 2016, Kaplan and Sadock 2024).

### 9.9 Clinical relevance: alexithymia, and EI in the therapeutic alliance

**Where it becomes clinical.** EI's clinical mirror-image is **alexithymia** (Sifneos 1973), literally "no words for feelings": a difficulty identifying and describing one's own emotions, distinguishing feelings from bodily sensations of arousal, and an externally oriented, concrete cognitive style. Alexithymia is essentially the low-EI end of the perceiving-and-understanding branches made pathological, and it is common in somatoform and functional disorders, substance use, eating disorders, and post-traumatic and personality disorders; it predicts poorer treatment response

and is a target of mentalisation-based and emotion-focused work. On the clinician's side, EI matters for the *therapeutic alliance*: the therapist's ability to accurately perceive a patient's affect, to attune and respond to it, and to regulate their own emotional reactions (countertransference) is EI in action, and higher clinician emotional competence is linked to stronger alliance and better engagement. This is why emotional-competence and empathy training is increasingly built into medical and psychiatric education (Kaplan and Sadock 2024).

### 9.10 Worked example: the patient who cannot name the feeling

**One consultation, read through the models.** A man presents with recurrent chest tightness and headaches; every investigation is normal. *Perceiving:* asked how he feels, he reports only the physical sensations and cannot label an emotion, high on somatic complaint, low on the perceiving branch, the signature of alexithymia. *Understanding:* he cannot connect the tightness to the fact that it began the week his father was hospitalised, a failure of the understanding branch to link emotion to cause. *Using and managing:* unable to name or modulate the feeling, he cannot use it to problem-solve and it discharges through the body. *Ability versus trait:* a self-report EI questionnaire might even rate him "fine" because he lacks the insight to report the deficit, exactly why an ability measure like the MSCEIT, or the clinician's own trained perception, catches what self-report misses. *Neural read:* the picture fits weak interoceptive and insular processing feeding a vmPFC that cannot translate bodily signals into labelled, regulable emotion. *The alliance as intervention:* the therapist uses their own EI to name the affect the patient cannot ("this started when your father fell ill, that must have been frightening"), and the therapy itself becomes emotion-labelling training. **Same patient, one somatic complaint, decoded as an emotional-intelligence deficit and treated by borrowing the clinician's EI until his own grows.**

MNEMONIC

**Four branches: "PUUM" (Perceive, Use, Understand, Manage)**

Read low to high, PUUM climbs the ability model: **P**erceive emotion, **U**se emotion to aid thought, **U**nderstand emotion, **M**anage emotion. Perceiving is the floor, managing is the ceiling.

COMMON TRAP

Do not blur the models. Mayer and Salovey = pure *ability* model (measured by performance, the MSCEIT). Goleman and Bar-On = *mixed* models that fold in personality and motivation (measured by self-report). Petrides = the explicit *trait* EI construct inside personality. A frequent error is crediting Goleman with defining EI: he popularised it, but Salovey and Mayer coined and defined it (1990). Another is claiming "EI predicts success better than IQ" as established fact, it is Goleman's popular claim and the incremental-validity data do not support it at that strength.

**GOOD TO REMEMBER**

- **Thorndike (1920):** first proposed "social intelligence," the ability to understand and manage people; named it but could not measure it.
- **Gardner (1983):** multiple intelligences; the two EI ancestors are *intrapersonal* (understanding one's own inner life) and *interpersonal* (reading others).
- **Salovey and Mayer (1990):** coined "emotional intelligence" and gave the founding definition; monitor own/others' emotions, discriminate, and use to guide thought and action.
- **Four-branch ability model (Mayer and Salovey 1997):** Perceive, Use (facilitate), Understand, Manage emotion; hierarchical, lowest to highest; EI as a genuine ability.
- **Goleman (1995, 1998):** mixed/competency model; five domains = *self-awareness, self-regulation, motivation, empathy, social skill*; claimed EI can matter more than IQ.
- **Bar-On (1997, 2006):** emotional-social intelligence (ESI); coined "EQ"; operationalised by the self-report EQ-i.
- **Petrides and Furnham (2001):** formalised the *trait EI* construct (trait emotional self-efficacy), sitting in the personality hierarchy.
- **Ability vs trait:** ability EI = performance test with right answers (MSCEIT); trait EI = self-report (EQ-i, TEIQue); the two correlate only weakly.
- **MSCEIT (Mayer-Salovey-Caruso, V2.0, 2003):** the flagship performance measure of the four branches, consensus/expert scored.
- **Incremental-validity critique (Locke 2005; Matthews, Zeidner and Roberts):** does EI predict beyond IQ + Big Five? Case is strongest for ability EI, weakest for self-report/mixed EI.
- **Neural correlate ("social brain"):** ventromedial prefrontal cortex (integration/regulation of value and emotion), amygdala (emotional salience, fear-face perception), insula (interoception, empathy); lesion evidence from Hogeveen, Salvi and Grafman (2016).
- **Alexithymia (Sifneos 1973):** difficulty identifying and describing feelings, externally oriented thinking; the low-EI pole, common in somatoform, substance-use, eating, trauma, and personality disorders.
- **Therapeutic alliance:** clinician EI (accurate affect perception, attunement, countertransference regulation) strengthens alliance; a rationale for empathy/EI training in medical education.

## 10 · Sensory deprivation and the mind-body problem

This is the philosophy-of-psychiatry topic, and it earns its place in the exam because it is where a clinical phenomenon and a two-thousand-year metaphysical puzzle turn out to be the same question asked twice. **Take away the world and the mind starts to invent one.** That single observation, from the isolation-tank experiments, is the empirical hook; the deeper question it forces is the one Descartes named: what exactly is the relation between the **mind** and the **body** (the brain)? The topic pairs the two deliberately. **Sensory deprivation** shows the mind is not a passive receiver of the world but an active constructor of it, which is exactly why perception is prediction (cross-refer the Perception topic); and the **mind-body problem** is the framework a psychiatrist needs to hold the biological and the psychological together without collapsing one into the other.

For the exam the payload is two halves that meet in the middle. First, sensory deprivation: the classic Hebb/McGill and Lilly experiments, the perceptual and cognitive effects, the hallucinations they produce, and the modern clinical relevance (REST, solitary confinement, the intensive-care unit). Second, the mind-body problem proper: the map of positions from

Cartesian **dualism** to the various **monisms**, the explanatory gap and qualia, and then why it all matters at the bedside: reductionism versus the biopsychosocial model, the brain-disease debate, and free will and responsibility. Ground text is Kaplan and Sadock (2024) for the philosophy-of-mind and sensory-deprivation material, with the New Oxford and Companion for the dualism-in-medicine framing and Engel (1977) for the biopsychosocial answer.

### 10.1 Sensory deprivation: definition and the classic experiments

**Strip out the input and perception destabilises. Sensory deprivation** is the drastic and sustained reduction of patterned sensory input across modalities. Humans normally operate in what Hartmann called an "average expectable environment," a certain level and variety of stimulation for which the nervous system is primed; remove it, and the brain, still generating predictions with nothing to correct them against, begins to produce its own content (Kaplan and Sadock 2024). Two lines of experiment defined the field. The **Hebb / McGill studies** (Bexton, Heron and Scott 1954, in Donald Hebb's laboratory at McGill University) paid student volunteers to lie on a bed in a lightproof, soundproof cubicle wearing translucent goggles and cardboard cuffs that abolished patterned touch; most could not tolerate more than two or three days, and they reported deteriorating concentration, disturbed thinking, and vivid visual hallucinations. The **Lilly isolation tank** (John C. Lilly, from 1954) took the reduction further: the subject floated, near-weightless, in a tank of body-temperature salt water in total darkness and silence, removing even gravity and proprioception. Lilly used it to explore altered states and the "higher levels of consciousness" the near-total silencing of input could produce (Psychotherapy Guidebook, Suedfeld). Together they established that the deprivation of stimulation is itself a potent alterer of the mind.

### 10.2 Perceptual, cognitive and affective effects

**A reproducible syndrome, not random noise.** The effects of prolonged sensory deprivation form a recognisable cluster that the exam expects enumerated.

#### Perceptual

Illusions first, then hallucinations, most often visual, progressing from simple flashes and geometric forms to complex, dramatic scenes; also somatic and auditory distortions and disturbances of body image. The three-scientists observation (below) captures the striking individual variability.

#### Cognitive

Impaired concentration and sustained attention, disorganised and drifting thinking, difficulty with directed thought, distortions of the sense of time, and increased suggestibility.

#### Affective and behavioural

Rising restlessness, irritability, anxiety and, in some, frank distress and an urge to escape the situation; a smaller group finds it relaxing or absorbing, which is what REST later exploited therapeutically.

**Individual variability is the examinable subtlety.** Kaplan and Sadock (2024) record the classic demonstration: three scientists floated in sensory-deprivation tanks for long periods; one had a few illusions and no hallucinations, the second had many illusions and a few faint hallucinations, and the third had vivid, dramatic, complex visual and auditory hallucinations. Identical

deprivation, radically different output, which foreshadows the point that what is "released" depends on the perceiver, not just the situation.

### 10.3 Hallucinations under deprivation: the mechanism (link to perception)

**Less input, not more, breeds the hallucination.** This is the counter-intuitive fact and the bridge back to the Perception topic. The **perceptual release theory** (Hughlings Jackson; developed by West 1962) holds that a steady stream of sensory input normally suppresses stored perceptual traces, memories and images, from reaching awareness; when input falls (sensory deprivation, blindness, deafness) or arousal-gating fails, those stored images are *released* and experienced as hallucinations located in outer space (Kaplan and Sadock 2024). A complementary framing is the **supersensitivity deprivation hypothesis**: deprived of expected input, the perceptual apparatus over-interprets any faint stimulation as evidence of the needed object. In the modern predictive-processing language of the Perception topic, both say the same thing: when bottom-up sensory evidence is weak, top-down priors dominate and the brain perceives what it expects. This is exactly why the blind develop Charles Bonnet hallucinations, the deaf develop musical hallucinations, and the sensory-deprived subject sees scenes in the dark, and it is the same imbalance, tipped further, that the predictive account gives for psychotic hallucination.

RULE **Less input, not more, breeds the hallucination.** When bottom-up sensory evidence is weak, top-down priors dominate and the brain perceives what it expects, which is why reduced input drives hallucination on the ward.

CLINICAL ANCHOR

The principle generalises to the ward. Any state that *reduces* sensory input or the capacity to process it heightens the risk of hallucination: the intensive-care unit at night, the post-operative patient, the cataract or hearing-impaired elderly patient, and the delirious patient (in whom impaired attention functions as an internal deprivation). It is a practical argument for windows, clocks, spectacles, hearing aids and daylight in delirium prevention.

### 10.4 REST and clinical relevance: therapy, solitary confinement, the ICU

**The same manipulation, three very different valences.** Sensory deprivation is neither uniformly harmful nor uniformly benign; its meaning depends on control, duration and consent.

| CONTEXT | FORM | EFFECT AND VALENCE |
|---|---|---|
| **REST (therapeutic)** | Restricted Environmental Stimulation Therapy: chamber confinement or flotation-tank immersion, minutes to hours, voluntary and monitored (Suedfeld) | **Deliberately controlled and brief; used for relaxation, smoking cessation and habit change, pain and anxiety; the reframing of deprivation as treatment** |
| **Solitary confinement** | Involuntary, prolonged social and sensory isolation in incarceration | **Harmful: the "SHU syndrome," anxiety, perceptual disturbance, hallucination, cognitive impairment and paranoia; a recognised human-rights and forensic-psychiatry concern** |
| **Intensive care unit** | Unintended: monotonous, windowless, day-night-blurred environment with immobilisation and impaired attention | **Contributes to ICU delirium; both under-stimulation (monotony) and over-stimulation (alarms, procedures) operate, so the fix is patterned, oriented stimulation, not simply "more" or "less"** |

One manipulation, three valences: controlled and consented deprivation heals, imposed and prolonged deprivation harms, and unintended deprivation in the ICU drives delirium.

### 10.5 The mind-body problem: the question and why it framed medicine

**How does the mental relate to the physical?** The **mind-body problem** is the question of the relation between mental phenomena (thoughts, feelings, subjective experience, intentions) and physical phenomena (the brain and body). Its modern statement is owed to Rene Descartes (1596 to 1650), whose **substance dualism** split reality into *res cogitans* (thinking, non-extended mind) and *res extensa* (extended, mechanical body), a term the exam attributes to Descartes via Damasio (1994). This is not idle metaphysics for a psychiatrist: the split hardened into the division of illness into "medical" (bodily pathology, treated by physicians) and "psychiatric" (an abnormal mental state, treated by psychiatrists), the very **mind-body dualism** that the New Oxford's "Deconstructing dualism" chapter argues has created obstacles to integrated care (Sharpe and Walker; Companion to Psychiatric Studies). The whole point of studying the positions below is to be able to hold biology and psychology together without falling into that clinically damaging split.

### 10.6 Dualism: the varieties

**Mind and body are, in some sense, two.** Dualist positions hold that the mental is not simply identical to the physical. They differ over whether mind is a separate *substance* or only a separate *property*, and over which way causation runs.

#### Substance dualism (interactionism)

Descartes's view: mind and body are two distinct kinds of substance that causally interact (he proposed, wrongly, at the pineal gland). Mind moves body (I decide, my arm rises) and body affects mind (injury causes pain). The fatal objection is the *interaction problem*: how can a non-physical mind push a physical brain without breaking the conservation of energy?

#### Epiphenomenalism

Body affects mind but not the reverse: mental states are causally inert by-products of brain activity, like the whistle of a steam engine that plays no part in driving the train. It preserves physics (only the physical causes) but at the price of making consciousness a passenger with no effect, which clashes with the intuition that our reasons cause our actions.

#### Property dualism

The one substance is physical, but it has two irreducibly different *kinds of property*, physical and mental. Kaplan and Sadock (2024) state this as their working position: the brain and the mind are different *levels of description* of one phenomenon (mechanism versus subjective experience), and because they are different levels they have different properties. It is distinguished sharply from substance dualism: nothing extra exists, but the mental cannot be read off the physical alone.

### 10.7 Monism: the varieties

**There is only one kind of stuff.** Monist positions deny a fundamental mind-body split; in psychiatry the relevant monisms are all forms of *physicalism* (everything is physical). They differ over how tightly the mental reduces to the physical.

#### Identity theory (type physicalism)

Mental states simply *are* brain states: to be in pain *is* to have a particular kind of neural activity (the slogan is "C-fibre firing"). Elegant and thoroughly physical, but criticised for chauvinism about *multiple realisability*: if an octopus or a silicon machine could feel pain with entirely different hardware, pain cannot be identical to one specific human brain state.

#### Functionalism

The fix for multiple realisability: a mental state is defined not by what it is made of but by its *functional role*, its causal relations to inputs, other states and outputs. Pain is whatever plays the pain-role, in a brain or in principle in silicon. This is the reigning framework in cognitive science, but it is charged with leaving out the felt quality of experience (the "absent qualia" worry).

#### Emergentism

Mind is a genuinely novel, *emergent* property of sufficiently complex and organised matter, real and causally efficacious yet not predictable from, or reducible to, the properties of the parts. Kaplan and Sadock (2024) note psychological phenomena are "emergent properties of lower-order constituents" (circuits, neurons, genes); consciousness is often described the same way. Emergentism sits between reductive physicalism and property dualism.

### 10.8 Reductionism: constitutive versus eliminative

**Not all reduction is the same, and the difference is clinically loaded.** Kaplan and Sadock (2024) draw the line the exam wants. **Constitutive reductionism**, reducing a complex entity to its component parts to *facilitate study*, is uncontroversial and is ordinary science. **Eliminative reductionism** goes further and insists that everything mental will *ultimately be explained away* at the material level, eliminating the need for a psychological level of analysis at all. The text rejects the eliminative move: valuable information is lost when you descend from mental states to neurons, and one may reasonably ask why the reduction should stop at the brain rather than continue to physics. The image they use is Shakespeare: the words on the page are material, but a chemical analysis of the ink will never capture the meaning of the play.

**COMMON TRAP**

The **treatment-etiology fallacy** (Kaplan and Sadock 2024): the fact that a treatment at one level works does *not* prove the cause lies at that level. An antidepressant helping depression no more proves depression is "a chemical imbalance" than aspirin curing a headache proves the headache was caused by an aspirin deficiency. Cognitive-behavioural therapy is at least as effective as medication for many depressions; both act, neither localises the cause. Do not slide from "responds to a drug" to "is a brain disease."

### 10.9 The explanatory gap and qualia

**The residue no physical account has closed.** Even granting full physicalism, a gap remains between the objective description of a brain process and the subjective feel of the experience it produces. This is the **explanatory gap** (Levine 1983) and, in its sharpest form, Chalmers's (1995) *hard problem of consciousness*: why is there *something it is like* to undergo a brain process at all? The felt qualities themselves, the redness of red, the ache of pain, are the **qualia**; Kaplan and Sadock (2024) describe them as subjective secondary qualities interpreted by the mind and attributed to the world, and identify "the subjectivity of experience, the so-called qualia of consciousness" as precisely what separates living consciousness from even the best computers. The philosophical thought-experiments the exam may cite, Nagel's "What is it like to be a bat?" (1974) and Frank Jackson's "Mary the colour scientist" (1982, who knows every physical fact about colour but learns something new on first seeing red), are both arguments that physical facts leave the qualia unexplained. This gap is the honest limit: no current position, dualist or monist, closes it, which is why the field defaults to a pragmatic property-dualist stance rather than a solved theory. (The full theories-of-consciousness sequence, James, Freud, Global Workspace, Integrated Information, is the Consciousness topic; here the gap functions only as the unresolved core of the mind-body problem.)

### 10.10 Why it matters for psychiatry I: the biopsychosocial model

**The clinical answer to the mind-body problem.** The discipline's practical resolution is not to pick a metaphysics but to adopt a working model that refuses the dualist split. George Engel's **biopsychosocial model** (Engel 1977) reframed illness as the product of interacting biological, psychological and social levels, a general-systems view in which no single level is privileged as "the real" cause (Tasman 2015). It is the direct clinical descendant of property dualism and emergentism: the levels are all real, none reduces to another, and formulation must move across them. Its virtue is integration and its recognised weakness is looseness (it can become a checklist rather than an explanation), but it remains the field's standard rebuke to both eliminative brain-reductionism and to a psychology that ignores biology. In a viva, "the biopsychosocial model is how psychiatry escapes Cartesian dualism in daily practice" is the line that ties the whole topic together.

HOLD THIS

**The mind is a real, emergent, causally potent level of a physical system.** Not reducible to its neurons and not a separate ghost; the biopsychosocial model (Engel 1977) is psychiatry's practical, principled escape from Cartesian dualism.

### 10.11 Why it matters for psychiatry II: the brain-disease debate and free will

**Where the metaphysics touches responsibility.** Two live controversies show the stakes are not academic. First, the *brain-disease* framing of addiction: Kaplan and Sadock (2024) criticise the neurocentric NIDA model ("addiction is a chronic, relapsing brain disease") precisely as eliminative reductionism, because it leaves the addicted *person*, the agent who retains substantial control and whose choices meditate recovery, in the shadows; the corrective is that neural correlates and voluntariness coexist. Second, *free will and responsibility*: if the mind is nothing but neurons obeying physical law (hard determinism, and the natural reading of epiphenomenalism), the ground for holding people responsible seems to vanish, which matters directly for forensic psychiatry and the insanity defence. Most psychiatrists work with a *compatibilist* stance, that meaningful agency and responsibility are consistent with a physical brain, which is again the property-dualist / biopsychosocial position applied to the will: the person is a real causal level, not an illusion painted over the neurons.

MNEMONIC

**"SIP-EF" for the positions: Substance, Interactionism, Property (dualism); Epiphenomenalism between; then the monist Family (Identity, Functionalism, Emergentism)**

Read left to right it is a ladder from "most separate" (substance dualism) to "least separate" (identity theory), with property dualism and emergentism as the clinically preferred middle where mind is real but not a separate stuff.

PEARL

The two halves are one argument. Sensory deprivation shows the mind actively constructs experience rather than passively receiving it, which is why removing the world produces hallucination, not blankness. The mind-body problem asks what that constructing mind *is*. The psychiatric answer to both is the same: the mind is a real, emergent, causally potent level of a physical system, not reducible to its neurons and not a separate ghost. Hold that, and you can say why the ICU patient hallucinates, why "chemical imbalance" is a half-truth, and why the biopsychosocial model is not woolly but principled.

**GOOD TO REMEMBER**

- **Sensory deprivation:** drastic sustained reduction of patterned input; the brain, still predicting, generates its own content.
- **Hebb / McGill studies (Bexton, Heron and Scott 1954):** lightproof-soundproof cubicle, goggles and cuffs; volunteers quit within days; impaired thinking and visual hallucinations. [verify author-year and design details]
- **Lilly isolation tank (John C. Lilly, from 1954):** flotation in body-temperature salt water, total dark and silence; altered states, "higher consciousness." [verify start year]
- **Effects triad:** perceptual (illusions then complex hallucinations, mostly visual), cognitive (impaired attention, disorganised thought, time distortion, suggestibility), affective (restlessness, anxiety, urge to escape; some find it relaxing).
- **Three scientists in tanks (K&S 2024):** one few illusions/no hallucinations, one many illusions/faint hallucinations, one vivid complex hallucinations; individual variability is the point.
- **Perceptual release (Hughlings Jackson; West 1962):** reduced input plus lost gating releases stored images as hallucinations; supersensitivity-deprivation hypothesis is the complement.
- **Clinical relevance:** REST (therapeutic, controlled, Suedfeld); solitary confinement (harmful, "SHU syndrome"); ICU (contributes to delirium; needs patterned oriented stimulation).
- **Mind-body problem:** relation of mental to physical; modern statement from Descartes (1596 to 1650), substance dualism, res cogitans vs res extensa (term via Damasio 1994).
- **Dualism, substance / interactionism (Descartes):** two substances causally interact; fails on the interaction problem (energy conservation).
- **Epiphenomenalism:** brain causes mind, mind causes nothing (the whistle, not the engine); makes consciousness causally inert.
- **Property dualism (K&S 2024's working stance):** one physical substance, two irreducible property-types; brain vs mind = different levels of description.
- **Identity theory (type physicalism):** mental state = brain state ("C-fibre firing"); criticised via multiple realisability.
- **Functionalism:** mental state defined by functional/causal role, not substrate; solves multiple realisability; charged with omitting qualia.
- **Emergentism:** mind a novel, real, non-reducible emergent property of complex organised matter.
- **Reductionism:** constitutive (study by parts, uncontroversial) vs eliminative (explains the mental away; rejected by K&S; the Shakespeare-and-ink image).
- **Treatment-etiology fallacy:** a treatment working at a level does not prove the cause lies there.
- **Explanatory gap (Levine 1983) / hard problem (Chalmers 1995):** why is there something it is like to be conscious; qualia = felt subjective qualities. Nagel's bat (1974); Jackson's Mary (1982).
- **Biopsychosocial model (Engel 1977):** interacting biological, psychological, social levels; psychiatry's practical escape from Cartesian dualism; strength = integration, weakness = looseness.
- **Brain-disease / free-will debate:** eliminative "addiction is a brain disease" critiqued (neural correlates and voluntariness coexist, K&S 2024); most psychiatrists compatibilist on responsibility.

## The three depth-psychology schools

### 11 · Freud and psychoanalysis

**The first of the depth schools.** Psychoanalysis is both a theory of mind and a treatment. Freud proposed that behaviour is governed by unconscious wishes and conflicts, that early childhood shapes the adult, and that these hidden forces can be reached and modified through a disciplined

verbal method. Every later depth-psychology school (Adler, Jung, Erikson, object relations, self psychology) defines itself by what it kept from Freud and what it rejected, so the exam expects you to hold his two models of mind, the five psychosexual stages with their ages and fixations, the core techniques, and the story of the circle that carried and then splintered the movement.

**Psychoanalysis** rests on three assumptions Freud held throughout (Kaplan & Sadock 2024): *psychological determinism* (no mental event is accidental; symptoms, dreams and slips have meaning), *unconscious mental processes* (much of mind is outside awareness), and *unconscious psychological conflict* (neurosis arises from clashing psychic forces). Note at once: this is a stage-and-concept theory, not one of the general cognitive functions, so it is examined as a system to be enumerated rather than as an evolution toward a currently accepted mechanism.

### 11.1 The topographic model: three systems of mind

**Ucs, Pcs, Cs.** Freud's first structural picture (from *The Interpretation of Dreams*, 1900) classified mental contents by their relation to awareness into three systems (Kaplan & Sadock 2024). The **unconscious** (Ucs) holds repressed wishes and drive-representations; it obeys the *pleasure principle* and works by *primary process* thinking (timeless, illogical, tolerating contradiction, using condensation and displacement, seeking immediate discharge). The **preconscious** (Pcs) holds material that is not conscious now but can be summoned; it obeys the *reality principle* and *secondary process* thinking (logical, verbal, tolerating delay). The **conscious** (Cs) is the small surface in immediate awareness. In this model the therapeutic aim was simply to lift repression, making the unconscious wish conscious.

### 11.2 The structural model: id, ego, superego

**The tripartite mind (1923).** Freud found the topographic model inadequate because the forces producing resistance and guilt were themselves unconscious, so the ego could not simply equal consciousness. In *The Ego and the Id* (1923) he introduced the **structural model** (the tripartite theory) of three agencies (Kaplan & Sadock 2024). The **id** is wholly unconscious, the primordial reservoir of sexual and aggressive drive energy, ruled by the pleasure principle and primary process. The **ego** is the executive mediator between id, superego and external reality; it is partly conscious but largely unconscious, and it carries out reality testing, judgment, impulse control, affect regulation and the deployment of defences. The **superego** holds internalised parental and social morals, ideals and prohibitions; it is the seat of conscience and guilt and is again mostly unconscious. Crucially id and Ucs are not synonymous, because ego defences and most of the superego are also unconscious.

TRAP **"Id" and "unconscious" are not the same.** The id is wholly unconscious, but ego defences and most of the superego are unconscious too, so the two models classify by different criteria (awareness versus function).

### 11.3 Libido, drives and the two principles

**The economic idea.** **Libido** is the mental energy of the sexual (life) instincts, a displaceable quantity (cathexis) that presses for discharge. Freud used "sexual" in an extended sense to mean bodily pleasurable, which is why feeding and toilet control count as psychosexual. Mental life is a

compromise between the *pleasure principle* (the demand for immediate gratification and tension reduction, native to id and unconscious) and the *reality principle* (the ego's capacity to postpone gratification and adapt to the external world). Maturation is broadly the shift from pleasure-principle to reality-principle governance. Cross-reference the Social, Learning & Personality Psychology notes for the full defence-mechanism catalogue and for the object-relations extension of these ideas.

### 11.4 The five psychosexual stages

**Erogenous zones and conflicts.** Freud held that libidinal energy settles successively on a leading body zone, each stage posing a developmental conflict; unresolved conflict leaves a *fixation* that colours adult character (Kaplan & Sadock 2024). Personality is largely set by about age five. The ages below are the standard textbook bands; treat them as approximate rather than sharp cut-offs.

#### Oral (birth to about 1 year)

Zone: mouth. Pleasure through sucking and biting; the infant is wholly dependent, so trust and dependency are at stake. Central conflict: weaning. Fixation gives oral traits: dependency, passivity or (biting phase) verbal aggression and sarcasm, and habits such as smoking, over-eating and nail-biting.

#### Anal (about 1 to 3 years)

Zone: bowel and bladder control. Central conflict: toilet training, autonomy versus control. Over-strict or early training yields the *anal-retentive* (orderly, parsimonious, obstinate, obsessional) character; over-lenient training yields the *anal-expulsive* (messy, wasteful, defiant) character. This stage is the classic root of obsessional traits.

#### Phallic (about 3 to 6 years)

Zone: genitals. The *Oedipus complex* (in boys) is the wish to possess the mother and displace the father, checked by *castration anxiety*; the analogous *Electra complex* (a term from Jung, not Freud) and *penis envy* were proposed for girls. Resolution comes through identification with the same-sex parent, which internalises parental morality and so forms the **superego**. Karen Horney countered penis envy with the concept of *womb envy*.

#### Latency (about 6 to puberty)

Sexual drives are relatively dormant and repressed; energy is channelled into schooling, skills, hobbies and same-sex peer relations. Ego and superego consolidate. Fixation impairs later social competence and intimacy.

#### Genital (puberty onward)

Libido re-emerges and, if earlier stages resolved, matures into stable heterosexual object-love with a capacity to work and to care for others. In Freud's scheme the well-resolved adult can love and work.

**Fixation and regression.** *Fixation* is arrested libido that stays partly invested in an earlier stage; *regression* is a retreat, under stress, to an earlier fixated stage. The two link: the point of fixation determines the point to which one regresses, which is how psychoanalysis tied adult symptom pictures back to specific childhood stages. Karl Abraham later refined the schema, splitting the oral stage into sucking and biting phases and the anal stage into destructive-expulsive (anal-sadistic) and mastering-retaining (anal-erotic) phases.

HOLD THIS

**Five stages by body zone: oral, anal, phallic, latency, genital; the superego forms at the Oedipal resolution.** Fixation is energy left at a stage; regression is retreat to the fixation point under stress, and the fixation point sets where one regresses to.

## 11.5 Core techniques of classical analysis

**How the method works.** Classical psychoanalysis makes the unconscious conflict available for interpretation through a small set of tools (Kaplan & Sadock 2024).

### Free association

The *fundamental rule*: the patient reports whatever comes to mind without censoring. Breaks and blocks in the flow mark *resistance*, pointing to where defended material lies.

### Dream analysis

Dreams are "the royal road to the unconscious." The remembered *manifest content* is decoded, via the dreamer's associations, to the underlying *latent content* (the disguised wish); the disguising work uses condensation, displacement, symbolisation and secondary revision.

### Transference

The patient unconsciously redirects feelings and templates from important early figures onto the analyst. Rather than a nuisance, the *transference neurosis* is the central working material, letting old conflicts be re-lived and interpreted in the room.

### Countertransference

The analyst's own emotional reactions to the patient. Freud first saw it as interference; modern analysis treats it as a source of information about what the patient evokes.

### The analytic frame

The fixed conditions that make the method possible: the couch with the analyst out of view, high session frequency, a stable time and fee, and the analyst's stance of *neutrality* and *abstinence*. Interpretation and *working through* (repeated interpretation across contexts until insight holds) do the therapeutic work.

## 11.6 The circle and the Wednesday Society

**From a Vienna sitting-room to a movement.** In 1902 Freud gathered a handful of physicians for weekly discussion in the **Wednesday** Psychological Society, meeting in his waiting room; early members included Alfred Adler, Wilhelm Stekel, Otto **Rank** (its long-serving secretary) and Hanns **Sachs**, with Paul Federn joining soon after. In 1908 the group was formally reconstituted as the **Vienna psychoanalytic** Society, and the circle widened internationally to Sandor **Ferenczi** in Budapest, Karl **Abraham** in Berlin, **Ernest Jones** in Britain, Max Eitingon, and, most prominently, Carl Jung in Zurich, whom Freud favoured as heir and installed as first president of the International Psychoanalytical Association (1910). To guard doctrinal orthodoxy after the early breaks, Jones proposed a *secret committee* (1912 to 1913) of trusted loyalists, to whom Freud gave engraved Greek intaglio rings.

**The defections.** The movement fractured over the primacy Freud gave to sexuality and libido. Alfred Adler left in 1911, replacing libido with the striving for superiority and the inferiority complex (individual psychology); Stekel departed the same period (1912) over orthodoxy; Carl

Jung broke in 1913, recasting libido as a general psychic energy and adding the collective unconscious and archetypes (analytical psychology); and Otto Rank drifted away in the mid-1920s after emphasising the birth trauma. These splits are examined the Social, Learning & Personality Psychology notes and in the Adler and Jung topics as the birth of the rival depth schools.

**PEARL**

Two models, one mind: the topographic model classifies mental contents by *awareness* (Ucs, Pcs, Cs), the structural model by *function* (id, ego, superego). They coexist rather than the second erasing the first. The ego and superego straddle both, which is exactly why "unconscious" and "id" are not the same thing.

**COMMON TRAP**

The *Electra complex* and *penis envy* are frequently miscredited to Freud in full. Freud described the girl's phallic conflict and penis envy; the term "Electra complex" was coined by Jung. Also do not confuse *fixation* (energy stuck at a stage) with *regression* (retreat to an earlier stage under stress).

**CLINICAL ANCHOR**

Psychosexual character types still cue clinical pattern recognition: anal-retentive traits (orderliness, parsimony, obstinacy) map onto the obsessional character, and oral fixation onto dependency and substance-seeking. These are heuristics, not diagnoses; the fixation ages themselves are not empirically validated, so cite them as Freudian theory.

**MNEMONIC**

**Old (Oral) Age (Anal) Pensioners (Phallic) Love (Latency) Grapes (Genital)**

Reads the five stages in order. For the ego's job, remember it serves "three masters": the id, the superego, and external reality.

**GOOD TO REMEMBER**

- **Topographic model (1900):** unconscious (pleasure principle, primary process), preconscious, conscious (reality principle, secondary process).
- **Structural model (1923, *The Ego and the Id*):** id (drives, pleasure principle), ego (mediator, reality testing), superego (conscience, formed at Oedipal resolution).
- **Oral:** birth to about 1 year, zone mouth, conflict weaning; fixation gives dependency, smoking, over-eating.
- **Anal:** about 1 to 3 years, zone bowel/bladder, conflict toilet training; fixation gives retentive (obsessional) or expulsive character.
- **Phallic:** about 3 to 6 years, zone genitals, Oedipus/Electra complex, castration anxiety and penis envy; superego forms here.
- **Latency:** about 6 to puberty, drives dormant, social and skill development.
- **Genital:** puberty onward, mature object-love, capacity to love and work.
- **Fixation vs regression:** fixation = energy left at a stage; regression = retreat to the fixation point under stress.
- **Techniques:** free association (fundamental rule), dream analysis (manifest to latent), transference, countertransference, the analytic frame (couch, neutrality, abstinence, working through).
- **Wednesday Psychological Society:** founded 1902 in Freud's waiting room.
- **Vienna Psychoanalytic Society:** renamed 1908; International Psychoanalytical Association founded 1910 (Jung first president).
- **Circle members:** Adler, Stekel, Rank, Sachs, Federn, then Ferenczi, Abraham, Ernest Jones, Eitingon, Jung.
- **Secret committee (1912 to 1913):** Jones's loyalist inner ring, marked by Freud's engraved rings.
- **Defections over primacy of sexuality/libido:** Adler 1911 (individual psychology), Stekel 1912, Jung 1913 (analytical psychology), Rank mid-1920s (birth trauma).

## 12 · Adler and individual psychology

Adler is the **second primary school** of the psychodynamic tradition and, for the exam, the cleanest contrast case to Freud: where Freud made the unconscious sexual drive the engine of the mind, Adler made a conscious, forward-pulling **striving** the engine, and made the person's embeddedness in a social world the measure of health. His system is called **individual psychology**, a name that is routinely misread. It does not mean a psychology of the isolated individual; it comes from the Latin *individuum*, meaning **indivisible,** and asserts that the person is a single unified whole (holism) that cannot be split into warring drives and agencies the way Freud split the psyche. Adler (1870 to 1937), an Austrian general physician, was one of the original members of Freud's Vienna circle from 1902, rose to president of the Vienna Psychoanalytic Society, and in 1911 broke away, the first of the inner circle to leave, because he rejected the primacy of the libido and the sexual origin of neurosis (Kaplan & Sadock 2024).

The examinable core is a small chain of concepts that hang together: an **inferiority feeling** is universal, it drives a **striving for superiority** (better read as striving for competence or perfection), that striving is organised by a self-chosen goal (fictional finalism) into a consistent **style of life**, and the whole enterprise is healthy only insofar as it is turned outward toward others as **social interest**. Learn the chain and you can place any Adlerian term. Because this topic names a theorist, dated events, and a set of hard classifications (inferiority versus superiority

complex, birth-order positions, safeguarding tendencies), it closes with a good-to-remember box that enumerates them (Kaplan & Sadock 2024; The Psychotherapy Guidebook 1976).

### 12.1 Individual psychology: the person as an indivisible, goal-directed whole

**Holism plus teleology is the frame.** Adler's two founding commitments are that the person is a *unit*, not a collection of drives divided against themselves, and that behaviour is *future-directed*. He called the second principle **dynamism**: in every individual the psyche moves toward a goal, and once the goal is set the whole psychic apparatus, memories, dreams, perceptions, shapes itself to attain it. This is a **teleological** account (explanation by final cause, the goal ahead) and it is the sharpest break from Freud's causal, backward-looking model in which the past determines the present. For Adler the person is not pushed from behind by instinct but pulled from in front by a chosen aim, and because the goal is chosen it can be changed, which is what makes therapy possible (Kaplan & Sadock 2024).

RULE **Adler is teleological, Freud causal.** Freud is pushed from behind by buried sexual conflict; Adler is pulled from in front by a chosen goal, and "individual" means indivisible whole (holism), not the isolated individual.

### 12.2 Organ inferiority: the biological seed

**Adler's earliest idea, and the root of the whole system.** Before the psychology came the medicine. In his *Study of Organ Inferiority* (Adler 1907), a constitutionally weak or defective organ (poor eyesight, weak lungs, poor eye-hand coordination) was shown to provoke **compensation**: the organism, or the person, works to overcome the deficit, sometimes overshooting into **overcompensation** and turning the weak point into a strength. The classic illustration is the stammerer who becomes an orator. Adler then generalised this bodily principle into a psychological law: the felt weakness drives the striving that builds the personality. Organ inferiority is thus the concrete biological seed from which the broader *inferiority feeling* grows (Kaplan & Sadock 2024).

### 12.3 The inferiority feeling and the striving for superiority: the great upward drive

**This is the master motive of the whole theory.** Every child begins life small, weak, and dependent among larger, more capable adults, so a **feeling of inferiority** is universal and normal, not pathological. The response to it is the single dynamic force Adler placed at the centre of personality: the **striving for superiority**, better translated as striving for significance, competence, mastery, or perfection, the "great upward drive" from a felt minus toward a felt plus. Adler was explicit that this is the one master motive to which all traits and drives are subordinated: standing before the unknown, each person strives to become more perfect and complete. Note the exam point that Adler *himself* shifted the emphasis over his career, from raw compensation for weakness toward a positive striving for self-realisation, so "superiority" here means self-perfection, not domination over others (The Psychotherapy Guidebook 1976; Kaplan & Sadock 2024).

### 12.4 Inferiority complex versus superiority complex: the two pathological outcomes

**Distinguish the normal feeling from the pathological complex.** The universal inferiority *feeling* is the engine of healthy growth. It becomes pathological when the person cannot move from the felt minus to a felt plus and instead becomes stuck. The two failures are mirror images and are a favourite discriminate.

#### Inferiority complex

An exaggerated, entrenched sense of inadequacy in which the normal inferiority feeling is not overcome but overwhelms the person, producing discouragement, avoidance, and a retreat from life's tasks. The term entered ordinary language; Adler coined it.

#### Superiority complex

A defensive overcompensation: the person masks deep inferiority behind a facade of arrogance, boastfulness, vanity, or a drive to dominate. It is not the opposite of the inferiority complex but its concealment, the same wound covered by bluster.

> **COMMON TRAP**
>
> Do not equate the *inferiority feeling* (universal, normal, motivating) with the *inferiority complex* (pathological, entrenched, disabling). The feeling drives healthy striving; the complex is striving that has failed and calcified. And the superiority complex is not the healthy striving for superiority: it is a mask *over* inferiority, so a boastful, domineering patient is showing you a hidden inferiority complex, not confidence.

### 12.5 Fictional finalism: the guiding self-ideal

**The goal that organises everything is an invented one.** Adler borrowed from the philosopher Hans Vaihinger the idea that people live by useful fictions, "as if" propositions that are not literally true but guide action. The person's central fiction is a **guiding self-ideal** or **final goal**, an imagined picture of the self as complete, significant, and secure, toward which all behaviour is aimed. This is **fictional finalism** (also called the guiding fiction): the final goal is subjective and largely out of awareness, yet it is the true cause of the person's movements. Two people with the same objective circumstances live utterly differently because they aim at different fictional goals. This is the mechanism that makes Adler teleological in practice: understand the patient's fictional final goal and the apparently disparate pieces of the life snap into a single pattern (Kaplan & Sadock 2024; The Psychotherapy Guidebook 1976).

### 12.6 Style of life: the unique, early-set signature of striving

**The consistent pattern by which a person pursues the final goal.** The **style of life** (lifestyle) is the individual's characteristic, unified way of striving toward significance, the personal method of solving the three great tasks of life, work, friendship (society), and love (sexuality). It forms early, by roughly age four to five, out of the child's constitution, family atmosphere, and creative interpretation of its situation, and then runs as a single theme through everything the person perceives and does; it is, in effect, the person's perceptual style. Crucially the style of life is not simply stamped in by heredity or environment. Adler insisted on the **creative self** (creative power): the child actively, creatively interprets and responds to its circumstances, so two children

in the same family build different lifestyles. If you grasp a patient's style of life, their behaviour stops looking random and starts making sense (The Psychotherapy Guidebook 1976).

### 12.7 Social interest (Gemeinschaftsgefuhl): the index of mental health

**This is the single most examinable Adlerian concept.** **Social interest** renders Adler's German *Gemeinschaftsgefuhl*, literally community feeling: an innate but developable capacity to feel with and for others, to identify with the human community, and to contribute to the common good rather than pursue private superiority. For Adler this is the *criterion of mental health*. The healthy person turns the upward striving outward, into socially useful contribution; the neurotic and the criminal turn it inward, striving for a personal superiority on the "useless side of life" at others' expense. Adler summarised the whole diagnosis in one line: the more social interest a person has, the fewer feelings of inferiority they carry, and the aim of therapy is to increase the patient's sense of belonging and contribution. Distinguishing neurosis from psychosis in his system also runs on this axis: the neurotic *retains* social interest but is blocked from life goals by symptoms, whereas the psychotic *loses* social interest and retreats into a private world (Kaplan & Sadock 2024; The Psychotherapy Guidebook 1976).

> **PEARL**
>
> If one word survives from Adler into the exam, it is *social interest* (Gemeinschaftsgefuhl) as the yardstick of mental health. Freud measures health by the capacity to love and to work; Adler measures it by the capacity to contribute to the community. A patient whose striving is all private ambition with no social feeling is, in Adler's terms, unwell however successful they look.

### 12.8 Birth order and the family constellation

**Adler's most popularly known and most testable classification.** Adler argued that a child's *psychological* position in the **family constellation**, not the birth date as such, shapes the lifestyle, because each position offers a different situation to interpret. He is credited as the first theorist to make birth order a serious variable in personality.

| POSITION | ADLER'S CHARACTERISTIC SITUATION | TYPICAL TENDENCY |
|---|---|---|
| **First-born (oldest)** | **"Dethroned" by the arrival of a sibling, having once been the sole focus** | Tends toward conservatism, order, and authority; may become achievement-oriented or, if the loss is felt as trauma, insecure |
| **Second / middle** | Grows up with a "pacemaker" ahead to overtake, never had the parents alone | **Ambitious, competitive, often better adjusted; may become the social activist, open to change** |
| **Youngest** | Never displaced, surrounded by older models, often pampered | Can be highly driven to surpass all others, or dependent and spoiled if over-indulged |
| **Only child** | Never shares the parents; adult world is the reference | **Precocious with adults but may struggle when not the centre; risk of pampering** |

Adler's birth-order positions and their characteristic situations: it is the child's interpreted *psychological* position in the family constellation, not the ordinal number, that shapes lifestyle (Kaplan & Sadock 2024).

### 12.9 Safeguarding tendencies and the masculine protest

**Two named defensive concepts examiners like to surface.** When the fictional goal of superiority is threatened, the person protects self-esteem rather than face reality, and Adler called these manoeuvres **safeguarding tendencies**, his forward-looking, self-esteem-protecting counterpart to Freud's defence mechanisms. They include *excuses* (the neurotic symptom offered as an alibi, "I would succeed, but for this"), *aggression* (depreciating others, accusation, self-accusation to secure superiority), and *distance-seeking* (moving backward, standing still, hesitating, or constructing obstacles so as never to risk the test). The **masculine protest** is his term for the overstriving, in either sex, to escape a felt "feminine", that is weak, inferior, submissive, position toward an idealised "masculine", strong, dominant one; Adler used it to reframe as a social-power struggle what Freud had explained sexually (for example penis envy), locating the drive in the culture's overvaluing of masculinity rather than in anatomy (Kaplan & Sadock 2024).

### 12.10 The 1911 break from Freud

**Know why he left, not just that he left.** Adler joined Freud's discussion circle in 1902 and became president of the Vienna Psychoanalytic Society, but he never accepted the pillars of Freud's system: the primacy of the libido, the sexual origin of neurosis, and the determining power of infantile sexual wishes. Where Freud looked backward to buried sexual conflict, Adler looked forward to a chosen goal; where Freud saw a psyche split into id, ego, and superego, Adler saw an indivisible whole; where Freud made drive central, Adler made social embeddedness central. The disagreement was irreconcilable, and in 1911 Adler resigned, taking a group of followers with him and founding individual psychology, the first major secession from psychoanalysis (Jung's followed in 1914) (Kaplan & Sadock 2024; The Psychotherapy Guidebook 1976).

### 12.11 Theory of psychopathology: the mistaken style of life

**Neurosis is a discouraged, socially useless lifestyle, not repressed sex.** For Adler, emotional disorder springs from a **mistaken style of life** built on false ideas about the self and the world and on goals of private superiority that lead away from social usefulness. The pampered child, for instance, grows up expecting others to serve them, avoids responsibility, blames others for failures, and yet feels chronically insecure because their whole worth depends on being served. When such a lifestyle meets a real challenge it cannot solve, symptoms appear, and the symptoms have a *purpose*: they protect self-esteem and provide an excuse ("I could have, but for this illness") while letting the person sidestep the task they fear. Pathology is thus discouragement plus deficient social interest, and it is correctable by insight and re-education because the goal that organises it was chosen (Kaplan & Sadock 2024).

HOLD THIS

**Social interest (Gemeinschaftsgefuhl) is Adler's yardstick of mental health.** The neurotic retains it but is blocked by symptoms; the psychotic loses it and retreats into a private world.

### 12.12 Therapy and legacy: encouragement, early recollections, and the line into CBT

**Adlerian technique is brief, active, collaborative, and re-educative.** The therapist works with the patient as an equal to uncover the style of life and its mistaken goals, then *re-orients* the patient toward socially useful living. The signature tools are **encouragement** (the therapeutic antidote to discouragement, building the patient's confidence to attempt life's tasks), **early recollections** (the earliest memories, read not as historical fact but as a projective clue to the present lifestyle, since what is remembered is selected to fit the current goal), analysis of **birth order and dreams** (dreams as an expression of present-day concerns and problem-solving, not disguised infantile wishes), and **task-setting** (assigning concrete, graded real-world tasks). Adler anticipated much of what came later: his focus on mistaken beliefs and faulty perceptions of self and world prefigured **cognitive therapy** (Beck and Ellis both acknowledged the debt); his stress on the person's inherent worth, agency, and phenomenology fed the **humanistic** tradition (Maslow, Rogers); and his attention to the family constellation and the person shaping their own interpersonal world seeded **family-systems** thinking. His techniques of *reframing* and *paradoxical intention* are now standard across schools (Kaplan & Sadock 2024).

CLINICAL ANCHOR

A high-achieving professional presents with paralysing procrastination on the one project that would confirm their talent. Freud might hunt an unconscious conflict; Adler asks what the delay *achieves*. The unfinished work is a safeguarding tendency: while the project is incomplete the fictional self-ideal of "the great talent" is never put to the test and cannot fail. Adlerian therapy names the mistaken goal (superiority without risk), reframes the procrastination as protection of a fragile self-estimate, and sets a graded real task to rebuild courage and turn striving back toward useful contribution.

**INDIA**

Birth-order and family-constellation reasoning translates readily to the large, multi-generational Indian joint family, where the eldest son's "dethronement" and burden of expectation, or the youngest's pampering, are lived realities rather than abstractions. Adler's *social interest* also maps onto collectivist framings of the self as embedded in family and community, which can make his community-feeling yardstick of health intuitive in the Indian setting; the caution is not to read culturally normative interdependence as pathological dependency.

**MNEMONIC**

### I Saw For Sure Some Big Sisters Mock

Adler's eight examinable concepts in order: **I**nferiority feeling, **S**uperiority striving, **F**ictional finalism, **S**tyle of life, **S**ocial interest, **B**irth order, **S**afeguarding tendencies, **M**asculine protest. Run the sentence and you have recalled the spine of individual psychology.

**GOOD TO REMEMBER**

- **Alfred Adler (1870 to 1937):** Austrian physician; founder of *individual psychology* ("individual" = indivisible whole, holism).
- **Circle and break:** joined Freud's Vienna circle 1902, became president of the Vienna Psychoanalytic Society, resigned 1911 (first major secession) over the primacy of libido and the sexual origin of neurosis.
- **Organ inferiority (1907):** a weak organ provokes compensation / overcompensation; the biological seed of the theory.
- **Inferiority feeling:** universal and normal (the small child among adults); the engine of healthy striving.
- **Striving for superiority:** the single master motive; the "great upward drive" from felt minus to plus; means self-perfection / competence, not domination.
- **Inferiority complex:** entrenched, disabling sense of inadequacy (term coined by Adler).
- **Superiority complex:** arrogant overcompensation masking a hidden inferiority.
- **Fictional finalism (guiding fiction):** a subjective, mostly unconscious final self-ideal that pulls all behaviour (borrowed from Vaihinger's "as if").
- **Style of life:** the unified, unique pattern of striving; set by about age four to five; shaped by the *creative self*, not just heredity/environment.
- **Three life tasks:** work, friendship (society), and love (sexuality).
- **Social interest (Gemeinschaftsgefuhl):** community feeling; the *index / criterion of mental health*; neurosis retains it, psychosis loses it.
- **Birth order / family constellation:** psychological position shapes lifestyle, first-born "dethroned"; second/middle competitive; youngest driven or pampered; only child precocious but risk of pampering.
- **Safeguarding tendencies:** self-esteem-protecting manoeuvres (excuses, aggression, distance-seeking); Adler's forward-looking analogue of defence mechanisms.
- **Masculine protest:** overstriving to escape a felt "weak/feminine" position; his social-power reframing of Freud's sexual account.
- **Therapy tools:** encouragement, early recollections, dream and birth-order analysis, task-setting, reframing, paradoxical intention; brief, active, egalitarian, re-educative.
- **Legacy:** anticipated cognitive therapy (Beck, Ellis), humanistic psychology (Maslow, Rogers), and family-systems thinking.

## 13 · Jung and analytical psychology

Jung is the **third primary school** of the psychodynamic tradition and, for the exam, the school that pushed the unconscious deepest and widest: Freud made it a personal repository of repressed sexual wishes, Adler barely used it, but Jung split it into a *personal* layer and a *collective* layer inherited by the whole species. His system is called **analytical psychology** (to distinguish it from Freud's psychoanalysis and Adler's individual psychology). Carl Gustav Jung (1875 to 1961), a Swiss psychiatrist who worked under Bleuler at the Burgholzli, was Freud's chosen heir and the first president of the International Psychoanalytic Association, then broke away in 1913 over the nature of libido, and founded the school that developed the concepts of the **collective unconscious**, the **archetypes**, and the two personality attitudes **introversion** and **extraversion** (Kaplan & Sadock 2024).

The examinable spine is a layered map of the psyche plus a typology. The map runs ego at the surface, then the personal unconscious holding the **complexes**, then the collective unconscious holding the archetypes (persona, **shadow**, anima/animus, the Self, the wise old man, the great mother). The typology crosses two attitudes with four functions and is the direct ancestor of the MBTI. The goal of the whole enterprise is **individuation**. Because this topic names a theorist, a dated break, a fixed set of psychic structures, the named archetypes, and hard classifications of attitude and function, it closes with a good-to-remember box that enumerates every one (Kaplan & Sadock 2024; Companion to Psychiatric Studies).

### 13.1 The word-association test: Jung's empirical root and the birth of the "complex"

**Start where the exam rarely does, with the data.** Jung's earliest and most rigorously empirical work at the Burgholzli was the **word-association test**: a standard list of stimulus words is read aloud and the patient responds with the first word that comes to mind, while the examiner times the reaction. Jung noticed that certain words provoked disturbances, a delayed reaction time, an unusual or absent response, repetition of the stimulus, or bodily signs measured by the galvanic skin response. He inferred that these disturbances clustered around emotionally charged themes, and he named such a cluster a **complex**: a group of unconscious ideas bound together by a common emotional tone (Kaplan & Sadock 2024). This is the origin of the everyday word "complex," and it is worth stressing that Jung's central construct was born from a laboratory reaction-time procedure, not from the couch. It was this work on complexes, and its relevance to the meaning of psychotic symptoms, that first drew Freud and Jung together.

### 13.2 The structure of the psyche: ego, personal unconscious, collective unconscious

**Learn the three-layer model as a nested map.** Jung replaced Freud's id-ego-superego apparatus with a layered psyche. At the surface sits the **ego**, the centre of conscious life and the bridge to external reality (in Jungian terms the ego is itself a complex). Below it lies the **personal unconscious**, the equivalent of Freud's unconscious, a repository of an individual's own repressed or forgotten memories, and the home of the complexes. Deeper still, and this is Jung's radical addition, lies the **collective unconscious** (also called the objective psyche): a shared, inherited stratum that is not personal at all but is the residue of humankind's evolutionary and ancestral past, "much as human DNA is an aggregate of the past" (Kaplan & Sadock 2024). The

collective unconscious houses the instincts, the potential for creativity, and the archetypes. Note the exam-critical boundary: complexes live in the personal unconscious, archetypes live in the collective unconscious.

RULE **Complexes sit in the personal unconscious, archetypes in the collective.** The archetype is the inherited mould; the complex is the personal cast filled in by lived experience.

### 13.3 Complexes and archetypes: how the two connect

**An archetype is the inherited mould; a complex is what gets cast in it.** A **complex** is a group of unconscious ideas around an emotionally toned experience, endowed with psychic energy from its affective charge; the more intense the complex, the greater its pull on imagery, emotion, and action, and a dormant complex can be stimulated by an external cue (a father complex fired by an older friend, or by music that evokes father memories) and then rise to dominate consciousness (Kaplan & Sadock 2024). Crucially, complexes are built around **archetypes**: genetically determined, universal, inherited predispositions to perceive and act in typically human ways (nurturance, aggression). The archetype supplies the inborn template; lived experience fleshes it out into a personal complex. Jung's own illustration is the *earth mother*: every infant is born with a dim, universal model of an all-nurturing caretaker (the mother archetype), and the individual's actual mother complex emerges as that template meets real mothering. Archetypes surface in dreams, myths, and fantasies as **primordial images** (the many-breasted animal as unlimited nurturance, the mandala as wholeness) that recur across cultures without transmission (Companion to Psychiatric Studies; Wolberg 1988).

### 13.4 The named archetypes: persona, shadow, anima/animus, the Self

**These four (plus the great mother and wise old man) are the ones examiners want by name.** Several universal archetypes attend the ego and structure the personality.

#### Persona

The public personality, the social mask that mediates between the ego and the outer world; the face one shows to others. Named after the mask of the classical actor. Over-identification with the persona (being only one's role) is a recognised pathology.

#### Shadow

The reverse image of the persona: the sum of traits unacceptable to the persona, whether negative or, importantly, positive. A brave persona has a fearful shadow. The shadow's archetype is the enemy or feared intruder, and its unacknowledged contents are the material most readily projected onto others.

#### Anima / animus

The contrasexual archetype. The *anima* is the residue of all experience of woman in a man's psychic heritage; the *animus* is the residue of all experience of man in a woman's. It connects the ego to the inner world and is projected onto partners in intimate relationships.

#### The Self

The archetype of wholeness and the innate ordering principle of the whole psyche, the unconscious centre that directs psychic life and gives rise to the ego. Not to be confused with the ego: the Self is the totality, the ego only the conscious fragment. Often symbolised by the mandala.

Two further named archetypes carry the personified wisdom and nurturance of the collective unconscious: the **wise old man** (the archetype of meaning, spirit, and guidance, appearing as the sage, teacher, or magician) and the **great mother** (the archetype of nurturance and of creation-and-destruction, the earth mother above) (Kaplan & Sadock 2024).

> **COMMON TRAP**
>
> Do not conflate the *ego* with the *Self*. In Jung the ego is only the centre of consciousness, a small part; the Self is the archetype of the whole psyche, conscious and unconscious together, and is the goal that individuation moves toward. Inflation of the ego with the Self's power (mistaking the part for the whole) is, for Jung, a route to grandiosity; being cut off from the Self yields alienation and depression. Likewise the *persona* is the outward mask and the *shadow* is the disowned inner opposite; they are complementary, not the same axis as ego and Self.

### 13.5 The two attitudes and four functions: Jung's typology behind the MBTI

**This is the most widely known part of Jung and the highest-yield to memorise cleanly.** Jung's **psychological types** (from *Psychological Types*, 1921) combine two *attitudes* of energy orientation with four *functions* of psychological activity. The two attitudes are **extraversion** (energy oriented outward, to others and the world of objects) and **introversion** (energy oriented inward, to the subject's own inner world); Jung himself described his type as an introverted intuitive. The four functions split into two pairs. The two *rational* (judging) functions are **thinking** (evaluating by logic) and **feeling** (evaluating by values and relationship, not by logic, so "feeling" here means valuing, not emotion). The two *irrational* (perceiving) functions are **sensation** (grasping a situation by assembling its concrete details, seeing the trees first) and **intuition** (grasping the whole first, seeing the forest). Everyone has all functions but a superior, most-developed one and an inferior, least-developed one (Kaplan & Sadock 2024). The **Myers-Briggs Type Indicator (MBTI)** operationalised Jung's attitudes and functions into a self-report instrument and is the most popular, most widely known descendant of his theory, though it is used detached from its Jungian roots and lacks strong psychometric standing.

| POLARITY | POLE A | POLE B | WHAT IT CONCERNS |
|---|---|---|---|
| **Attitude** | Extraversion (energy outward) | Introversion (energy inward) | **Direction of psychic energy / object relatedness** |
| **Rational (judging) function** | Thinking (logic) | Feeling (values) | **How information is evaluated and judged** |
| **Irrational (perceiving) function** | Sensation (details, "trees") | Intuition (whole, "forest") | **How information is perceived / taken in** |

Jung's typology: one attitude axis and two function axes (thinking/feeling are rational, sensation/intuition irrational); crossing them yields the eight function-attitude types operationalised by the MBTI (Kaplan & Sadock 2024).

### 13.6 Individuation and the transcendent function: the goal of the psyche

**Individuation is Jung's word for the lifelong drive toward wholeness.** Where Freud's endpoint was the resolution of infantile conflict, Jung's is **individuation**: the process by which a person becomes a whole, unique individual by integrating the unconscious (especially the shadow and

the anima/animus) into conscious life, so that the ego comes into a working relationship with the Self. Jung placed this squarely in the *second half of life*: in youth the ego builds itself and adapts to the world, but at midlife the task turns inward, toward meaning, and toward the parts of the personality left undeveloped (the inferior functions, the disowned shadow). The **transcendent function** is the mechanism of integration: it is the psychic function that unites conscious and unconscious contents, typically through a symbol that holds both opposites, so that the tension between them is resolved at a higher level rather than by one side suppressing the other (Kaplan & Sadock 2024; Companion to Psychiatric Studies). Individuation is thus not becoming self-centred; it paradoxically yields broader, more mature relationships and greater creativity.

HOLD THIS

**Three Jung survivors: the collective unconscious and archetypes (unique to him), introversion/extraversion plus four functions (the root of the MBTI), and individuation as the goal.** Individuation is a task of the second half of life.

### 13.7 Synchronicity and the compensatory unconscious

**Two smaller Jungian concepts worth a line each.** **Synchronicity** is Jung's term for a meaningful coincidence of an inner state and an outer event that are connected by *meaning* rather than by cause, an "acausal connecting principle." It sits at the mystical edge of his system and is one of the concepts that separates Jungian thought from mainstream scientific psychology. Second, Jung held that the psyche is self-balancing: his **law of compensation** states that for any one-sided or overly intense conscious attitude, the unconscious produces a compensating counterweight, which is why he read a dream by asking what conscious attitude it compensated for (a neglected person dreams of a huge, many-breasted mother) (Kaplan & Sadock 2024).

### 13.8 The 1913 break from Freud: libido as general psychic energy

**Know the specific point of rupture, not just the fact of it.** Jung was Freud's designated successor, but the friendship ended around 1913 over the *nature of libido*. Freud insisted libido was fundamentally *sexual* energy; Jung redefined it as a general, undifferentiated **psychic energy** or "life urge," of which sexuality was only one expression (Companion to Psychiatric Studies). From this single disagreement the rest of the split followed: Jung rejected the Oedipus complex as a universal developmental stage, minimised the causal weight of infantile sexuality, and replaced Freud's backward-looking, causal model with a teleological one in which the psyche is also pulled forward by the drive toward individuation and meaning. He further parted from Freud on the unconscious itself, adding the collective layer Freud never accepted. Jung's own turbulent period of self-analysis from 1913 to about 1918, during which he experienced quasi-psychotic imagery and used it as a spur to introspection, produced the raw material of much of his theory (Kaplan & Sadock 2024).

### 13.9 Therapeutic legacy: analytical psychotherapy, active imagination, dream amplification

**Jungian technique is active, symbol-centred, and pitched at meaning.** **Analytical psychotherapy** abandons the couch and the authoritarian analyst for a face-to-face (vis-a-vis) partnership, keeps the relationship positive and avoids fostering a transference neurosis, and

tailors technique to type (the introvert given elaborate interpretations, the extravert helped to pragmatic adjustment) (Wolberg 1988). Its signature methods are: **active imagination** (the patient deliberately enters and dialogues with unconscious images in a waking, semi-directed reverie, giving the unconscious a voice); **dream amplification** (elaborating a dream image by connecting it to parallel mythological, religious, and cultural motifs to draw out its archetypal meaning, rather than reducing it to a disguised infantile wish); and the use of drawings, paintings, mandalas, and the sand tray to externalise unconscious contents. Dreams are read as reflecting present strivings and future direction, not only the buried past. Beyond the clinic, Jung's reach is unusually wide: he seeded the MBTI, the word "complex," concepts of introversion and extraversion that entered ordinary language and later trait psychology, and a deep influence on the study of myth, religion, art, and spirituality (Wolberg 1988; Kaplan & Sadock 2024).

**CLINICAL ANCHOR**

A successful surgeon in his early fifties, secure in career and family, presents with a flat, purposeless depression and recurrent dreams of a locked room he cannot enter. Nothing in his life has "gone wrong." A Jungian reading treats this as a midlife individuation crisis: the ego-project of the first half of life is complete, and the Self is pressing for the neglected, unlived parts of the personality (the inferior functions, the shadow). The locked room is amplified as an image of the closed-off inner world; therapy uses dream work and active imagination to open a dialogue with it, aiming not to remove a symptom but to integrate what has been left out. This is precisely the "Who is the real me?" presentation Jungian analysis is considered well suited to (Kaplan & Sadock 2024).

**PEARL**

If three things survive from Jung into the exam, they are: (1) the *collective unconscious* with its *archetypes* as the one idea unique to him; (2) *introversion / extraversion* and the four functions as the root of the MBTI; and (3) *individuation* as the goal. Anchor the map with one boundary rule: complexes sit in the *personal* unconscious, archetypes in the *collective* unconscious.

**INDIA**

Jung engaged directly with Indian thought: the *mandala* he took as the central symbol of the Self is drawn from Hindu and Buddhist iconography, and his notion of individuation toward wholeness has been read alongside concepts of Self-realisation in Indian philosophy. For the Indian trainee this makes several Jungian symbols intuitively familiar; the exam caution is to keep the technical Jungian meanings (mandala = archetype of the Self and of psychic order) distinct from their devotional or ritual meanings.

MNEMONIC

### PSA-S = Persona, Shadow, Anima/animus, Self

The four core archetypes in the order they are usually met in analysis (outermost mask to innermost centre): **P**ersona (the mask), **S**hadow (the disowned opposite), **A**nima/animus (the contrasexual bridge to the inner world), **S**elf (the archetype of wholeness at the centre). Add the two personified figures, the wise old man (meaning) and the great mother (nurturance), and you have the named archetype set.

GOOD TO REMEMBER

- **Carl Gustav Jung (1875 to 1961):** Swiss psychiatrist; worked under Bleuler at the Burgholzli; founder of *analytical psychology*.
- **Break from Freud (c. 1913):** over libido, Freud held it sexual, Jung held it a general psychic energy or "life urge"; Jung also rejected the universal Oedipus complex and added the collective unconscious.
- **Word-association test:** Jung's empirical root; origin of the term *complex* (a cluster of emotionally toned unconscious ideas, detected by disturbed reaction times).
- **Structure of the psyche:** ego (surface, centre of consciousness) → personal unconscious (holds the complexes) → collective unconscious / objective psyche (holds the archetypes).
- **Boundary rule:** complexes = personal unconscious; archetypes = collective unconscious.
- **Archetype vs complex:** archetype = inherited universal template (mould); complex = the personal cast filled in by lived experience.
- **Persona:** the social mask mediating ego and world.
- **Shadow:** the disowned reverse of the persona (positive or negative); readily projected.
- **Anima / animus:** the contrasexual archetype (anima = the feminine in a man; animus = the masculine in a woman).
- **Self:** the archetype of wholeness and the ordering centre of the whole psyche (symbol: mandala); not the same as the ego.
- **Wise old man / great mother:** personified archetypes of meaning/guidance and of nurturance.
- **Two attitudes:** extraversion (energy outward) and introversion (energy inward).
- **Four functions:** rational (judging) = thinking (logic) and feeling (values); irrational (perceiving) = sensation (details, "trees") and intuition (whole, "forest").
- **MBTI:** Myers-Briggs Type Indicator; the popular self-report descendant of Jung's attitudes and functions (used detached from Jungian theory, weak psychometrics).
- **Individuation:** the goal, integration of the unconscious into a whole, unique self; a task of the second half of life.
- **Transcendent function:** the psychic function that unites conscious and unconscious via a symbol holding both opposites.
- **Synchronicity:** meaningful (acausal) coincidence of inner state and outer event.
- **Law of compensation:** the unconscious counterbalances a one-sided conscious attitude (basis of Jung's dream reading).
- **Therapy:** analytical psychotherapy (face-to-face, active, type-tailored); active imagination; dream amplification; drawings, mandalas, sand tray. Dreams read for present and future, not only the past.
- **Key works:** *Psychological Types* (1921), *Two Essays on Analytical Psychology*, *The Archetypes and the Collective Unconscious*.

# Developmental psychology

## 14 · Erikson psychosocial stages

**The theory that took development off the couch and across the whole lifespan.** Erik Erikson (1902 to 1994) is the ego psychologist every psychiatry exam expects you to command in full, because his eight-stage schema is the reference frame for adolescent identity work, midlife crisis, and the psychology of ageing, and because it is the cleanest illustration of how psychoanalysis was extended beyond the drives. Where Freud's psychosexual stages ended at the genital stage and fell back on themselves after adolescence, Erikson's **psychosocial** stages continued through youth, middle age, and old age, describing the maturing ego's relations with an ever-widening social world rather than a biological unfolding of erogenous zones (Kaplan & Sadock 2024).

For the exam hold four things: the eight stages in order with their ages, the crisis and the **virtue** that each resolves into, the **epigenetic principle** that binds the sequence together, and Marcia's four identity statuses as the empirical operationalisation of stage five. Erikson is best remembered as the man who coined the phrase **identity crisis**, drawing it explicitly from his own alienated, wandering adolescence (Kaplan & Sadock 2024).

### 14.1 Who Erikson was, and what he fixed

**From Freud's drives to the ego's adaptation.** Erikson was trained in Vienna by Anna Freud, absorbed her ego psychology (her 1936 treatise on the defence mechanisms), and carried it into a developmental theory of growth rather than pathology (Kaplan & Sadock 2024). His three landmark works map onto his own model: *Childhood and Society* (1950) laid out the life cycle; *Young Man Luther* analysed an adolescent identity crisis resolved in early adulthood; *Gandhi's Truth* demonstrated generativity at midlife. What he fixed from classical psychoanalysis was its two blind spots: it stopped at adolescence, and it read development as a biological unfolding of libido. Erikson kept the psychosexual scaffolding but recast each stage as a **psychosocial** crisis anchored in family, society, and history, and he pushed the sequence all the way to death. What he left debated was the empirical status of the stages themselves, which is exactly the gap Marcia later filled (see 14.6).

### 14.2 The epigenetic principle

**The organising rule of the whole theory.** Erikson borrowed the **epigenetic principle** from embryology: just as an organism in utero develops according to a predetermined ground plan in which each part has its time of special ascendancy, psychosocial growth proceeds in a fixed sequence of phases (Kaplan & Sadock 2024). Three consequences follow, and each is examinable. First, the elements of every stage are present from birth and merely differentiate over time. Second, each stage has its own period of quiescence and its own critical ascendancy, and depends on the proper resolution of the stages before it. Third, work on any stage is never finished; an old conflict can be reactivated by a later life event, which is why an adult can be thrown back into a trust or an identity crisis. The stages are not water-tight boxes but points along a continuum, and

the later four can be read as recombinations of the earlier ones (intimacy, for instance, fuses trust and autonomy).

### 14.3 Crisis, virtue, and the syntonic-dystonic balance

**Each stage is a turning point, not a catastrophe.** Erikson was precise that **crisis** means a turning point of heightened vulnerability and heightened potential, not a threat of disaster (Kaplan & Sadock 2024). Every stage pits a positive **syntonic** tendency against a negative **dystonic** one, and healthy resolution is not the total victory of the positive pole but a favourable ratio in which the syntonic quality predominates while a measure of the dystonic is retained. From that balance emerges a **virtue** or "basic strength", which Erikson defined as an inherent strength, the way one speaks of the virtue of a medicine. A useful refinement to quote: overshooting the positive pole produces a **maladaptation** (for example, sensory maldjustment, an over-trusting naivety), while collapse to the negative pole produces a **malignancy** (for example, withdrawal, entrenched mistrust). Both represent failed resolution of the crisis.

TRAP A crisis is a turning point of heightened vulnerability and potential, **not a catastrophe**. Healthy resolution is a favourable syntonic-over-dystonic ratio, not total victory of the positive pole.

### 14.4 The eight stages in order

**The spine of the topic, learn it cold.** The ages below follow Kaplan & Sadock (2024); note that the commonly taught bands (for example, trust to about 1 year, industry 6 to 12) are the same stages under rounder ages, and either set is acceptable in an answer so long as the sequence and virtues are exact. Stage five is the pivot of adolescent psychiatry; stages seven and eight are the ones examiners use to test the lifespan extension.

#### 1. Trust versus mistrust (birth to about 18 months; virtue: hope)

The infant learns from consistent, responsive caregiving whether the world is dependable. The Freudian correlate is the oral stage. Failure yields basic mistrust; the malignancy is withdrawal.

#### 2. Autonomy versus shame and doubt (about 18 months to 3 years; virtue: will)

Toilet training and mobility let the toddler exercise self-control and choice. The Freudian correlate is the anal stage. Over-control by caregivers breeds shame and self-doubt; the virtue is willpower.

#### 3. Initiative versus guilt (about 3 to 5 years; virtue: purpose)

The child plans, initiates, and asserts through play and questions. The Freudian correlate is the phallic-oedipal stage. Excessive prohibition breeds guilt; the virtue is purpose.

#### 4. Industry versus inferiority (about 6 to 12 years; virtue: competence)

School-age children build skills, compare themselves to peers, and derive self-esteem from accomplishment. The Freudian correlate is latency. Repeated failure or invidious comparison breeds inferiority; the virtue is competence.

#### 5. Identity versus role confusion (adolescence, about 12 to 18 years; virtue: fidelity)

The adolescent integrates childhood identifications into a coherent, continuous sense of self and vocation. This is the identity crisis; the psychosocial moratorium is its healthy exploratory phase. Failure yields role (or identity) confusion; the virtue is fidelity, the capacity to sustain loyalties despite contradictions.

#### 6. Intimacy versus isolation (young adulthood, about 20s to 40; virtue: love)

Having secured an identity, the young adult can fuse it with another's in genuine intimacy without fear of ego loss. Failure yields isolation and superficial relationships; the virtue is love.

#### 7. Generativity versus stagnation (middle adulthood, about 40 to 65; virtue: care)

The adult invests in guiding the next generation through parenthood, mentorship, and productive work. Failure yields stagnation and self-absorption; the virtue is care.

#### 8. Ego integrity versus despair (old age, about 65 to death; virtue: wisdom)

The elder reviews the life lived and either accepts it as meaningful and inevitable (integrity) or is overwhelmed by regret and the shortness of remaining time (despair). The virtue is wisdom, a detached yet active concern with life in the face of death.

### 14.5 Freud beside Erikson: the psychosexual-to-psychosocial extension

**Same childhood scaffold, then Erikson keeps going.** The single most common comparison question asks how Erikson relates to Freud (Tasman 2015). The two theories run in parallel through childhood, then Freud's stops and Erikson's continues for three more stages across the whole adult life.

| AGE BAND | FREUD (PSYCHOSEXUAL) | ERIKSON (PSYCHOSOCIAL) | VIRTUE |
|---|---|---|---|
| **0 to ~1.5 y** | Oral | Trust vs mistrust | **Hope** |
| **~1.5 to 3 y** | Anal | Autonomy vs shame and doubt | **Will** |
| **~3 to 5 y** | Phallic (oedipal) | Initiative vs guilt | **Purpose** |
| **~6 to 12 y** | Latency | Industry vs inferiority | **Competence** |
| **Adolescence** | Genital | Identity vs role confusion | **Fidelity** |
| **Young adulthood** | **(Freud stops here)** | Intimacy vs isolation | **Love** |
| **Middle adulthood** | **(no Freudian stage)** | Generativity vs stagnation | **Care** |
| **Old age** | **(no Freudian stage)** | Ego integrity vs despair | **Wisdom** |

The discriminator: Freud's map ends at the genital stage in adolescence, whereas Erikson adds three adult stages (intimacy, generativity, integrity), which is precisely his lifespan extension of psychoanalysis.

### 14.6 Marcia's four identity statuses: the empirical extension

**The evidence base examiners want attached to stage five.** James Marcia (1966) operationalised Erikson's identity-versus-role-confusion crisis into a testable paradigm, crossing two dimensions: **exploration** (the presence or absence of a crisis, an active period of trying out alternatives) and **commitment** (whether the person has settled on values, vocation, and beliefs). The two-by-two grid yields four **identity statuses**, and this cross-tabulation is the single most examinable diagram in the topic.

| STATUS | EXPLORATION (CRISIS) | COMMITMENT | CHARACTER |
|---|---|---|---|
| **Identity achievement** | **Yes (explored)** | **Yes (committed)** | Confident, self-directed; the mature resolution |
| **Moratorium** | **Yes (in active crisis)** | **No (not yet committed)** | Anxious but open, actively searching |
| **Foreclosure** | **No (no crisis)** | **Yes (committed)** | Conformist; commitments taken wholesale from parents or authority without questioning |
| **Identity diffusion** | **No** | **No** | Aimless, detached, no direction; the least adaptive status |

Foreclosure is the classic trap: commitment without exploration. Diffusion is neither; achievement is both; moratorium is the healthy exploratory phase Erikson himself lived through.

**The clinical and cultural nuance to add.** Diffusion carries the highest risk for internalising and externalising problems and for suicidality, whereas achievement predicts higher subsequent intimacy, generativity, and integrity (longitudinal data). Marcia noted that in some cultural and gender contexts foreclosure can be socially adaptive, so the statuses are not a simple ranking from bad to good.

HOLD THIS

**Erikson psychosocialised Freud and ran him across the whole lifespan; Marcia then made stage five empirical.** The four statuses cross exploration (crisis) with commitment: achievement (both), moratorium (crisis only), foreclosure (commitment only), diffusion (neither).

### 14.7 Worked clinical example

**Reading a case through the schema.** A 19-year-old who abruptly abandons the engineering course his parents chose, drops his social group, and describes feeling "there is no real me under all this" is presenting a stage-five failure: an unresolved **identity versus role** crisis. In Marcia's terms he has moved out of *foreclosure* (a borrowed, unexamined commitment) into *moratorium* (active exploration without a new commitment). The developmentally correct clinical stance is not to rush him to a decision but to protect the psychosocial moratorium, because premature foreclosure would only re-create the problem. If, decades later, the same man at 68 sits in your clinic consumed by regret that he "wasted his life" and terrified of dying, you are looking at stage eight, despair rather than **integrity**, and the therapeutic task is a supported life review toward acceptance and wisdom. The same theory frames both encounters, which is exactly why Erikson endures in clinical psychiatry.

**COMMON TRAP**

Do not swap the virtues between stages: initiative gives *purpose* (not competence) and industry gives *competence* (not purpose); intimacy gives *love* and generativity gives *care*. And do not confuse Marcia's *moratorium* status (active exploration, no commitment) with *foreclosure* (commitment without exploration): foreclosure is the one that looks settled but has skipped the crisis.

**PEARL**

The one-line integration for an examiner: Erikson psychosocialised Freud and extended him across the whole lifespan under the epigenetic principle, and Marcia then made the adolescent identity stage empirical by crossing exploration with commitment. Name that arc (Freud to Erikson to Marcia) and you have framed the entire topic.

**MNEMONIC**

### Virtues: "Hope Will Push Children Fully Loving Caring Wisely"

Stage virtues in order: **H**ope, **Wi**ll, **P**urpose, **C**ompetence, **F**idelity, **L**ove, **C**are, **Wi**sdom. For the statuses, remember the crisis-by-commitment grid: achievement (both), moratorium (crisis only), foreclosure (commitment only), diffusion (neither).

**GOOD TO REMEMBER**

- **Stage 1, trust vs mistrust:** birth to about 18 months; virtue *hope*; Freudian oral stage.
- **Stage 2, autonomy vs shame and doubt:** about 18 months to 3 years; virtue *will*; Freudian anal stage.
- **Stage 3, initiative vs guilt:** about 3 to 5 years; virtue *purpose*; Freudian phallic-oedipal stage.
- **Stage 4, industry vs inferiority:** about 6 to 12 years; virtue *competence*; Freudian latency.
- **Stage 5, identity vs role confusion:** adolescence (about 12 to 18 years); virtue *fidelity*; the identity crisis and psychosocial moratorium.
- **Stage 6, intimacy vs isolation:** young adulthood; virtue *love*.
- **Stage 7, generativity vs stagnation:** middle adulthood (about 40 to 65); virtue *care*.
- **Stage 8, ego integrity vs despair:** old age (about 65 to death); virtue *wisdom*.
- **Epigenetic principle:** fixed, predetermined sequence; each stage present from birth, ascendant in turn, dependent on prior resolution.
- **Crisis:** a turning point of heightened vulnerability and potential, not a catastrophe (Erikson).
- **Virtue / basic strength:** the ego strength emerging from a favourable syntonic-over-dystonic ratio.
- **Maladaptation vs malignancy:** too much positive pole (maladaptation) vs collapse to the negative pole (malignancy); both are failed resolution.
- **Marcia (1966) statuses:** achievement (crisis + commitment), moratorium (crisis, no commitment), foreclosure (commitment, no crisis), diffusion (neither).
- **Extension of Freud:** Erikson made the stages psychosocial and added three adult stages past the genital stage (intimacy, generativity, integrity).
- **Key works:** *Childhood and Society* (1950), *Young Man Luther*, *Gandhi's Truth*.

## 15 · Piaget cognitive development, Vygotsky and theory of mind

**The map of how thinking is built.** Jean Piaget (1896 to 1980) gave psychiatry its dominant account of how the child's mind is constructed, stage by qualitatively distinct stage, from reflex to abstract reason. The exam wants three things held together and often contrasted: Piaget's **constructivist** stage theory (the mechanisms, the four periods with their ages and signature tasks, and the standard critiques), Lev Vygotsky's rival **sociocultural** theory (learning as socially mediated, the zone of proximal development, scaffolding), and the **theory of mind** tradition that grew out of the egocentrism question and reset the age at which a child grasps that others hold false beliefs.

Piaget held that the child's mental life is *qualitatively* different from the adult's, not merely a smaller version of it (Companion to Psychiatric Studies). The child is an active builder, an epistemologist: by acting on the world the child constructs internal structures, and those structures, not the environment itself, govern how the child thinks (Kaplan & Sadock 2024). This is a stage-and-concept theory, so it is examined as a system to enumerate rather than as an evolution toward a single currently accepted mechanism; treat the ages below as the standard textbook bands, not sharp cut-offs.

### 15.1 The building blocks: schema, assimilation, accommodation, equilibration

**Functional invariants.** A **schema** (scheme) is a unit of cognition: the organised structure of an action, generalised by repetition to analogous situations, from the infant's grasping reflex to the adolescent's logical operation (Kaplan & Sadock 2024). Schemata change through two complementary processes that operate at every level of development. In **assimilation**, the child incorporates new input into an existing schema: a child who meets a dachshund for the first time assimilates it into the schema "dog" (Tasman 2015). In **accommodation**, a novel stimulus that will not fit forces the schema to expand or reorganise: the schema "all four-legged animals are dogs" must be altered when the child meets a cat. **Equilibration** is the self-regulating drive that balances assimilation against accommodation; Piaget called it "compensation for an external disturbance," the internal factor that structures developing intelligence and pushes it toward wider adaptation. Biological maturation, learning and social interaction feed into development and crystallise through equilibration.

TRAP In **assimilation** the input is bent to fit the schema (a dachshund fits "dog"); in **accommodation** the schema is bent to fit the input (the schema changes when a cat will not fit "dog"). Assimilation keeps the schema, accommodation changes it.

### 15.2 Sensorimotor stage (birth to about 2 years): object permanence

**Knowing through action.** In the **sensorimotor** period the child constructs schemata purely through perception and bodily movement, with no symbols or representational thought yet (Kaplan & Sadock 2024). Piaget divided it into six substages, tracked through the infant's growing repertoire of *circular reactions*, repeated actions that reproduce an interesting result: *primary* circular reactions centre on the infant's own body (repeating a chance motor act), *secondary* circular reactions act on external objects (shaking a rattle to reproduce a sound), and

*tertiary* circular reactions in stage 5 explore variation deliberately (using a stick to move a distant object), the hallmark of active experimentation and discovery. The crowning achievement is **object permanence**, the knowledge that objects exist independently of the child's perception of them; Piaget called it the first victory of conservation and the foundation of all future knowledge. Early on, a toy dropped out of sight simply ceases to exist; by around 12 months the child searches for a hidden object. The classic error is the *A-not-B error* of stage 4: after an object is repeatedly hidden and found at point A, the infant keeps searching at A even after watching it hidden at point B.

### 15.3 Preoperational stage (about 2 to 7 years): symbols without logic

**Representation arrives, operations do not.** The **preoperational** subperiod opens with the *semiotic (symbolic) function*, the ability to let a signifier stand for something absent (Kaplan & Sadock 2024). Piaget flagged it by five behaviours emerging in the second year: deferred imitation, symbolic (pretend) play, drawing, mental imagery and language. Thought is now representational but not yet logical, limited by several features:

#### Egocentrism

The child cannot separate its own viewpoint from another's and assumes others share its perceptions and tastes; a toddler covers its own eyes and says "now you can't see me." Demonstrated by the *three-mountains task*, where the child fails to report how the scene looks from a doll's position.

#### Centration

Narrow focusing on one salient dimension of a situation while ignoring others; the child judges a quart of milk poured into two smaller containers as "less" because it attends only to the containers' smaller size (Tasman 2015).

#### Animism

Attributing life, feelings and intentions to inanimate objects (the sun "wants" to shine).

#### Lack of conservation

The child does not grasp that a quantity stays invariant across a change in appearance; poured into a tall thin glass, the same liquid is judged to be "more."

### 15.4 Concrete operational stage (about 7 to 11 years): logic on the concrete

**Reversibility unlocks conservation.** The **concrete operational** child can now perform mental *operations*, which are interiorised actions that are *reversible* and organised into a system (Kaplan & Sadock 2024). Reversibility, the ability to mentally undo a transformation (pour the liquid back), is what lets the child achieve **conservation**: the certainty that quantity, mass, number, weight or volume stays invariant despite a perceptual change. Piaget noted a fixed order within the stage, a *horizontal decalage*: conservation of number and quantity around 7, of weight around 9 to 10, and of volume only around 11 to 12. Two further operations appear: *classification* and *class inclusion* (holding a superordinate class in mind while perceiving subordinate ones, so the child grasps that there are more "pets" than "dogs"), and *seriation* (ordering rods by length, which underlies dimensional thinking). Thought is logical but tied to concrete, present objects; the child still struggles with the purely abstract or hypothetical.

| ~7 y | ~9 to 10 y | ~11 to 12 y |
|---|---|---|
| CONSERVE NUMBER/QUANTITY | CONSERVE WEIGHT | CONSERVE VOLUME |

### 15.5 Formal operational stage (about 11 years onward): hypothetico-deductive reasoning

**The possible over the real.** In the **formal operational** stage, the relationship between the real and the possible reverses: for the adolescent the possible has priority and the actual is treated as one instance of what could be (Kaplan & Sadock 2024). Three features follow. Thought becomes *hypothetico-deductive*, moving from a general hypothesis to its testable consequences, mirroring scientific reasoning. It becomes *propositional*, operating on abstract statements freed from concrete referents, so transitive inferences (A less than B, B less than C, therefore A less than C) can be made without demonstration. And it can *isolate variables and systematically examine all combinations*, holding other factors constant to test each cause in turn. Piaget noted a fresh burst of *adolescent egocentrism* at this transition, in which the adolescent unrealistically assumes others are as preoccupied with them as they are, feeding social anxiety and idealism.

### 15.6 Critiques of Piaget

**Right sequence, wrong timetable and boundaries.** The developmental sequence Piaget described is robustly supported and rarely reverses, but three lines of criticism are exam-standard (Companion to Psychiatric Studies; Kaplan & Sadock 2024). First, he *underestimated infants and young children*: Gibson and Walk's visual-cliff work showed depth perception by 6 months, and Margaret Donaldson's redesigned conservation task, in which "naughty teddy" rather than a deliberate adult moves the counters, let far more 4 to 6 year olds conserve, arguing that Piaget's tasks misled children rather than measuring pure incompetence. Second, *ages vary and the stages are too broad*; specific training accelerates conservation, and many adolescents and adults fail formal-operations tasks, so the timetable is not fixed. Third, there is *cultural bias*: cross-cultural work shows tasks are mastered at different ages across cultures, and the supremacy of formal over concrete operations is culturally relative. Piaget also relied heavily on the child's verbal justification, confounding logical competence with verbal skill, and gave little weight to social intelligence or to knowledge acquired by social transmission, the very gap Vygotsky fills.

### 15.7 Vygotsky: the sociocultural alternative

**Learning is social first, individual second.** Lev Vygotsky's sociocultural theory treats cognitive development as a fundamentally **social** process, not the solitary journey of discovery Piaget emphasised (Tasman 2015). Learning is driven and mediated by interaction with a *more-knowledgeable other* (parent, teacher, more capable peer), and culture shapes which skills are learned, so development varies across cultures; children internalise the "tools of intellectual adaptation" their culture supplies. Its core constructs:

#### Zone of proximal development (ZPD)

The gap between what a learner can do independently (actual developmental level) and what they can achieve with guidance (level of potential development). Instruction is most effective, and cognitive growth maximised, when pitched into this zone.

#### Scaffolding

The graduated, temporary support a more-knowledgeable other gives within the ZPD (modelling, visual aids, worked examples, one-to-one feedback), progressively withdrawn as the learner becomes able to perform the task alone. (The term is Wood, Bruner and Ross's, applied to Vygotsky's framework.)

**More-knowledgeable other (MKO)**
Anyone with greater mastery of the task, most often a parent, teacher or peer, who guides the learner across the ZPD.

**Private speech**
Self-directed audible speech (typically from about age 3) that regulates the child's own behaviour and problem-solving; for Vygotsky it is a transitional stage between social external speech and silent inner speech (from about age 7), and thought and language, initially separate, merge around this age. Contrast Piaget, who read the same self-talk as immature egocentric speech that simply fades.

### 15.8 Piaget versus Vygotsky

| DIMENSION | PIAGET | VYGOTSKY |
|---|---|---|
| **Engine of development** | **Individual construction: the lone child acting on the world** | **Social mediation: guided interaction, then internalisation** |
| **Role of culture** | Universal, culture-general stages | Central; development varies across cultures |
| **Role of language** | A product of thought; egocentric speech is immature | The root of learning; private speech regulates and builds thought |
| **Learning and development** | Development leads; readiness gates learning | Learning leads development within the ZPD |
| **Adult / other** | Peers spur cognitive conflict; direct teaching can constrain | The MKO actively scaffolds new competence |

Two constructivisms: Piaget builds the mind from the inside out, Vygotsky from the social world in.

### 15.9 Theory of mind and the false-belief task

**Knowing that others can be wrong.** **Theory of mind** is the ability to attribute mental states (beliefs, desires, intentions) to oneself and others and to use them to predict behaviour, and to grasp that beliefs can be true or false and that different people can hold different beliefs (Companion to Psychiatric Studies). It is tested with the **false-belief** task, which Wimmer and Perner introduced in 1983 (the "Maxi" task, in which a child must predict where a character will look for chocolate that was moved in his absence). Simon Baron-Cohen, Alan Leslie and Uta Frith adapted it into the *Sally-Anne task* (1985): Sally places a marble in a basket and leaves; Anne moves it to a box; the watching child is asked where Sally will look on returning. Children of about 3 and under answer "the box," the marble's true location, failing to separate their own knowledge from Sally's; from about *4 years* children answer "the basket," correctly tracking Sally's false belief. This resets Piaget's egocentrism finding: the shift out of egocentrism on a belief task happens nearer 4 than the 7 years Piaget implied for perspective-taking. Its clinical weight is in autism: Baron-Cohen, Leslie and Frith found children with autism selectively failed the Sally-

Anne task despite adequate mental age, giving rise to the influential *mindblindness* account of autism as a specific theory-of-mind deficit, with theory-of-mind impairment later also implicated in schizophrenia (Frith).

HOLD THIS

**False belief emerges about age 4, resetting Piaget's egocentrism.** Object permanence is sensorimotor; conservation is concrete-operational; the Sally-Anne autism study is Baron-Cohen, Leslie and Frith (1985), the paradigm Wimmer and Perner (1983).

CLINICAL ANCHOR

Theory-of-mind testing sits directly in the autism assessment. A child with intact general ability who selectively fails false-belief tasks fits the mindblindness profile; theory-of-mind deficits also feature in the social cognition literature on schizophrenia. Piagetian stage is a useful frame for pitching psychoeducation: a concrete-operational child reasons about present, tangible facts, so explanations of illness or medication should be concrete rather than abstract until formal operations are in place.

COMMON TRAP

Do not confuse the ages: object permanence in the *sensorimotor* stage, conservation in the *concrete operational* stage. Do not credit "scaffolding" to Vygotsky as a term (it is Wood, Bruner and Ross; the underlying ZPD is Vygotsky's). And the false-belief milestone is about *4 years*, not the 7 years Piaget gave for perspective-taking; the Sally-Anne autism study is Baron-Cohen, Leslie and Frith 1985, while the false-belief paradigm itself is Wimmer and Perner 1983.

MNEMONIC

### Some People Can Fly = Sensorimotor, Preoperational, Concrete, Formal

Reads Piaget's four periods in order. Anchor one signature to each: Sensorimotor to object permanence, Preoperational to egocentrism (no conservation), Concrete to conservation, Formal to hypothetico-deductive abstraction.

**GOOD TO REMEMBER**

- **Schema:** unit of cognition; changed by assimilation (fit new input to old schema) and accommodation (alter schema to fit new input), balanced by equilibration.
- **Sensorimotor:** birth to about 2 years; action-based, circular reactions (primary, secondary, tertiary); achieves object permanence; A-not-B error.
- **Preoperational:** about 2 to 7 years; symbolic/semiotic function; egocentrism (three-mountains task), centration, animism, no conservation.
- **Concrete operational:** about 7 to 11 years; reversibility gives conservation, plus classification, class inclusion and seriation; logic tied to the concrete.
- **Formal operational:** about 11 years onward; abstract hypothetico-deductive and propositional thought, isolating variables; adolescent egocentrism.
- **Conservation order (decalage):** number/quantity about 7, weight about 9 to 10, volume about 11 to 12.
- **Piaget critiques:** underestimated infants (Donaldson's naughty-teddy task; Gibson and Walk visual cliff), ages vary and stages too broad, cultural bias.
- **Vygotsky (sociocultural):** zone of proximal development, scaffolding, more-knowledgeable other, private speech; learning is socially mediated and culture-dependent.
- **Piaget vs Vygotsky:** individual construction vs social mediation; Piaget development leads learning, Vygotsky learning leads development.
- **Theory of mind:** attributing mental states and grasping false belief; emerges about 4 years.
- **False-belief task:** Wimmer and Perner 1983 (Maxi); Sally-Anne = Baron-Cohen, Leslie and Frith 1985, relevant to autism (mindblindness).

## 16 · Kohlberg moral development

**Where it sits.** Lawrence **Kohlberg** (1958, 1969, 1984) took Piaget's two-phase account of moral judgment (the young child's **moral realism**, in which rules are fixed and sacred and wrongness equals the size of the damage, giving way to the older child's **moral relativism** or autonomy, in which rules are negotiable agreements and intention counts) and built it into a full **six-stage, three-level** theory of moral *reasoning*. Piaget wrote *The Moral Judgment of the Child* but did not develop the area further; Kohlberg's extension is, in Kaplan and Sadock's phrasing, "the first and perhaps best-known attempt to extend Piaget theory" (Kaplan & Sadock 2024).

For the exam this is the single most examinable moral-development theory: know the three level names, the six stage names, that it is elicited by the **Heinz dilemma**, that it is the *reasoning and not the answer* that fixes the stage, that progression is invariant and forward-only but that most people never reach the top, and that it draws two famous critiques, Gilligan's ethic-of-care/gender-bias critique and the cross-cultural critique. The stages presuppose Piagetian cognitive stages: conventional reasoning needs concrete operations, principled reasoning needs formal operations (Kaplan & Sadock 2024).

### 16.1 The method: moral dilemmas and the Moral Judgment Interview

**What Kohlberg measured.** He adopted Piaget's storytelling technique but standardised it into the **Moral Judgment Interview** (MJI): each participant was read a set of ten hypothetical dilemmas, each engineered to pit one ethical norm against another (property versus life, law versus compassion, loyalty versus honesty), and then probed with follow-up questions asking *why*

a course of action was right or wrong. The original sample was 72 Chicago boys aged 10 to 16 years, of whom 58 were followed at roughly three-yearly intervals for 20 years (Kohlberg 1984). Kohlberg was deliberately indifferent to the participant's final choice: development pertained to the *form* of the thinking, not the content of the solution (Kaplan & Sadock 2024).

## 16.2 The Heinz dilemma

**The stimulus.** Heinz's wife is dying of a cancer that a new drug might cure. The chemist who discovered it charges ten times its cost, far more than Heinz can raise even with help. The chemist refuses to sell cheaper or to accept later payment, so Heinz breaks in and steals the drug. *Should Heinz have stolen it, and why?* The genius of the design is that "yes" and "no" answers appear at every level, so it is only the **justification** that reveals the stage: fear of jail (preconventional), a good husband's duty (conventional), or the relative worth of life over property (postconventional). This is the load-bearing exam point, the same answer can be stage 1 or stage 6 depending on the reason.

RULE **It is the reasoning, not the answer, that fixes the stage.** Two people who both say Heinz should steal can be a stage apart; two who disagree on the verdict can share a stage.

## 16.3 Level I: Preconventional morality (moral authority is external)

**The child accepts an outside code.** Typically the mode until about age 9, and grounded in the anticipated consequence of the act to oneself. There is no internal sense of right and wrong yet; "right" is what avoids punishment or brings reward (Kaplan & Sadock 2024).

### Stage 1 : Punishment and obedience orientation

Rules are fixed and absolute; an act is "bad" purely because it is punished. Intent is ignored. Heinz should not steal because he could be jailed. The defining test of "right" becomes being able to get away with it.

### Stage 2 : Instrumental exchange (naive hedonism, self-interest)

The child recognises that different people have different interests and acts to serve personal need. Reciprocity is transactional, "an eye for an eye," "you scratch my back," "what's in it for me." Heinz may steal if the wife's survival serves him, not from any principle.

## 16.4 Level II: Conventional morality (moral authority is internalised but unquestioned)

**The standards of the group become one's own.** Prevalent from adolescence; the person internalises the moral standards of valued adults and the norms of the group, and reasons to maintain relationships and social order. Authority is taken on board but not interrogated (Kaplan & Sadock 2024).

### Stage 3 : Good-boy / good-girl, interpersonal conformity

Morality is being seen as good by others: trust, loyalty, living up to what a nice person in one's role would do. Heinz should steal because a devoted husband is *expected* to do everything to save his wife; the motive is approval and the maintenance of the relationship.

### Stage 4 : Law-and-order, authority and social-order maintenance

The frame widens from the immediate circle to society as a whole. One obeys laws, respects authority and does one's duty because the social system depends on it. Heinz should not steal because upholding

the law prevents the chaos that would follow if everyone broke it.

### 16.5 Level III: Postconventional morality (moral authority is self-chosen principle)

**Principles come to outrank both the group and the law.** Reached, if at all, in late adolescence or early adulthood, and only by a minority: Kohlberg held that roughly 10 to 15 percent of people ever reason predominantly at this level, because it demands the abstract, formal-operational thought needed to weigh competing rights (Kohlberg 1984).

#### Stage 5 : Social contract and individual rights

Laws are seen as social agreements serving the greatest good, but as fallible and revisable when they conflict with fundamental rights. Heinz should steal because the preservation of life is a more basic value than the chemist's property right; the law here works against a legitimate individual interest.

#### Stage 6 : Universal ethical principles

Reasoning rests on self-chosen, universal principles of justice, equality and the dignity of human life that apply to everyone and override any law. The person will act on them, and accept punishment, even against the whole of society (non-violent civil disobedience is the paradigm). Kohlberg himself doubted that many people ever reach stage 6 and in later work questioned whether it could be reliably identified.

### 16.6 The structure of the sequence: invariant, forward-only, not universal in attainment

**How the stages behave.** The levels form an invariant sequence; a person passes through them in fixed order and each new stage replaces the reasoning of the one before, so stages cannot be skipped and there is no regression (Kaplan & Sadock 2024). Progress is driven by cognitive **disequilibrium**, the discomfort of meeting a viewpoint one's current reasoning cannot handle, and by improving perspective-taking. Crucially, Kohlberg did *not* claim that all or even most people reach the highest levels: attainment is capped by cognitive development and by exposure, and the top level is rare. Colby and Kohlberg's (1983) longitudinal re-analysis of the original cohort, tested repeatedly over more than two decades, supported the fixed-order claim.

### 16.7 Scoring: how a stage is assigned

**The 50 percent rule.** Responses across the ten dilemmas are coded and a person is formally classified at a stage only if they reason at that stage 50 percent or more of the time, so the stage represents their dominant, preferred mode rather than a single answer. The standardised scoring manual (Colby & Kohlberg 1983) defined explicit stage criteria and sharply improved inter-rater reliability, addressing an early complaint that scoring was subjective.

| 72 | 50% | 10 to 15% |
|---|---|---|
| CHICAGO BOYS, ORIGINAL SAMPLE | REASONING TO BE SCORED AT A STAGE | EVER REACH POSTCONVENTIONAL |

### 16.8 Gilligan's critique: an ethic of care versus an ethic of justice

**The gender-bias objection.** Kohlberg's original sample was entirely male, and his data suggested men more often progressed past stage 4, which read as though women were morally deficient (typically "stuck" at stage 3). His research associate Carol **Gilligan** (1977, 1982, *In a Different Voice*) argued the theory was androcentric: it defined morality narrowly as abstract justice and so

mis-scored a genuinely different, equally mature **ethic of care** centred on relationships, responsibility and context, more common in women. In the Heinz dilemma a care voice attends to consequences for the marriage (if Heinz is jailed his wife loses him) rather than ranking abstract rights. Gilligan's charge is that women reason from care and connection, men from justice and fairness, and that Kohlberg mistook difference for deficiency (Kaplan & Sadock 2024).

COMMON TRAP

Do not present Gilligan's critique as the settled last word. Kaplan and Sadock note that *subsequent empirical research showed women score as high as, or higher than, men* on Kohlberg's stages, so the original claim of a female deficit did not hold up, which paradoxically weakens the premise Gilligan was attacking while leaving her positive point (that care is a legitimate moral orientation) intact. The examinable nuance: state the care-versus-justice distinction AND the finding that the sex difference in stage scores was not replicated.

### 16.9 The other criticisms: content, verbal skill, ecological validity and culture

**Beyond gender.** Kaplan and Sadock (2024) list several further objections. First, the moral *subject* was criticised as detached from moral *content*, and individual differences in reasoning stage did not correlate strongly or consistently with actual moral *behaviour* (reasoning and conduct diverge). Second, the method may have confounded verbal skill and general intelligence with moral reasoning, since higher stages simply require more articulate justification. Third, the dilemmas are artificial and hypothetical and so lack ecological validity (Rosen 1980); ten-to-sixteen-year-old boys had never been married or faced anything like Heinz's plight. The **cross-cultural critique.** Kohlberg's work was criticised as culturally biased toward the Western middle-class male: postconventional, individual-rights reasoning reflects an individualist liberal ethic, and members of collectivist and traditional societies who reason from communal duty, family honour or religious law are systematically scored lower, which many regard as an artefact of the instrument rather than genuinely lower morality (Kaplan & Sadock 2024).

HOLD THIS

**Progression is invariant and forward-only, but attainment is not universal.** Conventional reasoning needs concrete operations, principled reasoning needs formal operations; the theory is justice-centred and Western, which Gilligan and the cross-cultural critics attacked.

INDIA

The cross-cultural critique matters directly in the Indian setting. In collectivist, family-centred and duty-oriented moral cultures, an appeal to *dharma*, filial obligation or the maintenance of family and social order (which Kohlberg codes as conventional, stage 4) is often the most mature and considered response available, yet the MJI grades individual-rights reasoning as superior. Shweder and colleagues' Indian work on the "big three" ethics (autonomy, community, divinity) is the classic demonstration that Kohlberg's justice-and-rights scheme captures only the autonomy ethic and undervalues community and divinity moralities. Read Kohlberg's hierarchy as culture-bound, not as a universal ranking of moral worth.

## 16.10 Clinical and exam relevance

**CLINICAL ANCHOR**

Moral-reasoning frameworks surface in child and adolescent psychiatry (assessing conduct disorder and callous-unemotional traits, where the question is whether reasoning is delayed versus behaviourally uncoupled from reasoning), in forensic and personality-disorder assessment, and in medical ethics teaching. Beck's cognitive therapy of antisocial personality disorder explicitly draws on Kohlberg's model, framing treatment as helping the patient move from egocentric, preconventional cost-benefit reasoning toward more perspective-taking, mutual-benefit reasoning (Beck, Freeman & Davis). In Young's schema therapy, the Self-Sacrifice schema is located as a higher moral level than Subjugation precisely by reference to Kohlberg's stages, one surrenders one's needs from an inner standard rather than from external coercion.

**MNEMONIC**

### "Pre-Con-Post" outer to inner · stages 1 to 6 = "Please Stop Getting Little Stupid Points"

Levels move from an **outside** code (Preconventional) to the **group's** code (Conventional) to a **self-chosen** code (Postconventional). For the six stages: **P**unishment, **S**elf-interest, **G**ood-boy, **L**aw-and-order, **S**ocial-contract, **P**rinciples. Pair each level with its Piagetian floor: conventional needs concrete operations, principled needs formal operations.

| LEVEL | STAGE | RIGHT IS DEFINED BY | HEINZ JUSTIFICATION |
|---|---|---|---|
| **I Preconventional (to ~age 9)** | 1 Punishment / obedience | Avoiding punishment; rules absolute | **Don't steal, he'll be jailed** |
| | **2 Instrumental exchange** | Self-interest, transactional reciprocity | **Steal if the wife is useful to him** |
| **II Conventional (adolescence on)** | 3 Good-boy / conformity | Approval, being a good person in one's role | **Steal, a good husband would** |
| | **4 Law-and-order** | Duty, obeying law, social order | **Don't steal, uphold the law** |
| **III Postconventional (10 to 15% only)** | 5 Social contract | Laws as revisable agreements; rights | **Steal, life outranks property** |
| | **6 Universal principles** | Self-chosen universal justice, dignity | **Steal, sanctity of life is absolute** |

Kohlberg's three levels and six stages, with the same dilemma scored differently at each stage: the reasoning, not the verdict, fixes the level.

**PEARL**

The one line that answers most viva questions: *"It is the reasoning, not the answer, that determines the stage."* Two people who both say Heinz should steal can be a stage apart; two who disagree on the verdict can share a stage. Add the two headline caveats, progression is invariant but attainment is not universal (only 10 to 15 percent reach postconventional), and the theory is justice-centred and culturally Western, which is exactly what Gilligan and the cross-cultural critics attacked.

**GOOD TO REMEMBER**

- **Theorist:** Lawrence Kohlberg (1958 onward); built on Piaget's moral realism to relativism shift.
- **Elicited by:** the Heinz dilemma, scored via the Moral Judgment Interview (10 dilemmas).
- **Original sample:** 72 Chicago boys aged 10 to 16; 58 followed for 20 years (Kohlberg 1984).
- **Level I Preconventional (to ~age 9):** Stage 1 punishment-and-obedience; Stage 2 instrumental exchange / self-interest.
- **Level II Conventional (adolescence onward):** Stage 3 good-boy interpersonal conformity; Stage 4 law-and-order / social-order maintenance.
- **Level III Postconventional (only 10 to 15% reach it):** Stage 5 social contract and individual rights; Stage 6 universal ethical principles.
- **Core rule:** the reasoning, not the answer, fixes the stage; sequence invariant and forward-only; attainment not universal.
- **Cognitive floor:** conventional needs concrete operations, principled needs formal operations (Piagetian dependency).
- **Scoring rule:** classified at a stage if reasoning at it 50% or more of the time; standardised by Colby & Kohlberg (1983).
- **Gilligan critique:** androcentric, justice-biased; proposed an ethic of care (relationships, context) versus ethic of justice; note women later scored as high as or higher than men.
- **Cross-cultural critique:** Western, individualist, middle-class male bias; undervalues collectivist duty and divinity moralities (Shweder).
- **Related models:** Loevinger (ego), Fowler (faith/spiritual) as parallel adult stage theories of maturation.

## 17 · Attachment theory: Bowlby, Ainsworth and Harlow

**The bond that builds the self.** Attachment theory is the developmental account of the child's first tie to a caregiver, and it is examined as a linked chain of three names. Harry Harlow's rhesus-monkey experiments overturned the old view that the infant loves the mother because she feeds it; John Bowlby recast attachment as an evolved **behavioural system** serving survival, with the caregiver as a **secure base**; and Mary Ainsworth turned Bowlby's theory into a measurable laboratory procedure, the **Strange Situation**, that yields the attachment classifications the exam most often asks for. Hold the sequence: Harlow the empirical challenge, Bowlby the theory, Ainsworth the measurement, with the disorganised type and reactive attachment disorder as the later additions.

The topic matters clinically because attachment is a major developmental-psychopathology construct: insecure and especially disorganised attachment in infancy is a replicated risk marker for later disorder, adult attachment style shapes the therapeutic relationship, and reactive attachment disorder is the diagnosable clinical extreme cross-referenced in Paper III child

psychiatry (Kaplan & Sadock 2024). This is a stage-and-concept theory, so it is examined as a system to enumerate rather than as an evolution toward a single mechanism; treat the ages and percentages below as the standard textbook figures.

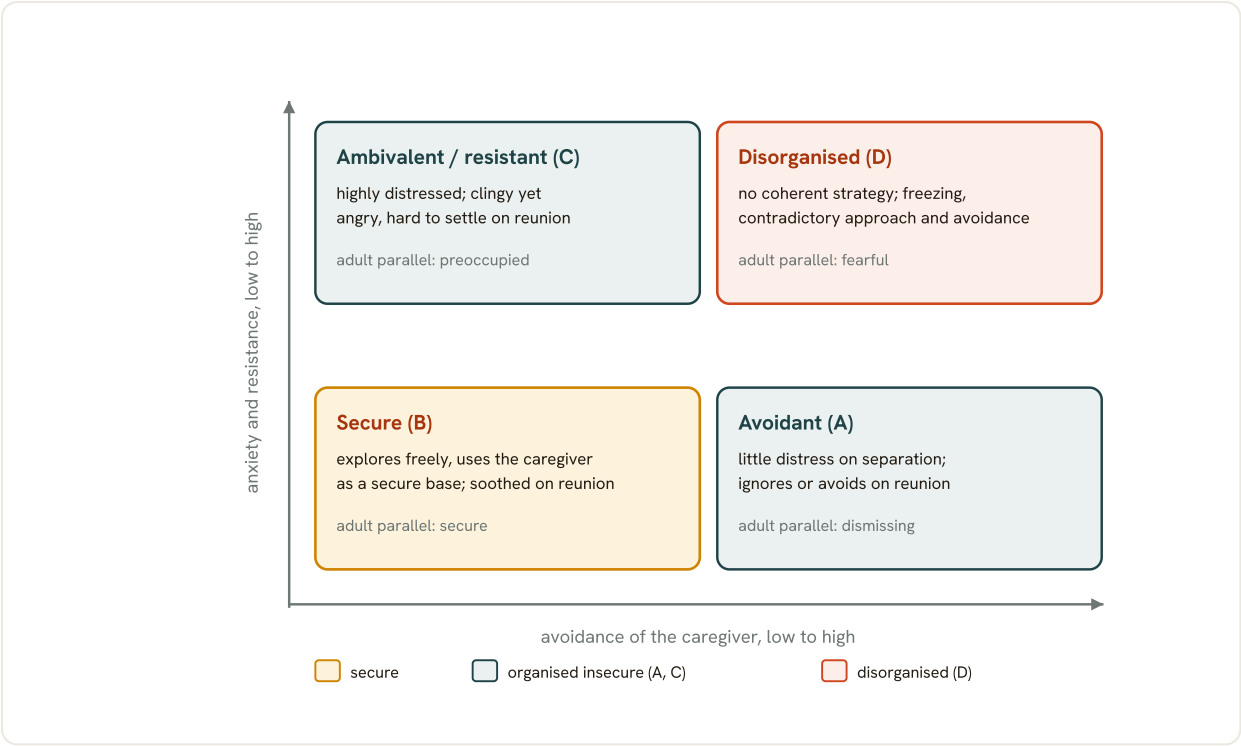



**Fig 4.6** Ainsworth's strange-situation classification, read on two axes: how much the infant avoids the caregiver, and how much anxiety and resistance it shows. Secure infants (B) use the caregiver as a secure base and are soothed on reunion; avoidant infants (A) show little overt distress and turn away; ambivalent-resistant infants (C) are highly distressed and cannot be settled. Disorganised attachment (D, Main and Solomon) is the collapse of any coherent strategy and carries the greatest developmental-psychopathology risk. The adult-attachment parallels are noted in each cell.

## 17.1 Harlow: contact comfort overturns cupboard love

**The wire mother and the cloth mother.** Before Harlow, both psychoanalysis and learning theory held a **drive-reduction** (or "cupboard-love") view: the infant bonds to the mother because she reduces the primary hunger drive, so love is a secondary, learned reward for feeding (Kaplan & Sadock 2024). Harry Harlow tested this in the 1950s by rearing newborn rhesus monkeys with two surrogate "mothers," one a bare wire cylinder fitted with a feeding bottle, the other wire covered in soft terry cloth but giving no food (Harlow 1958). The prediction of cupboard love was that the infant would prefer whichever surrogate fed it. Instead, the infant monkeys spent almost all their time clinging to the cloth mother and went to the wire mother only to feed, then returned to the cloth; when frightened by a novel stimulus they fled to the cloth mother for comfort and used her as a base from which to venture out. The bond formed with the source of **contact comfort**, not the source of food. Harlow's later isolation experiments showed that monkeys reared without a real mother developed profound and lasting social, sexual and emotional deficits, evidence for a sensitive period in social development and against the idea that feeding is what matters.

PEARL

Harlow's single most exam-quoted conclusion: attachment is built on comfort and responsiveness, not on feeding. His work gave Bowlby the empirical footing to reject the psychoanalytic secondary-drive theory of the bond, and it prefigured the modern idea, carried into Emotionally Focused Therapy, that soothing physical contact directly regulates the threatened brain.

### 17.2 Bowlby: attachment as an evolved behavioural system

**A control system for keeping the infant safe.** John Bowlby (1907 to 1990), drawing on ethology, reframed attachment as a biologically evolved **behavioural system** whose set-goal is proximity to the caregiver and whose survival function is protection from predators and danger (Bowlby 1969). Attachment behaviours (crying, clinging, following, smiling, calling) are activated by fear, separation or fatigue and terminated by contact with the attachment figure. Two of Bowlby's terms recur in the exam. The **secure base** is the caregiver used as a base from which the child explores and to which it retreats when alarmed, so that attachment and exploration are reciprocally balanced. **Monotropy** is Bowlby's claim that the infant has an innate bias to form one principal, hierarchically superior attachment (usually but not necessarily the mother), which is qualitatively distinct from its bonds to other figures. Bowlby deliberately wrote "attachment figure" rather than "mother," acknowledging that fathers, grandparents and other caregivers can serve as attachment figures; the field's later focus on mothers reflected sampling convenience more than theory (Cassidy et al. 2013).

### 17.3 Bowlby: the internal working model

**A cognitive template of self and other.** The **internal working model** (IWM) is Bowlby's mechanism for how early experience persists: from repeated interactions the child builds a mental representation of whether the attachment figure is reliably available and responsive, and a complementary model of the self as worthy or unworthy of care (Bowlby 1969; Kaplan & Sadock 2024). These paired models operate largely outside awareness, guide expectations in later relationships, and are the theorised route by which infant attachment security predicts adult relational functioning. The IWM is the conceptual bridge from Ainsworth's infant classifications to the adult attachment literature and to the intergenerational transmission of attachment: a parent's own working model, captured on the Adult Attachment Interview, tends to predict the classification their infant will show in the Strange Situation.

### 17.4 Phases of attachment development

**From indiscriminate signalling to a focused bond.** Attachment is not present at birth but assembles over the first year through a described sequence of phases; the widely taught four-phase version comes from Schaffer and Emerson's longitudinal study of 60 infants (Schaffer & Emerson 1964), and maps closely onto Bowlby's own phase model.

#### Pre-attachment (birth to about 3 months)

No specific attachment; innate signals such as crying and smiling draw any caregiver near and are not yet directed at a particular person.

#### Indiscriminate attachment (about 6 weeks to 7 months)

The infant distinguishes familiar from unfamiliar people and responds more positively to primary caregivers but still accepts comfort from others.

#### Discriminate (specific) attachment (about 7 to 11 months)

A focused bond to one figure emerges; the infant now shows *separation protest* when parted from that figure and *stranger anxiety*, both appearing around 7 to 9 months.

#### Multiple attachments (after about 9 months)

Additional bonds form with other consistent caregivers (second parent, siblings, grandparents).

### 17.5 Maternal deprivation and separation: protest, despair, detachment

**The sequence of a young child losing the caregiver.** Bowlby's early work on prolonged separation described a predictable three-phase response in a young child removed from the attachment figure, for example on hospital or institutional admission (Kaplan & Sadock 2024). In **protest** the child cries, searches and refuses comfort, actively trying to recover the caregiver. In **despair** the child becomes quiet, withdrawn, hopeless and inactive, appearing to mourn. In **detachment** the child superficially recovers, engaging with surroundings and even the returning parent with apparent indifference, having defensively deactivated the attachment. Bowlby's **maternal deprivation hypothesis** linked disrupted early care to later disturbance, echoing René Spitz's earlier account of *anaclitic depression* in institutionalised infants deprived of a mothering figure (Spitz 1946). The strong "critical-period" reading of the hypothesis was later softened: outcome depends on the quality and reversibility of care, and later good caregiving can partly repair early deprivation.

### 17.6 Ainsworth: the Strange Situation procedure

**A laboratory microcosm of attachment.** Mary Ainsworth operationalised Bowlby's theory in the **Strange Situation**, a standardised observational procedure for infants of roughly 12 to 18 months (Ainsworth et al. 1978). It comprises eight brief episodes (about three minutes each) staged in an unfamiliar toy-filled room, using structured separations from and reunions with the caregiver plus the entry of a stranger, deliberately escalating mild stress to activate the attachment system. Observers rate four behavioural dimensions: *proximity and contact seeking*, *contact maintaining*, *avoidance* of proximity and contact, and *resistance* to contact and comfort, together with separation anxiety, stranger anxiety and, most diagnostically, the child's behaviour on *reunion*. The classification rests principally on the reunion episodes, not on how much the child cries at separation.

RULE **Read the type from reunion, not separation.** Both secure (B) and ambivalent (C) infants are highly distressed at separation, so separation distress alone never classifies.

### 17.7 The attachment classifications

**Three original patterns plus a fourth.** Ainsworth's analysis yielded three patterns, one secure and two insecure; Mary Main and Judith Solomon later added a fourth, **disorganised**, for infants who did not fit the original coding (Main & Solomon 1986).

| TYPE | LABEL | EXPLORATION / SEPARATION | REUNION BEHAVIOUR (THE DISCRIMINATOR) | TYPICAL CAREGIVING |
|---|---|---|---|---|
| **B** | Secure | Explores freely using caregiver as a base; distressed at separation | **Actively seeks and is readily comforted by caregiver, then returns to play** | Sensitive, consistently responsive |
| **A** | Insecure-avoidant | Explores with little reference to caregiver; little or no distress at separation | **Avoids or ignores caregiver on return; treats stranger and caregiver similarly** | Rejecting, dismissing of needs |
| **C** | Insecure-ambivalent / resistant | Clingy, explores little; intensely distressed at separation | **Seeks contact yet resists it, may arch away or push the caregiver away; not settled** | Inconsistent, unpredictable |
| **D** | Disorganised | No coherent strategy for managing distress | **Contradictory, odd or fearful acts on reunion: freezing, dazed expression, approaching then backing away** | Frightening / frightened; abuse or neglect |

The reunion column is what separates the four types; separation distress alone does not, since both secure and ambivalent infants are distressed.

**Distribution.** In Ainsworth's original middle-class US sample the classic split was roughly secure 70 percent, avoidant 15 percent, ambivalent 15 percent, before the disorganised category existed (Ainsworth et al. 1978). A large modern meta-analysis of 285 studies and over 20,000 infant-caregiver pairs gives a global distribution of secure 51.6 percent, avoidant 14.7 percent, resistant 10.2 percent and disorganised 23.5 percent (Madigan et al. 2023). The A, B, C patterns are described as **organised** strategies (each a coherent, if insecure, way of managing an available or unavailable caregiver), whereas D reflects a breakdown of strategy.

| 51.6% | 14.7% | 10.2% | 23.5% |
|---|---|---|---|
| SECURE (B) | AVOIDANT (A) | RESISTANT (C) | DISORGANISED (D) |

**COMMON TRAP**

Do not equate crying at separation with insecurity: a securely attached infant is typically distressed when the caregiver leaves and comforted on return, whereas the avoidant infant shows little separation distress. The classification is read from *reunion*, not separation. Keep the letters and their labels aligned: A is avoidant, B is secure, C is ambivalent/resistant, D is disorganised. And attribute the fourth category correctly: the original three are Ainsworth's, the disorganised type is Main and Solomon.

### 17.8 Adult attachment, intergenerational transmission and psychopathology risk

**The IWM carried forward and across generations.** The infant patterns have adult counterparts assessed on the Adult Attachment Interview (autonomous corresponding to secure, dismissing to avoidant, preoccupied to ambivalent, and unresolved/disorganised to disorganised), and a parent's classification statistically predicts their infant's, the phenomenon of **intergenerational transmission** of attachment; the imperfect link between parental state of mind and observed caregiving is the well-known "transmission gap" (Cassidy et al. 2013). Clinically, **disorganised** attachment is the pattern of greatest concern: it is over-represented in maltreated infants and is a robust early risk marker in developmental psychopathology, prospectively associated with later externalising problems, dissociation and personality pathology (Tasman 2015). Attachment concepts also underpin mentalization-based treatment, which locates the capacity to understand mental states within the security of early attachment relationships (Bateman & Fonagy).

**HOLD THIS**

**Harlow theory, Bowlby framework, Ainsworth measure; disorganised (D) carries the greatest psychopathology risk.** Harlow showed contact comfort beats feeding; the disorganised type (Main & Solomon) is over-represented in maltreated infants and is a safeguarding cue.

### 17.9 Reactive attachment disorder: the clinical extreme

**When a selective attachment fails to form.** **Reactive attachment disorder** (RAD) is the diagnosable disorder at the far end of the attachment spectrum, cross-referenced in Paper III (Kaplan & Sadock 2024). In DSM-5-TR and ICD-11 it requires a developmental age of at least **9 months** (the level at which selective attachment first becomes possible), onset before age 5, and a documented history of grossly insufficient care: social neglect, repeated changes of caregiver that prevent stable bonds, or rearing in settings with high child-to-caregiver ratios. The child shows an *emotionally withdrawn, inhibited* pattern: minimal seeking of or response to comfort when distressed, blunted positive emotion, and unexplained irritability, sadness or fearfulness. Autism spectrum disorder must be excluded. Its former "disinhibited" subtype is now the separate **disinhibited social engagement disorder** (DSED), marked by indiscriminate over-familiarity and reduced stranger wariness, and increasingly regarded as distinct from attachment as such. The evidence base is the English and Romanian Adoptees study and the Bucharest Early Intervention Project, which showed RAD signs recede within weeks of adequate care, whereas DSED can persist; neuroimaging in RAD has found reduced visual cortex volume and altered thalamic and white-matter measures (Kaplan & Sadock 2024).

**CLINICAL ANCHOR**

Attachment thinking is used at the bedside well beyond the RAD diagnosis. A child's attachment status frames how it will use a hospital admission or a new caregiver, and Bowlby's protest to despair to detachment sequence still describes the young inpatient separated from a parent. Adult attachment style shapes the therapeutic alliance: a dismissing patient may minimise distress and disengage, a preoccupied patient may over-seek reassurance, and an unresolved/disorganised state of mind flags trauma to be handled carefully. Disorganised attachment in an infant is a safeguarding cue, since it clusters with maltreatment.

**INDIA**

The Strange Situation was normed on Western nuclear families, and its coding of "avoidance" and independent exploration can misread culturally valued behaviour; in multiple-caregiver and joint-family settings common in India, distributions and the very meaning of a single monotropic figure may differ. Read a child's attachment behaviour against its actual caregiving ecology rather than against the original US base rates.

**MNEMONIC**

### "A Avoids, B is Best, C Clings, D is Disordered"

Maps the four Strange-Situation letters to their signature: A avoidant (avoids the caregiver on reunion), B secure (the best-adjusted, comforted on reunion), C ambivalent/resistant (clings yet resists), D disorganised (no coherent strategy, odd or fearful reunion).

**GOOD TO REMEMBER**

- **Harlow (1958):** rhesus monkeys; cloth (contact-comfort) mother preferred over wire (feeding) mother, disproving cupboard-love / drive-reduction.
- **Bowlby (1907 to 1990):** attachment as an evolved behavioural system; secure base, monotropy, internal working model.
- **Internal working model:** mental template of caregiver-availability and of self-worth; route to adult and intergenerational transmission.
- **Separation response:** protest to despair to detachment (Bowlby); anaclitic depression (Spitz 1946).
- **Phases of attachment:** pre-attachment (0 to 3 mo), indiscriminate (6 wk to 7 mo), discriminate/specific (7 to 11 mo, separation protest and stranger anxiety), multiple (after ~9 mo).
- **Ainsworth (1978):** Strange Situation, infants ~12 to 18 months, 8 episodes; classification read from reunion.
- **Type B, Secure (~70% original):** distressed at separation, readily comforted on reunion; sensitive caregiving.
- **Type A, Insecure-avoidant (~15%):** little separation distress, avoids caregiver on reunion; rejecting caregiving.
- **Type C, Insecure-ambivalent/resistant (~15%):** intense distress, seeks yet resists contact; inconsistent caregiving.
- **Type D, Disorganised (Main & Solomon 1986):** contradictory/fearful reunion behaviour; frightening caregiving, maltreatment; highest psychopathology risk.
- **Modern distribution (Madigan et al. 2023):** secure 51.6%, avoidant 14.7%, resistant 10.2%, disorganised 23.5%.
- **Reactive attachment disorder:** developmental age ≥9 months, onset before age 5, pathogenic care; withdrawn/inhibited; ASD excluded. DSED is the separate disinhibited disorder. Evidence: ERA study, Bucharest Early Intervention Project.

## 18 · Temperament: Thomas and Chess

**The idea that a child arrives with a behavioural signature, and the environment either fits it or fights it.** **Temperament** refers to the constitutionally based, early-appearing, moderately heritable and relatively stable individual differences in how a person reacts to the world and regulates that reaction. It is the raw behavioural material on which later personality is built. For the psychiatry exam this topic is owned by two child psychiatrists, Stella Chess and Alexander Thomas, whose New York Longitudinal Study (NYLS, begun in the 1950s) gave the field its enduring vocabulary: nine temperament dimensions, three temperamental constellations, and the concept of goodness of fit (Kaplan & Sadock 2024).

Hold four things for the exam and you command the topic: the nine **dimensions** Chess and Thomas rated; the three **types** (easy, difficult, slow-to-warm-up) with their approximate proportions; **goodness of fit** as the actual predictor of outcome (not the temperament alone); and the later models that refined the picture, Kagan's behavioural inhibition, Rothbart's reactivity and self-regulation, and Cloninger's psychobiological model that bridges temperament to personality. The etymology is worth a line: temperament comes from the Latin *temperare*, "to mix", the same idea that ran through Galen's four humoral temperaments and survives today in talk of neurotransmitter balance (Kaplan & Sadock 2024).

### 18.1 What temperament is, and how it differs from character and personality

**Three words that are not synonyms.** Examiners like the distinction because textbooks warn it is habitually blurred (Kaplan & Sadock 2024). **Temperament** is the biologically given, early-emerging, heritable substrate of reactivity and self-regulation, observable in infancy and stable across years. **Character** is the acquired layer: the self-concepts, goals, and values that develop through learning and experience and mature into adulthood (in Cloninger's model, self-directedness, cooperativeness, and self-transcendence). **Personality** is the integrated whole, temperament plus character, further shaped by culture, cognition, and life experience. Most theorists treat temperament as one of the foundations of personality, with the boundary between them genuinely obscure, "somewhat akin to pinpointing exactly when someone is an adult" (Kaplan & Sadock 2024). A useful shorthand: temperament is the *how* of behaviour (style and intensity), character is the *what for* (goals and values), personality is the sum.

### 18.2 The New York Longitudinal Study and the nine dimensions

**Where the nine came from.** During the 1950s, against a climate in which both psychoanalysis and behaviourism attributed almost everything to nurture, Chess and Thomas interviewed parents and observed children over many years and proposed that infants show measurable, heritable behavioural styles from the start (Kaplan & Sadock 2024). Rating behaviour, not underlying motive, they extracted **nine dimensions**. Each is a continuum, and the profile across all nine defines the child.

#### 1. Activity level

The proportion of active to inactive periods; the child's overall motor tempo and vigour.

#### 2. Rhythmicity (regularity)

The predictability of biological functions: sleep, hunger, and bowel habit falling into a regular schedule or not.

#### 3. Approach or withdrawal

The nature of the first response to a new stimulus, person, food, or place: does the child move toward it or pull back?

#### 4. Adaptability

How readily the initial response is modified in the desired direction once the novelty is no longer new; ease of settling into change.

#### 5. Intensity of reaction

The energy level of a response, positive or negative, irrespective of its quality or direction.

#### 6. Threshold of responsiveness

The strength of stimulation needed to evoke a discernible response (sensory threshold to light, sound, touch, and social cues).

#### 7. Quality of mood

The balance of pleasant, joyful, friendly behaviour against unpleasant, crying, unfriendly behaviour.

#### 8. Distractibility

The degree to which extraneous stimuli divert the child from ongoing behaviour.

#### 9. Attention span and persistence

How long an activity is pursued (span) and whether it is continued despite obstacles or interruption (persistence); treated as one paired dimension.

### 18.3 The three constellations: easy, difficult, slow-to-warm-up

**The person-centred layer that made the study famous.** Beyond the nine variables, Chess and Thomas noticed that certain dimensions cluster into recognisable constellations, and named three types (a fourth group could not be classified). The proportions below are the NYLS figures and are examinable (Kaplan & Sadock 2024). Note that later writers, uneasy with judgemental labels for infants, renamed the types (flexible, feisty, cautious), and either set is acceptable.

| TYPE (ALTERNATIVE NAME) | APPROX. PROPORTION | DEFINING TEMPERAMENTAL PROFILE |
|---|---|---|
| **Easy child (flexible)** | **~40%** | Regular rhythmicity, positive approach to novelty, high adaptability, mild-to-moderate intensity, predominantly positive mood; settles into routines quickly. |
| **Difficult child (feisty)** | **~10%** | Irregular rhythmicity, withdrawal from the new, poor (slow) adaptability, high intensity of reaction, predominantly negative mood; the low-threshold, intense, hard-to-soothe child. |
| **Slow-to-warm-up child (cautious)** | **~15%** | Initial withdrawal and slow adaptability like the difficult child, but with low activity and low-intensity reactions; warms up gradually if allowed repeated low-pressure exposure. |
| **Undifferentiated / unclassified** | ~35% | A mix of characteristics not fitting any single type; positive on some dimensions, negative on others. |

The discriminator between the two withdrawing types: the difficult child reacts with high intensity and negative mood, whereas the slow-to-warm-up child withdraws quietly, with low activity and low intensity; time and gentle re-exposure win the slow-to-warm child over.

**Why the difficult child matters clinically.** Chess and Thomas were emphatic that no type is pathology per se, but in the longitudinal follow-up it was the difficult children, roughly 10% of the sample, who most often went on to poorer adjustment and greater psychiatric disturbance (Kaplan & Sadock 2024). The precise cluster they defined as difficult was low rhythmicity, low response threshold, low adaptability, and high response intensity.

| | | |
|---|---|---|
| **~40%** EASY | **~10%** DIFFICULT (HIGHEST RISK) | **~15%** SLOW-TO-WARM-UP |

### 18.4 Goodness of fit: the real predictor of outcome

**The single most important concept in the topic.** Chess and Thomas' deepest contribution was to insist that temperament does not determine outcome by itself. **Goodness of fit** is the match between the child's temperament and the demands, expectations, and capacities of the environment, above all the caregivers (Kaplan & Sadock 2024). A good fit, in which environmental demands are consonant with the child's style, promotes healthy development; a poor fit, in which demands clash with the child's temperament, breeds stress, conflict, and later disturbance. The corollary is that no trait is intrinsically good or bad: a fearful, withdrawing temperament may be adaptive in a genuinely dangerous setting and maladaptive in a safe, predictable one. Outcome depends less on the child's temperament than on how the environment responds to it, which is exactly why this construct anchors modern parent-guidance and early-intervention work.

RULE **Goodness of fit, not temperament, predicts outcome.** No type is pathology; a difficult child is only at higher risk, and that risk is realised or averted by the match between the child's style and the environment's demands.

CLINICAL ANCHOR

A "difficult" infant (irregular, intense, slow-adapting) placed with a calm, flexible, patient parent who paces transitions gently can develop well; the same infant with an anxious or rigid parent who reads intensity as defiance and escalates is set up for a coercive cycle and later behaviour problems. Rettew and colleagues showed this empirically: high child novelty-seeking predicted attention problems only when paired with a high-novelty-seeking mother, not with a low-novelty-seeking one. The lesson for the clinic is to treat the dyad, not the child alone, and to reframe temperament for parents as a style to be worked with rather than misbehaviour to be disciplined out.

### 18.5 Kagan's behavioural inhibition

**The most heavily researched single temperamental trait.** Jerome Kagan and colleagues at Harvard defined **behavioural inhibition** (BI) as the tendency of a subgroup of young children, roughly 10% to 15% of the population, to respond to novel people and situations consistently with reticence, restraint, and fear (Kaplan & Sadock 2024). Its opposite, behavioural disinhibition, is the sociable, approach-dominant response to novelty. Unlike most dimensions, BI has been studied largely as a near-categorical trait a child does or does not show. It matters because toddlers with BI carry an elevated risk of later anxiety disorders, above all social anxiety disorder. Its neural signature is durable: adults who were behaviourally inhibited at age 2 show heightened amygdala activation to novel faces on fMRI decades later, even when they report no current anxiety, evidence that the physiology of a temperamental trait can persist beneath a behaviourally regulated surface.

### 18.6 Rothbart's reactivity and self-regulation

**The definition most textbooks now adopt.** Mary Rothbart reframed temperament as "constitutionally based individual differences in **reactivity** and **self-regulation**", where reactivity is the excitability of emotional, motor, and attentional systems and self-regulation is the capacity

(chiefly **effortful control**) to modulate that reactivity (Kaplan & Sadock 2024). Her structure resolves into three broad higher-order factors that recur across modern taxonomies: **surgency/extraversion** (approach, activity, positive emotion), **negative affectivity** (fear, anger, discomfort, sadness), and **effortful control** (attentional focusing and inhibitory control). What Rothbart fixed from Chess and Thomas was the addition of a genuine regulatory dimension, effortful control, which lets temperament account for how a child governs reactivity, not merely how strongly it reacts.

### 18.7 Cloninger: the bridge from temperament to personality

**Where temperament research meets personality-disorder theory.** C. Robert Cloninger's psychobiological model is the standard bridge, and it is the model that formally separates the two words this topic keeps distinguishing (Companion to Psychiatric Studies; Kaplan & Sadock 2024). His Temperament and Character Inventory (TCI) posits four heritable **temperament** dimensions, each tied to a neurotransmitter system, and three **character** dimensions that mature with experience.

#### Temperament (heritable, early, neurotransmitter-linked)

**Novelty seeking** (dopaminergic, approach to novelty), **harm avoidance** (serotonergic, behavioural inhibition to punishment), **reward dependence** (noradrenergic, sensitivity to social reward), and **persistence** (perseverance despite frustration).

#### Character (experiential, maturing)

**Self-directedness** (being responsible and goal-directed), **cooperativeness** (tolerance and helpfulness toward others), and **self-transcendence** (identification with something beyond the self).

The clinical payoff examiners want: low self-directedness and low cooperativeness (the character dimensions) are the core marker that a personality disorder is present, while the temperament profile shapes *which* disorder, for example high novelty seeking with low harm avoidance and low reward dependence maps to the antisocial/adventurous profile (Kaplan & Sadock 2024). This is how a childhood temperament construct connects to adult personality pathology.

> HOLD THIS
>
> **Temperament is the heritable early substrate (the how), character the acquired goals and values (the what for), personality the sum.** In Cloninger, low self-directedness and low cooperativeness are the core marker that a personality disorder is present.

### 18.8 Neurobiology of temperament

**The "usual suspects" of psychiatry reappear here.** Temperament is 20% to 60% heritable across twin and adoption studies, with additive polygenic effects and substantial nonshared-environmental contribution (Kaplan & Sadock 2024). The **neural correlates** map cleanly onto the three higher-order dimensions. Negative affectivity, harm avoidance, and behavioural inhibition centre on the **amygdala** and its circuitry (reduced amygdala-anterior-cingulate connectivity tracks higher harm avoidance; amygdalar hyperreactivity underlies BI), with serotonergic dorsal-raphe projections and HPA-axis dysregulation. Approach, novelty seeking, and extraversion run on **dopaminergic** mesolimbic and nigrostriatal pathways. Reward

dependence and social affiliation involve **noradrenergic** locus-coeruleus output, median-raphe serotonin, and **oxytocin** at reward centres. Effortful control and persistence are mediated by **anterior/prefrontal cortex** and the **anterior cingulate** modulating subcortical drive. An EEG signature is examinable: left frontal activation tracks approach and positive emotion, right frontal activation tracks withdrawal and negative emotion.

**COMMON TRAP**

Do not say a "difficult" temperament causes psychopathology. Chess and Thomas explicitly denied that any type is pathology; the difficult child is only at higher *risk*, and that risk is realised or averted by goodness of fit. Equally, do not conflate temperament with personality on the exam, temperament is the heritable early substrate, personality is temperament plus acquired character. And do not confuse Kagan's behavioural inhibition (a near-categorical trait predicting social anxiety) with Chess and Thomas' slow-to-warm-up type; they overlap in withdrawal but are separate constructs from separate research programmes.

**PEARL**

The three big modern taxonomies converge: Rothbart's negative affectivity, Cloninger's harm avoidance, and the personality trait neuroticism describe the same amygdala-linked withdrawal dimension; Rothbart's surgency, Cloninger's novelty seeking, and extraversion describe the same dopamine-linked approach dimension; Rothbart's effortful control, Cloninger's persistence, and conscientiousness describe the same prefrontal regulatory dimension. If you can state these three axes, you can answer almost any temperament comparison question.

**MNEMONIC**

### A RAAI TMDP

Read the nine dimensions in this order: **A**ctivity level, **R**hythmicity, **A**pproach-withdrawal, **A**daptability, **I**ntensity of reaction, **T**hreshold of responsiveness, **M**ood, **D**istractibility, **P**ersistence (attention span). For the three types, the fit is on a sliding scale: the child who fits Easily, the one who is Difficult, and the one who is Slow to warm.

**GOOD TO REMEMBER**

- **Chess and Thomas, New York Longitudinal Study (1950s):** the origin of the nine dimensions, three types, and goodness of fit.
- **Nine dimensions:** activity level, rhythmicity, approach-withdrawal, adaptability, intensity of reaction, threshold of responsiveness, quality of mood, distractibility, attention span and persistence.
- **Easy child (~40%):** regular, approaching, adaptable, positive mood; also called flexible.
- **Difficult child (~10%):** irregular rhythmicity, withdrawing, poorly adaptable, intense, negative mood; highest risk of later disturbance; also called feisty.
- **Slow-to-warm-up child (~15%):** initial withdrawal and slow adaptation but low activity and low intensity; warms with gentle re-exposure; also called cautious.
- **Undifferentiated (~35%):** mixed profile, unclassifiable.
- **Goodness of fit:** match between child temperament and environmental demand is the actual predictor of outcome, not temperament alone.
- **Kagan, behavioural inhibition:** ~10% to 15% of children, fearful/reticent to novelty, near-categorical, predicts social anxiety disorder; persistent amygdala signature on fMRI.
- **Rothbart:** temperament as reactivity and self-regulation; three factors, surgency/extraversion, negative affectivity, effortful control.
- **Cloninger TCI:** four temperament dimensions (novelty seeking, harm avoidance, reward dependence, persistence) plus three character dimensions (self-directedness, cooperativeness, self-transcendence); low self-directedness and cooperativeness mark personality disorder.
- **Temperament vs character vs personality:** temperament is the heritable early substrate (the how); character is the acquired goals and values (the what for); personality is the integrated whole.
- **Heritability of temperament:** about 20% to 60% across twin and adoption studies.

## 19 · Mahler separation-individuation

**The psychological birth of the human infant, mapped month by month.** Margaret Mahler (1897 to 1985), a Hungarian-born analyst working in New York, did for the first three years of life what Erikson did for the whole lifespan: she took direct, systematic observation of infants and their mothers and built from it a stage theory of how a self is born out of fusion (Kaplan & Sadock 2024). Her **separation-individuation** theory is the developmental spine of psychodynamic child psychiatry, and it is the theory examiners reach for whenever they want to test the developmental roots of borderline personality organisation. The title of her 1975 book with Fred Pine and Anni Bergman, *The Psychological Birth of the Human Infant*, is itself the thesis: biological birth and psychological birth are separate events, and the second one takes about three years.

For the exam hold four things: the two normal precursor phases (**autism** and **symbiosis**), the four subphases of separation-individuation in order with their ages, the two conceptual poles the whole process moves between (**separation**, the emergence from fusion, and **individuation**, the growth of an autonomous self), and the endpoint, **emotional object constancy**. Then attach the one clinical hypothesis every examiner wants: the rapprochement-failure account of borderline pathology (Masterson & Rinsley 1975). Mahler is a developmental map only; the fuller object-relations school that grew alongside her (Klein, Winnicott, Fairbairn) is **the Social, Learning & Personality Psychology notes** material and is signposted below, not taught here.

### 19.1 Who Mahler was, and what her method fixed

**From reconstructed fantasy to observed behaviour.** Before Mahler, most analytic accounts of infancy were reconstructions, inferred backwards from adult patients or from the analysis of older children. Mahler's contribution was methodological as much as theoretical: she and her collaborators watched mother-infant pairs directly, over time, in a naturalistic playroom setting, and derived the phases from what infants actually did (Kaplan & Sadock 2024). What this fixed was the empirical thinness of earlier drive-based accounts of the first year. What she kept from psychoanalysis was its central question, how the mind comes to distinguish self from other; what she left debated was whether her earliest phases (normal autism above all) survive scrutiny against modern infant research, which shows newborns to be far more socially oriented from birth than a phase of "objectless" autism would allow. Hold that critique for 19.8; it is the standard higher-order examiner follow-up.

### 19.2 Normal autistic phase (birth to about 1 month)

**The closed system.** In the **normal autistic phase** the newborn is described as being in a state of absolute primary narcissism, without awareness of a mothering agent, functioning as though within a closed psychological system (Kaplan & Sadock 2024). Needs are met but not yet attributed to anything outside the self; the infant does not know that the satisfaction comes from a caregiver. Mahler suggested a normal degree of autism here may be protective, buffering the immature nervous system against a flood of stimuli. This is the phase most challenged by later research, and Mahler herself, late in her career, questioned whether it should be retained; keep that caveat ready.

### 19.3 Normal symbiotic phase (about 1 to 5 months)

**The dual unity within one common boundary.** In the **normal symbiotic phase** the infant develops a dim awareness that need satisfaction comes from outside the self, and behaves as though it and the mother were "an omnipotent system, a dual unity within one common boundary" (Kaplan & Sadock 2024). Self and object are not yet distinguished; the boundary between them differentiates only momentarily, in states of **affect hunger**, and dissolves again once the need is gratified. This fused, need-satisfying matrix is the ground from which the true psychological birth will emerge. The word **symbiosis** is Mahler's, and it is the term examiners test: it names a subjective fusion, not a biological one.

### 19.4 Subphase 1, differentiation or hatching (about 5 to 9 months)

**Breaking out of the symbiotic shell.** Separation-individuation proper begins with **differentiation**, which Mahler called **hatching**: the infant gradually emerges from the symbiotic orbit and begins to sense the body-self as distinct from the mother (Kaplan & Sadock 2024). Attention turns outward, from an internal preoccupation to active curiosity about the surroundings and about the caregiver as a separate entity. The behavioural markers are the classic ones of this age: increased alertness, scanning, and comparative examination of the mother against strangers. Stranger reactions and the beginnings of exploration belong here. The two threads of the process are already visible and should be named separately: *separation* (emerging

from fusion) and *individuation* (the growth of the infant's own capacities), which advance in parallel but are not the same thing.

### 19.5 Subphase 2, practising (about 9 to 16 months)

**The love affair with the world.** The **practising** subphase is powered by upright locomotion: crawling, then walking, let the toddler physically leave the mother's orbit and return to it (Kaplan & Sadock 2024). Mahler split it into an early phase (the infant moves away by crawling but keeps visually "checking back") and a practising period proper (free upright walking). Two concepts are examinable here. The first is **emotional refuelling**: the toddler ventures out, and returns to physical contact with the mother to be recharged before venturing again, using her as a **home base**. The second is the elated, seemingly grandiose mood of this period, the toddler "intoxicated with their own faculties", relatively impervious to knocks and frustrations, which Mahler's colleague Greenacre called the toddler's "love affair with the world". Separation anxiety is at its lowest ebb here, which is exactly why the next subphase lands so hard.

### 19.6 Subphase 3, rapprochement (about 16 to 24 months): the crisis

**The single most examinable moment in the whole theory.** By the middle of the second year the toddler's growing cognitive and language ability delivers an unwelcome discovery: it is small, separate, and dependent after all. This is the **rapprochement** subphase, and its defining feature is the **rapprochement crisis** (Kaplan & Sadock 2024). The elated omnipotence of practising collapses into an acute awareness of separateness, and the child oscillates: it wants autonomy and it wants the mother, and it cannot have both without contradiction.

**The behavioural signature.** The child alternates between clinging to the mother (shadowing) and darting away from her (darting-off), and between demanding help and angrily refusing it. Mahler named this vacillation **ambitendency**. It generates the classic tantrums and neediness of the period, and it places a specific demand on the mother: she must remain emotionally available and tolerant of the child's ambivalence, surviving its aggression without retaliating or withdrawing. Optimal maternal availability here lets the child integrate the loving and the frustrating images of the mother into one whole. Failure of that maternal function is the hinge of the borderline hypothesis in 19.8.

RULE **Rapprochement is the crisis of the whole theory.** Practising omnipotence collapses into an awareness of separateness, and the toddler oscillates (ambitendency: shadowing and darting-off), needing the mother to survive its aggression without withdrawing.

### 19.7 Subphase 4, consolidation and emotional object constancy (about 24 to 36 months)

**Carrying the mother inside.** The last subphase is the **consolidation of individuality** and the attainment of **emotional object constancy** (Kaplan & Sadock 2024). Two achievements define it. First, a stable, integrated sense of self (individuality consolidated). Second, and the term to get exactly right, **emotional object constancy**: the capacity to hold a stable, unified internal representation of the mother as both good and frustrating, so that her image can be sustained and can comfort the child even in her absence and even when she is frustrating the child. This is distinct from Piaget's *object permanence*, which is merely knowing that a physical object continues

to exist when out of sight; a discriminator examiners love. With object constancy the child can tolerate longer separations, accept symbolic substitutes, and finally hold together love and hate for the same person. This is the true endpoint of psychological birth.

| PHASE / SUBPHASE | AGE (MONTHS) | CORE TASK OR STATE | SIGNATURE MARKER |
|---|---|---|---|
| **Normal autism** | 0 to 1 | Closed system, primary narcissism | **No awareness of a mothering agent** |
| **Normal symbiosis** | 1 to 5 | Dual unity, one common boundary | **Fusion; boundary appears only in affect hunger** |
| **Differentiation (hatching)** | 5 to 9 | Body-self felt as distinct | **Hatching; outward attention, stranger reactions** |
| **Practising** | 9 to 16 | Locomotor exploration from a home base | **Emotional refuelling; elated "love affair with the world"** |
| **Rapprochement** | 16 to 24 | Awareness of separateness and dependence | **Rapprochement crisis; ambitendency, shadowing and darting** |
| **Consolidation / object constancy** | 24 to 36 | Stable self plus internalised whole mother | **Emotional object constancy** |

The whole arc at a glance: two normal precursor phases, then four subphases of separation-individuation, ending at emotional object constancy by about the third birthday. The discriminator column carries the term most likely to be asked for each row.

### 19.8 The rapprochement-failure hypothesis of borderline pathology

**Why Mahler is on a psychiatry syllabus at all.** The clinical payoff of the theory is a developmental account of **borderline personality organisation**. Masterson and Rinsley (1975), building directly on Mahler, proposed that borderline pathology is a fixation at, or failure of, the rapprochement subphase (Bateman & Fonagy 2004). Their model runs as follows. The mother of the pre-borderline child (in their formulation, herself often borderline) rewards clinging, regressive dependence and withdraws her emotional supply, her **libidinal availability**, precisely when the child moves toward autonomy. The child is left with a lasting equation: separation and individuation bring abandonment. Because the loving and the frustrating images of the mother are never integrated, the person's inner world stays organised by **splitting** into all-good and all-bad object representations, and emotional object constancy is never securely reached (Kaplan & Sadock 2024).

**What this explains, and its limits.** The adult correlates fall out neatly: the terror of abandonment, the unstable and intense relationships that swing between idealisation and devaluation, the identity disturbance, and the abandonment depression Masterson placed at the centre of the disorder. This is a high-yield exam line, but state it as a hypothesis, not fact: it is a retrospective, reconstructive model, and contemporary aetiology of borderline personality disorder is multifactorial (temperament, trauma, invalidating environments, and gene-

environment interaction), with the developmental account one contributing strand rather than the whole story.

HOLD THIS

**Failed rapprochement is the developmental template for borderline splitting (Masterson & Rinsley).** The loving and frustrating images never integrate, so emotional object constancy is never reached and the inner world stays split into all-good and all-bad. State it as a hypothesis.

CLINICAL ANCHOR

An adult patient who cannot be alone, who idealises then abruptly devalues the same person, and who experiences any move toward independence in therapy as an abandonment, can be formulated in Mahlerian terms as arrested at rapprochement: love and hate for the object were never integrated, so object constancy fails and the inner world stays split. In the transference this shows as the therapist being all-good one week and all-bad the next. Naming that mechanism (splitting from failed rapprochement) is the developmental half of a borderline formulation; the treatment half belongs to the the Social, Learning & Personality Psychology notes object-relations therapies.

### 19.9 Boundary line: where Mahler ends and object-relations theory begins

**Know the fence so you place each name on the right side of it.** Mahler gives the developmental cartography, the observed sequence from fusion to a self. The wider **object-relations** school gives the theory of how internal images of self and other are built, split, repaired, and used, and that school is taught in full on **the Social, Learning & Personality Psychology notes**. Three names sit on the far side of that fence and should be signposted, not developed here.

#### Melanie Klein (the Social, Learning & Personality Psychology notes)

The paranoid-schizoid position and the depressive position; part-objects (good and bad breast), projective identification, and the origin of the object-relations view. The Kleinian "positions" are the structural counterpart to Mahler's developmental subphases.

#### Donald Winnicott (the Social, Learning & Personality Psychology notes)

The good-enough mother, the holding environment, the transitional object and transitional space. Winnicott's "there is no such thing as a baby, only a nursing couple" is the object-relations echo of Mahler's symbiosis.

#### Ronald Fairbairn (the Social, Learning & Personality Psychology notes)

The most thoroughgoing object-relations theorist: libido is object-seeking rather than pleasure-seeking, and the ego is split (central, libidinal, and anti-libidinal or internal saboteur) through frustrating early relationships.

The one link to carry across the fence: Mahler's *emotional object constancy* and Klein's *depressive position* describe the same maturational achievement from two vantage points, the integration of a whole object that is both loved and hated. Everything else about Klein, Winnicott and Fairbairn waits for the Social, Learning & Personality Psychology notes.

**COMMON TRAP**

Do not conflate Mahler's *emotional object constancy* with Piaget's *object permanence*. Object permanence (roughly 8 to 12 months) is the cognitive knowledge that a thing still exists when hidden; emotional object constancy (by about 36 months) is the affective capacity to hold a stable, integrated internal image of a specific person as both good and bad, and to be soothed by it in their absence. They are different constructs, different theorists, and different ages. A second trap: *symbiosis* in Mahler is a subjective psychological fusion, not the biological symbiosis of two organisms.

**PEARL**

The one-line integration for an examiner: Mahler mapped the psychological birth of the infant across two normal phases and four subphases, ending at emotional object constancy, and the failure of the rapprochement subphase (Masterson & Rinsley) is the developmental template for borderline splitting. Name that arc (symbiosis to rapprochement crisis to object constancy, and its borderline failure) and you have the whole topic.

**MNEMONIC**

### Subphases: "Dear Practising Reaches Consolidation"

**D**ifferentiation (hatching, 5 to 9m), **P**ractising (9 to 16m), **R**approchement (16 to 24m), **C**onsolidation and object constancy (24 to 36m). Prefix the two normal precursors with "**A**utism, **S**ymbiosis" and the full order is A, S, then D, P, R, C.

**GOOD TO REMEMBER**

- **Margaret Mahler (1897 to 1985):** separation-individuation theory; book with Pine and Bergman, *The Psychological Birth of the Human Infant* (1975).
- **Normal autistic phase:** birth to about 1 month; closed system, primary narcissism, no awareness of a mothering agent.
- **Normal symbiotic phase:** about 1 to 5 months; dual unity within one common boundary; boundary appears only in affect hunger.
- **Differentiation (hatching):** about 5 to 9 months; body-self felt as distinct; outward attention, stranger reactions.
- **Practising:** about 9 to 16 months; locomotor exploration, home base, emotional refuelling, elated "love affair with the world".
- **Rapprochement:** about 16 to 24 months; rapprochement crisis; ambitendency, shadowing and darting-off; separation anxiety peaks.
- **Consolidation / emotional object constancy:** about 24 to 36 months; stable self plus integrated whole-object image of the mother.
- **Separation vs individuation:** separation = emergence from fusion; individuation = growth of the autonomous self; parallel but distinct threads.
- **Emotional object constancy vs object permanence:** affective (stable inner image of a person, by ~36m, Mahler) vs cognitive (a thing persists when hidden, ~8 to 12m, Piaget).
- **Rapprochement-failure hypothesis:** Masterson & Rinsley (1975); mother withdraws libidinal availability at moves toward autonomy; fixation at rapprochement, persistent splitting, failed object constancy; developmental template for borderline organisation (a hypothesis, not settled fact).
- **the Social, Learning & Personality Psychology notes boundary (object-relations school):** Klein (paranoid-schizoid and depressive positions), Winnicott (good-enough mother, holding, transitional object), Fairbairn (object-seeking libido, ego splitting) are taught on the Social, Learning & Personality Psychology notes, not here.

## 20 · Language and motor developmental milestones

**The developmental yardstick.** A **milestone** is a functional skill that a typically developing child acquires at a roughly predictable age, and the milestones are conventionally tracked along four parallel **streams**: gross motor, fine motor (adaptive), language, and personal-social (adaptive-social). The exam wants two things from this topic. First, the milestone ages themselves, because a psychiatrist reads them backwards: a delayed or lost milestone is the earliest sign of intellectual developmental disorder, autism, cerebral palsy or a regressive condition, and the developmental history is a fixed part of every child psychiatric assessment (Kaplan & Sadock 2024). Second, the competing theories of how one milestone in particular, spoken language, is acquired, because the Skinner-to-Chomsky argument is a set-piece and Chomsky's language acquisition device is the single most asked-about idea in this area.

Handle the two halves differently. The milestone ages are learned as a table to be enumerated, with a small set of high-yield anchor ages committed to memory. The language-acquisition theories, by contrast, follow the standard evolution-of-theories flow: Skinner's learning account, what Chomsky's nativism fixed, then the interactionist synthesis that is currently accepted, followed by the neural correlate and a worked example. Treat the ages below as the standard

textbook figures (K&S / Gesell schedule); normal children vary, and a lag of a month or two around any single milestone is not itself pathological.

### 20.1 The four streams and why they are read together

**One age, four windows.** Development is assessed across four streams because a child can be typical in one and delayed in another, and the *pattern* of delay is diagnostic. **Gross motor** covers posture and large-muscle control (head control, sitting, standing, walking). **Fine motor** or adaptive covers hand skills and eye-hand coordination (reaching, grasp, the pincer grip, tower-building, copying shapes). **Language** covers both reception and expression (cooing, babbling, first words, phrases). **Personal-social** covers interaction and self-care (social smile, stranger anxiety, feeding self, dressing). An *isolated* motor delay points to a neuromuscular or cerebral-palsy picture; an isolated language delay points to hearing loss or developmental language disorder; a *global* delay across all four streams is the developmental signature of intellectual developmental disorder, and a delay concentrated in language plus social-reciprocity flags autism spectrum disorder (Kaplan & Sadock 2024).

TRAP Do not read one milestone in isolation; it is the **pattern of delay** that is diagnostic. Isolated motor delay points to cerebral palsy, isolated language delay to hearing loss, global delay to intellectual developmental disorder, language-plus-social delay to autism.

### 20.2 Gross-motor milestones

**Cephalocaudal progression: head, trunk, legs.** Motor control descends the body, so head control precedes sitting, which precedes standing and walking. The high-yield ages are head control (steady head-holding, lifting the head to 90 degrees prone) by about 3 months; rolling over and sitting with support by about 5 months; sitting steadily without support with a straight back by about 6 to 8 months; pulling to stand and cruising around furniture by about 10 months; and walking well without support by about 14 to 15 months (Kaplan & Sadock 2024). By 2 years the child runs and climbs stairs; by 3 years climbs stairs with alternating feet and rides a tricycle.

### 20.3 Fine-motor (adaptive) milestones

**From whole-hand rake to precise pincer.** Grasp matures from a crude palmar rake toward the **pincer grasp**, the opposition of thumb and index finger that lets the infant pick up a small pellet, which appears at about 9 to 10 months and is a classic exam item because it marks a qualitative advance in hand control (Kaplan & Sadock 2024). Construction and copying then follow a fixed order used clinically to estimate developmental age: a tower of 3 to 4 cubes by about 18 months, a tower of 6 to 7 cubes and copying a horizontal line by 2 years, then copying a circle at 3 years, a cross at 4 years, a square at 5 years, a triangle at 6 years and a diamond at 7 years. The copy-a-shape sequence (circle 3, cross 4, square 5, triangle 6, diamond 7) is a favourite because the ages step up by one year.

### 20.4 Language milestones

**Sound before words, words before sentences.** Expressive language runs through a conserved sequence: vocalising apart from crying and laughing aloud by about 3 months; saying "mama, dada" and other repeated syllables non-specifically by about 9 months; the **first words** used

meaningfully at around 12 months; roughly 10 words including the child's name by 18 months; and combining two different words into simple phrases between 18 and 24 months (Kaplan & Sadock 2024). By 3 years the child uses plurals and has a fair vocabulary; by 5 years names the primary colours accurately and defines simple words. Reception runs slightly ahead of expression throughout: a 10-month-old understands "where is mama?" before it can say much itself.

### 20.5 Personal-social milestones

**The social calendar.** The **social smile**, the first smile given in response to a human face rather than reflexively, appears at about 6 to 8 weeks and is the earliest social milestone routinely asked about (Kaplan & Sadock 2024). The infant recognises the mother by about 3 months and smiles at its mirror image by about 6 months. **Stranger anxiety**, wariness or distress at an unfamiliar face, emerges at about 8 months (the range 7 to 9 months is quoted), signalling that the infant now discriminates the primary caregiver from others; separation anxiety appears in the same window. Self-care then advances: feeding self with a spoon by about 18 months, dressing with help by 3 years, and dressing without supervision by 5 years.

PEARL

Stranger anxiety at about 8 months is not a problem, it is a milestone: it means the infant has formed a specific, discriminated attachment and can tell its caregiver from a stranger. Its *absence* at the expected age is the concern. The same 8-month window is why reactive attachment disorder requires a developmental age of at least 9 months, the point at which a selective attachment (and therefore its failure) first becomes possible.

### 20.6 The milestone table (verified ages)

**The four streams side by side.** The following consolidates the high-yield ages across streams for rapid recall (Gesell schedule as reproduced in Kaplan & Sadock 2024).

| AGE | GROSS MOTOR | FINE MOTOR / ADAPTIVE | LANGUAGE | PERSONAL-SOCIAL |
|---|---|---|---|---|
| **6 to 8 weeks** | Lifts head momentarily prone | **Regards / follows a face** | Vocalises, coos | Social smile |
| **3 months** | Head control (holds head, 90 degrees prone) | **Follows object past midline** | Laughs aloud | Recognises mother |
| **6 months** | Sits with support; rolls over | **Palmar (raking) grasp; reaches** | Babbles | Smiles at mirror image |
| **8 months** | Sits steadily without support | **Transfers object hand to hand** | Non-specific "mama, dada" | Stranger anxiety |
| **9 to 10 months** | Pulls to stand; cruises furniture | **Pincer grasp (thumb-index)** | Understands "where is mama?" | Responds to social play |
| **12 months** | Stands alone; may take first steps | **Neat pincer; releases object** | First words (meaningful) | Waves bye-bye |

| AGE | GROSS MOTOR | FINE MOTOR / ADAPTIVE | LANGUAGE | PERSONAL-SOCIAL |
|---|---|---|---|---|
| **14 to 15 months** | Walks well without support | **Tower of 2 cubes; scribbles** | Jargon; few words | Points to indicate wants |
| **18 months** | Runs stiffly; walks up stairs, hand held | **Tower of 3 to 4 cubes** | About 10 words | Feeds self with spoon |
| **2 years** | Runs well; climbs stairs | **Tower of 6 to 7 cubes; copies line** | Two-word phrases; simple sentences | Wears simple garments |
| **3 years** | Stairs with alternating feet; tricycle | **Copies a circle; tower of 9 to 10** | Plurals; fair vocabulary | Dresses/undresses with help |

Anchor ages to memorise: social smile 6 to 8 wk, head control 3 mo, sits without support 6 mo, stranger anxiety 8 mo, pincer 9 to 10 mo, first words ~12 mo, walks 14 to 15 mo, two-word phrases 18 to 24 mo.

| 6 to 8 wk | 8 mo | 9 to 10 mo | ~12 mo |
|---|---|---|---|
| SOCIAL SMILE | STRANGER ANXIETY | PINCER GRASP | FIRST WORDS |

**COMMON TRAP**

Do not conflate the walking figure quoted in different books. One common figure gives independent walking at 14 to 15 months as the age most children walk *well*; many texts quote the wider normal range of 12 to 15 months, and the red-flag cut-off for referral is failure to walk by 18 months. State the figure with its book, and use the red flag, not the median, to decide whether a child is delayed. Likewise "first words at 12 months" is the median; the delay threshold is no single words by *2 years*.

### 20.7 Red-flag delays

**When variation becomes concern.** A single milestone reached a little late is usually normal; a red flag is a delay large enough to warrant assessment, or any *loss* of a skill already gained (regression), which is always abnormal (Kaplan & Sadock 2024). The standard motor and social red flags are: no head control by 4 months, not sitting unsupported by 9 months, not walking by 18 months, and no social smile by 3 months. The language red flags are the most examinable and come straight from ICD-11: the *absence of single words by 2 years* of age and the *failure to generate simple two-word phrases by 3 years*, especially when persistent or with a family history of language problems, are the thresholds that separate a late talker (who usually catches up) from developmental language disorder (World Health Organization ICD-11 2019). Loss of previously acquired language or social skills, at any age, warrants urgent evaluation for autism spectrum disorder or a neurodegenerative or epileptic process.

### 20.8 Stages of language: cooing, babbling, holophrastic, telegraphic

**The universal sequence.** Before the theories, fix the stages, because every account has to explain this sequence and all typically developing infants pass through it in the same order (Tasman 2015). **Cooing**, the production of vowel-like sounds, begins at about 2 months. **Babbling** proper

follows as consonants are added at about 4 to 6 months, becoming *canonical (reduplicated) babbling* with repeated consonant-vowel syllables such as "da-da-da" by about 7 months. The **holophrastic** or one-word stage begins around 12 months, when a single word ("milk") is used to carry the force of a whole utterance. The **telegraphic** or two-word stage begins at about 18 to 24 months, when the child combines two content words ("more milk", "daddy go") while omitting grammatical function words, like a telegram. The child then acquires roughly 5 to 9 new words a day through the preschool years, reaching about 5,000 words by kindergarten (Tasman 2015).

### 20.9 Skinner: the learning (operant) account

**Language as verbal behaviour shaped by reinforcement.** The first systematic theory was B. F. Skinner's, set out in *Verbal Behavior* (Skinner 1957). On this behaviourist account, language is learned like any other operant: the infant emits sounds, the caregiver *reinforces* approximations to real words with attention, praise and getting what is named, and through selective reinforcement, shaping and imitation the child's output is gradually moulded toward the adult language (Tasman 2015). There is no special language faculty; the same principles of operant conditioning (reinforcement, extinction, stimulus control) that Skinner used to explain all behaviour explain speech. *What it got right:* environmental input clearly matters, since children learn the specific language they are exposed to, vocabulary tracks the amount of speech directed at the child, and reinforcement does influence output. *What it left unexplained:* the sheer speed of acquisition, the fact that children produce grammatical forms and novel sentences they have never heard and could not have been reinforced for, and their regular *over-generalisation* errors ("goed", "foots") which are the opposite of what imitation predicts.

### 20.10 Chomsky: nativism and the language acquisition device

**An innate grammar organ.** Noam Chomsky's 1959 review of Skinner's book is the standard turning point (Chomsky 1959). Chomsky argued that language cannot be learned by reinforcement alone because of the **poverty of the stimulus**: the speech a child actually hears is finite, error-filled and degenerate, yet from it every normal child rapidly extracts an infinite generative grammar and masters most of the basic rules by about age 4 (Tasman 2015). To bridge this gap Chomsky proposed an innate, biologically given **language acquisition device** (LAD): humans are born with a domain-specific facility for acquiring language (Chomsky 1975). Its content is a **universal grammar**, a set of structural principles common to all human languages, so that the environment only has to *set the parameters* for the particular language, not teach grammar from scratch. This is the **nativist** or innateness hypothesis: at least some linguistic knowledge exists in humans at birth (Chomsky 1986; Tasman 2015). *What it fixed:* it explained the speed, the creativity (novel grammatical sentences), the universality of the stage sequence, and the ease with which children handle grammatical transformations. *What it left debated:* the strong version treats environmental input as almost irrelevant, which sits badly with the robust evidence that responsive, socially contingent talk accelerates acquisition, and the LAD itself is a postulated faculty rather than a localised structure.

**COMMON TRAP**

Keep the labels straight. The *LAD* is the hypothesised innate device or faculty; *universal grammar* is its content, the shared structural principles; *nativism / innateness hypothesis* is the broader position that some grammar is inborn; and *poverty of the stimulus* is the argument *for* nativism, not a synonym for it. Skinner is the learning theorist Chomsky was refuting, not a nativist. And Chomsky 1959 is the review of Skinner; the LAD is elaborated in the later works (1975, 1986).

### 20.11 The interactionist / social-pragmatic view (currently accepted)

**Innate capacity plus social input.** The **currently accepted** position is neither pure Skinner nor pure Chomsky but an **interactionist** synthesis (Tasman 2015). Interactionist theorists accept Chomsky's evidence for an innate, biologically prepared capacity for language, but hold that this capacity is realised only through environmental and, crucially, *social* input: language emerges from the interaction of the child's endowment with responsive communication tuned to the child's level. The *social-pragmatic* strand (drawing on Bruner's "language acquisition support system" and on Vygotsky) stresses that language is acquired in the service of shared social goals, scaffolded by joint attention and contingent caregiver talk; the classic experimental support is that socially contingent feedback to an infant's babble accelerates phonological learning (Goldstein & Schwade 2008). This resolves the Skinner-Chomsky opposition: the nativists were right that experience alone is insufficient and a prepared capacity is needed, and the learning and social theorists were right that input, especially interactive input, is what switches that capacity on and shapes it to the ambient language.

**HOLD THIS**

**Language = an innate capacity switched on by social input (interactionist synthesis).** Skinner (reinforcement) could not explain over-generalisation ("goed"); Chomsky's LAD and universal grammar could; the currently accepted view keeps both.

### 20.12 Neural correlate and a critical period

**Where language lives, and when the window is open.** The **neural correlate** of language is a left-hemisphere-dominant perisylvian network: *Broca's area* in the left inferior frontal gyrus for speech production and syntax, *Wernicke's area* in the left posterior superior temporal gyrus for comprehension, and the *arcuate fasciculus* connecting them (Kaplan & Sadock 2024). Consistent with the nativist claim of a biological substrate, a seed language-processing network is already detectable in the temporal cortex of newborns just a few days old, an experience-independent "attractor" template on which the mature network is built through exposure (Kaplan & Sadock 2024). Language acquisition is subject to a **critical period**: the capacity to acquire a first language effortlessly, and to attain native accent in a second, declines from childhood and closes around puberty, which is why very early deprivation of language input has lasting effects while later good input can only partly compensate.

### 20.13 Worked example

**The over-regularisation error, read by each theory.** A 3-year-old who has correctly said "went" for months suddenly starts saying "goed". Skinner's account struggles here: the child was never

reinforced for, and never heard, "goed", so imitation and reinforcement cannot have produced it. The nativist reads it as decisive evidence for an internal rule system: the child has extracted the productive past-tense rule "add -ed" from universal grammar's parameter-setting and is over-applying it to an irregular verb, generating a form it could not have copied. The interactionist adds that the child will drift back to "went" as continued interactive exposure supplies the correct irregular form and the caregiver's contingent recasts ("yes, he went") tune the rule. The single error thus captures the whole debate: it is inexplicable by input alone, it demonstrates an internal generative rule, and it is corrected by social input, which is exactly why the interactionist synthesis is accepted.

**INDIA**

Milestone screening in Indian practice relies on locally validated tools rather than the raw Gesell ages: the Trivandrum Developmental Screening Chart and the developmental sections of instruments such as the Vineland Social Maturity Scale (Indian adaptation) are in routine use, and the RBSK (Rashtriya Bal Swasthya Karyakram) programme screens for developmental delay at anganwadi and school level. The language red flags need cultural adjustment too: many Indian children grow up bilingual or multilingual, and a transient "delay" in one language with normal total vocabulary across languages is not developmental language disorder. Assess the child's language across all the languages it hears, not just the clinic language.

**MNEMONIC**

### "Smile at 2 months, Sit at 6, Stranger at 8, Speak at 12"

The four social-motor anchors in month order: social *smile* at about 6 to 8 weeks (~2 months), *sits* without support at about 6 months, *stranger* anxiety at about 8 months, and first *words* ("speak") at about 12 months. For the copy-a-shape ladder: circle 3, cross 4, square 5, triangle 6, diamond 7, each a year apart.

**GOOD TO REMEMBER**

- **Social smile:** 6 to 8 weeks (~2 months); earliest social milestone.
- **Head control:** 3 months (holds head, 90 degrees prone). Recognises mother 3 months.
- **Rolls over / sits with support:** about 5 to 6 months; babbles ~6 months.
- **Sits without support:** about 6 to 8 months (straight back, steady).
- **Stranger anxiety:** about 8 months (range 7 to 9); marks discriminated attachment.
- **Pincer grasp:** 9 to 10 months (thumb-index opposition).
- **First words (meaningful):** around 12 months; understands "where is mama?" by 10 months.
- **Walks well without support:** 14 to 15 months; wider normal range 12 to 15 months.
- **Two-word (telegraphic) phrases:** 18 to 24 months; ~10 words by 18 months.
- **Copy-a-shape ladder:** circle 3 y, cross 4 y, square 5 y, triangle 6 y, diamond 7 y.
- **Language red flags (ICD-11):** no single words by 2 years; no two-word phrases by 3 years; any loss of skill (regression) at any age is abnormal.
- **Motor red flags:** no head control by 4 mo, not sitting by 9 mo, not walking by 18 mo, no social smile by 3 mo.
- **Language stages:** cooing ~2 mo, babbling (canonical) 4 to 7 mo, holophrastic (one-word) ~12 mo, telegraphic (two-word) 18 to 24 mo.
- **Skinner (1957):** operant / learning account; language shaped by reinforcement and imitation; no special faculty.
- **Chomsky (1959 review; LAD 1975):** nativist; language acquisition device, universal grammar, poverty-of-stimulus argument.
- **Interactionist / social-pragmatic:** currently accepted; innate capacity realised through responsive social input (Bruner LASS, Vygotsky scaffolding).
- **Neural correlate:** left perisylvian network, Broca (production/syntax), Wernicke (comprehension), arcuate fasciculus; critical period closing around puberty.

## Discriminate

### 21 · Discriminate: the theories side by side

**The step that turns a list of theorists into an answer that scores.** these notes reward one skill above all others: the ability to hold two or more rival theories in the same frame and name the one line that separates them. Examiners do not ask "describe Erikson"; they ask "compare Freud and Erikson", "which theory says the body changes first", "how does assimilation differ from accommodation". This topic gathers the three comparisons the exam returns to again and again and lays them out as tables, because a table is exactly the form a discrimination question wants back. Read the individual theory topics for depth; read this one to **compare** them cold.

Three grids do the work. The first and most important is the **aligned developmental-stages** grid, which stacks Freud, Erikson, Piaget and Kohlberg down a single shared age axis so you can read across a row and see what each theorist says is happening in the same child at the same age. The second sets the four emotion theories against each other on the single axis of *sequence*, the order in which arousal, cognition and feeling arrive. The third arranges the intelligence models on the single axis of *number*, one general capacity against many. A closing trap box collects the classic mix-ups that cost marks. Ground text throughout is Kaplan and Sadock (2024), with the

New Oxford Textbook, Tasman (2015) and the Companion to Psychiatric Studies behind the individual entries.

| Age | Freud psychosexual | Erikson psychosocial | Piaget cognitive | Kohlberg moral |
|---|---|---|---|---|
| 0 to 1 infancy | Oral | Trust vs mistrust | Sensorimotor | (pre-moral) |
| 1 to 3 toddler | Anal | Autonomy vs shame, doubt | sensorimotor to preoperational | Preconventional emerging |
| 3 to 6 preschool | Phallic Oedipus | Initiative vs guilt | Preoperational | Preconventional stages 1 to 2 |
| 6 to 12 school age | Latency | Industry vs inferiority | Concrete operational | Conventional stages 3 to 4 |
| 12 to 18 adolescence | Genital | Identity vs role confusion | Formal operational | Conventional to postconventional |
| 19 to 40 young adult | Genital mature | Intimacy vs isolation | formal operational | Postconventional stages 5 to 6 |
| 40 to 65 midlife | (complete) | **Generativity vs stagnation** | (complete) | (complete) |
| 65 plus old age | (complete) | **Integrity vs despair** | (complete) | (complete) |

**Fig 4.7** The four stage theories aligned down one shared age axis, the flagship figure of these notes. Reading across any row shows what each theorist claims is happening at that age: at 3 to 6 years, for instance, Freud's phallic conflict, Erikson's initiative crisis, Piaget's preoperational thought and Kohlberg's earliest preconventional morality all coincide. Reading down a column gives that theorist's full sequence. The single most examinable point is visible at a glance: Freud, Piaget and Kohlberg complete their sequences by early adulthood, while only Erikson's psychosocial stages (marigold) carry through midlife and old age.

## 21.1 The aligned developmental-stages grid: four theorists, one age axis

**The flagship comparison of the whole set of notes.** Four great stage theorists mapped childhood and beyond, each along his own dimension: Freud on the moving **erogenous zone** (psychosexual), Erikson on the widening **social** task (psychosocial), Piaget on the growing **cognitive** structure, and Kohlberg on the maturing basis of **moral** reasoning. Because they share a rough age spine, they can be aligned so that a single column, say the preschool child of 3 to 5, shows Freud's phallic-oedipal drama, Erikson's initiative-versus-guilt, Piaget's preoperational egocentrism, and Kohlberg's preconventional obedience all at once. Learning the grid down the age axis, rather than four separate ladders, is the single highest-yield move for these notes, and it is the figure to draw from memory in the exam (Kaplan and Sadock 2024).

Two alignment caveats before the grid. Kohlberg's stages are keyed to moral *reasoning* and therefore lag the others: preconventional reasoning runs to roughly age 9, and the higher levels

open only in adolescence and adulthood, so the moral column is deliberately coarser than the rest. And Freud's ladder simply *stops* at the genital stage in adolescence, whereas Erikson, Piaget (formal operations) and, above all, Erikson's three adult stages carry the developmental story across the entire lifespan. The empty lower-left of the Freud column is itself an examinable fact.

| AGE BAND | FREUD (PSYCHOSEXUAL) | ERIKSON (PSYCHOSOCIAL: CRISIS / VIRTUE) | PIAGET (COGNITIVE) | KOHLBERG (MORAL) |
|---|---|---|---|---|
| **Infancy (birth to ~1.5 y)** | **Oral** | Trust vs mistrust / hope | **Sensorimotor (object permanence)** | (pre-moral) |
| **Toddler (~1.5 to 3 y)** | **Anal** | Autonomy vs shame and doubt / will | **Sensorimotor into preoperational** | (pre-moral) |
| **Preschool (~3 to 5 y)** | **Phallic (oedipal)** | Initiative vs guilt / purpose | **Preoperational (egocentrism)** | Level I Preconventional (to ~age 9): punishment-obedience, then self-interest |
| **School-age (~6 to 12 y)** | **Latency** | Industry vs inferiority / competence | **Concrete operational (conservation)** | |
| **Adolescence (~12 to 18 y)** | **Genital** | Identity vs role confusion / fidelity | **Formal operational (hypothetico-deductive)** | Level II Conventional: good-boy, then law-and-order |
| **Young adulthood** | **(Freud stops here)** | Intimacy vs isolation / love | Formal operational (mature) | Level III Postconventional (only ~10 to 15%): social contract, then universal principles |
| **Middle adulthood (~40 to 65 y)** | **(no Freudian stage)** | Generativity vs stagnation / care | Formal operational | |
| **Old age (~65 y to death)** | **(no Freudian stage)** | Ego integrity vs despair / wisdom | Formal operational | |

Read across a row for the same-aged child through four lenses; read down the Freud column to see it end at adolescence while Erikson runs to death. Ages are the standard textbook bands (Kaplan and Sadock 2024), not sharp cut-offs.

**How to use the grid in an answer.** The examiner's favourite cross-sectional question is "what is happening developmentally at age X". At the preschool column you can now say, in one breath, that the phallic-stage child working through the Oedipus complex is simultaneously exercising Eriksonian initiative, thinking in egocentric preoperational terms (three-mountains task), and reasoning morally only from fear of punishment. That four-lens sentence is worth more than any single ladder recited in isolation, and it is exactly what the aligned grid trains.

**TRAP** Do not expect Freud's ladder to continue past adolescence. Freud, Piaget and Kohlberg **finish by early adulthood; only Erikson runs to death**, and the empty lower-left of the Freud column is itself an examinable fact.

### 21.2 Emotion theories on the axis of sequence: which comes first?

**One question orders all four: body-first or cognition-first?** Given a bear on the path, does the pounding heart come before the fear, at the same time, or after an appraisal? Each named theory is a different answer, and the whole set is best held as a single spectrum from pure body-first (james-lange) to pure cognition-first (lazarus), with cannon-bard and schachter-singer between them (Kaplan and Sadock 2024). The discriminator is always the *order* of the three ingredients: physiological arousal, cognitive interpretation, and conscious feeling.

| THEORY (AUTHOR, YEAR) | SEQUENCE IT PROPOSES | THE ONE DISCRIMINATOR |
|---|---|---|
| **James-Lange (James 1884, Lange)** | Stimulus, then bodily arousal, then perception of it = the emotion | **Body first; feeling is the read-out of the body ("we are afraid because we tremble"); needs a unique bodily pattern per emotion** |
| **Cannon-Bard (Cannon 1927, Bard)** | Stimulus, then arousal and feeling together, in parallel | **Simultaneous and independent; the thalamus fires body and cortex at once, neither causes the other** |
| **Schachter-Singer (1962)** | Stimulus, then arousal, then cognitive label = the emotion | **Two factors: undifferentiated arousal first, but cognition must name it; same arousal labelled fear or euphoria by context** |
| **Lazarus appraisal (1966, 1991)** | Stimulus, then appraisal, then feeling and arousal together | **Cognition first; appraisal of meaning-for-self is necessary and prior and generates both feeling and body** |

The spectrum from body-first to cognition-first. Note the two easily-confused middle theories: cannon-bard is simultaneous-and-independent, schachter-singer is arousal-then-label (still body-first, but cognition specifies which emotion).

**The pairing examiners exploit.** The two most-confused theories are james-lange and cannon-bard, because both concern the body, yet they are opposites on sequence: james-lange makes the body *cause* the feeling (serial, body then feeling), cannon-bard makes body and feeling *parallel* and unlinked (simultaneous, neither causing the other). Cannon built cannon-bard precisely as a rebuttal of james-lange, on three grounds: isolating the viscera did not abolish emotion, injected arousal did not create a genuine emotion, and autonomic responses are too slow and too uniform to explain the speed and variety of feeling. Beyond the four, the *currently accepted* synthesis folds them together, appraisal (Lazarus) sets it off, interoception gives it its felt body (james-lange revived, via Damasio's somatic markers and the insula), and conceptual construction names it (Schachter-Singer's label, formalised by Barrett 2017), with the appraisal-versus-primacy tension resolved neurally by LeDoux's low and high roads (Kaplan and Sadock 2024).

### 21.3 Intelligence models on the axis of number: one thing or many?

**The single question that orders the intelligence theories: how many intelligences are there?** Every model is judged against one stubborn empirical fact, the **positive manifold**, that scores on

almost all cognitive tests correlate positively, which any theory denying a general factor has to explain away. The models run from Spearman's single *g* to Gardner's eight-or-nine, with the Cattell-Horn-Carroll hierarchy resolving the fight by making it a matter of levels rather than of count (Kaplan and Sadock 2024; Carroll 1993).

| MODEL (AUTHOR, YEAR) | HOW MANY, AND WHAT | THE ONE DISCRIMINATOR |
|---|---|---|
| **Spearman two-factor (1904)** | One general factor g, plus a specific s per task | **Unitary: one g lifts every performance; explains the positive manifold directly** |
| **Gardner multiple intelligences (1983)** | Many (seven, then eight): linguistic, logical-mathematical, spatial, musical, bodily-kinaesthetic, interpersonal, intrapersonal, naturalistic | **Plural and independent; each dissociable, own neural substrate; critique: contradicts the positive manifold, abilities do correlate** |
| **Sternberg triarchic (1985)** | Three: analytical, creative, practical | **Real-world success, not just school; first to bring creativity formally inside intelligence** |
| **Cattell-Horn-Carroll, CHC (1993)** | All levels at once: g over ~8 to 10 broad abilities over many narrow abilities (three strata) | **Hierarchy dissolves the one-vs-many war; g at the apex (Spearman) above broad and narrow abilities (Thurstone); the currently accepted consensus** |

The axis is number. Spearman says one, Gardner says many-and-independent, Sternberg says three-for-real-life, and CHC nests them all: g over broad over narrow. The pluralist theories that deny g cannot be the consensus because the positive manifold is real.

**Why CHC wins and the pluralists do not.** The exam rewards the counter-intuitive line: Gardner and Sternberg feel modern and inclusive, but they sit *outside* the empirical mainstream precisely because they deny or minimise g, which the positive manifold will not allow. CHC is the working consensus because it honours both halves of the century-old debate, a genuine general factor at the top (vindicating Spearman) sitting over a rich layer of broad and narrow abilities (vindicating Thurstone, Cattell and Horn), which is why modern tests report both a full-scale IQ and index scores (Kaplan and Sadock 2024).

### 21.4 The three axes in one sentence each

**Carry these away.** The developmental grid is organised by *age* (what four theorists say is happening in the same child), the emotion theories by *sequence* (body-first to cognition-first), the intelligence models by *number* (one general capacity to many independent ones). Name the axis first in any comparison answer and the discriminators fall into place, because each theory is only ever defined by where it sits on its axis relative to its neighbours.

HOLD THIS

**Three axes: developmental theorists on age, emotion theories on sequence, intelligence models on number.** Name the axis, place each theory on it, state the single discriminator; that is what converts a memorised list into a comparison answer.

COMMON TRAP

The four classic mix-ups the exam plants:

- **James-Lange vs Cannon-Bard (direction):** both are about the body, but james-lange is *serial* (arousal then feeling, the body causes the emotion) while cannon-bard is *parallel and independent* (arousal and feeling together, neither causes the other). Do not call schachter-singer "cognition-first": its arousal comes first, then the label.
- **Assimilation vs accommodation:** in *assimilation* the new input is bent to fit the existing schema (a dachshund fits "dog"); in *accommodation* the schema is bent to fit the new input (the schema changes when a cat will not fit "dog"). Assimilation keeps the schema, accommodation changes it.
- **Piaget vs Vygotsky:** Piaget is individual construction (the lone child acting on the world, development leads learning); Vygotsky is social mediation (a more-knowledgeable other scaffolds within the zone of proximal development, learning leads development). Scaffolding as a term is Wood, Bruner and Ross, not Vygotsky.
- **Freud vs Erikson stage names:** Freud's are psychosexual (oral, anal, phallic, latency, genital); Erikson's are psychosocial crises with virtues (trust-vs-mistrust / hope, and so on). They run in parallel through childhood; then Freud stops at genital while Erikson adds three adult stages (intimacy, generativity, integrity). Do not swap Erikson's virtues between stages: initiative gives *purpose*, industry gives *competence*.

PEARL

For any "compare X and Y" question, do three things in order: name the shared axis (age, sequence, or number), place each theory on it, and state the single discriminator between the two. That structure, axis then placement then discriminator, is what converts a memorised list into a comparison answer, and it is why examiners set discrimination questions in the first place.

MNEMONIC

### Three axes: AGE, SEQUENCE, NUMBER

Developmental theorists align on **age** (Freud / Erikson / Piaget / Kohlberg across one child), emotion theories order on **sequence** (body-first james-lange to cognition-first lazarus), intelligence models split on **number** (one g to many). Name the axis, then the discriminator.

**GOOD TO REMEMBER**

- **Aligned grid, preschool column (~3 to 5 y):** Freud phallic, Erikson initiative-vs-guilt (purpose), Piaget preoperational, Kohlberg preconventional.
- **Aligned grid, school-age (~6 to 12 y):** Freud latency, Erikson industry-vs-inferiority (competence), Piaget concrete operational, Kohlberg preconventional into conventional.
- **Aligned grid, adolescence:** Freud genital (last Freudian stage), Erikson identity-vs-role-confusion (fidelity), Piaget formal operational, Kohlberg conventional.
- **Freud stops, Erikson continues:** Freud's ladder ends at the genital stage; Erikson adds intimacy (love), generativity (care), integrity (wisdom) across adult life.
- **James-Lange:** body-first, feeling is the perception of arousal ("afraid because we tremble").
- **Cannon-Bard:** arousal and feeling simultaneous and independent (thalamic theory); built as the rebuttal of james-lange.
- **Schachter-Singer (1962):** two-factor, arousal then cognitive label; same arousal, different emotion by context.
- **Lazarus (1966, 1991):** cognition-first, appraisal is prior and necessary; Zajonc (1980) counter = affective primacy.
- **Emotion axis:** body-first to cognition-first; currently accepted = appraisal + interoception + construction.
- **Spearman (1904):** one general factor g plus specific s; the positive manifold.
- **Gardner (1983):** multiple independent intelligences (seven then eight); critique = contradicts the positive manifold.
- **Sternberg (1985):** triarchic, analytical + creative + practical.
- **CHC (Carroll 1993):** three-stratum hierarchy (g over broad over narrow); the currently accepted consensus.
- **Intelligence axis:** number, one thing (g) to many; pluralists that deny g fall outside the mainstream.
- **Four classic traps:** james-lange vs cannon-bard (serial vs parallel); assimilation (keep schema) vs accommodation (change schema); Piaget (individual) vs Vygotsky (social); Freud psychosexual vs Erikson psychosocial names.

## Apply and consolidate

### 22 · Apply: four psychology vignettes

**The final step, where the theories become an answer.** Psychology is only worth marks if the frameworks convert into reads of a described child or adult. Examiners increasingly favour the short clinical vignette: a two-line presentation, then "which stage", "which attachment type", "which theory explains this". This topic drills that conversion on four deliberately varied cases, one per major tool covered above, so that the *discriminator* (the single fact that decides the answer) is what you learn to hunt for. Each vignette follows the same discipline: read the presentation, name the tool the case is testing, apply it, and state the one line that carries the mark.

The four cases are chosen to span the whole of this material. The first is a **developmental-stage** read of a preschooler placed simultaneously through Piaget, Erikson and the milestone schedule. The second is a **goodness-of-fit** case pairing a difficult-temperament infant with a rigid

parenting environment. The third is an **attachment classification** from a Strange-Situation description, naming the type and the internal working model it encodes. The fourth is an **emotion-theory and intelligence** application, reading an arousal-then-label sequence by Schachter-Singer and placing a jagged ability profile on CHC and Gardner. Ground text is Kaplan and Sadock (2024), with Piaget (1952), Ainsworth and colleagues (1978) and Schachter and Singer (1962) behind the individual reads.

### 22.1 Vignette 1: the four-year-old who fails conservation and false belief

**A developmental-stage read across three theorists at once.** This case tests whether you can take a single age and place the child correctly on Piaget, Erikson and the milestone schedule together, which is exactly the four-lens sentence a cross-sectional question rewards. The discriminator is the pairing of the two failed tasks: a conservation failure and a false-belief failure are the twin signatures of preoperational thought.

CLINICAL ANCHOR

**Case (vignette).** A boy of 4 years is watched at play. When water from a short wide beaker is poured into a tall thin glass in front of him, he insists there is now "more water". Shown the Sally-Anne scenario, in which Sally hides a marble in a basket and leaves, Anne moves it to a box, and Sally returns, he says Sally will look in the box. He copies a cross on request but cannot yet copy a square. Place him.

**The reasoning.** Two failures anchor the Piagetian stage. The child cannot conserve liquid quantity because he *centrates* on the single salient dimension (the height of the column) and lacks the *reversibility* that would let him mentally pour the water back; conservation of quantity is not achieved until the concrete operational stage at about 7 years (Piaget 1952). He also fails the false-belief task, answering from his own privileged knowledge of where the marble truly is rather than tracking Sally's false belief, the marker of *egocentrism*; theory of mind on this task emerges at about 4 years (Wimmer and Perner 1983; Baron-Cohen, Leslie and Frith 1985), so at exactly 4 he can be on the cusp and still fail. Both features place him firmly in the **preoperational stage** (about 2 to 7 years).

**The read.** Piaget: preoperational, shown by non-conservation (centration, irreversibility) and egocentrism (false-belief failure). Erikson: at 4 the crisis is *initiative versus guilt*, virtue purpose (about 3 to 5 years). Freudian correlate: the phallic-oedipal stage. Milestones: copying a cross is the expected fine-motor item *at 4 years* (the square comes at 5), so his graphomotor development is on schedule and the cognitive "failures" are stage-appropriate, not delay. The whole answer in one line: a normally developing preoperational preschooler in Erikson's initiative-versus-guilt stage, whose conservation and false-belief failures are expected for his age.

HOLD THIS

**At 4 years, non-conservation and false-belief failure are expected, not delay.** The paired failure is the twin signature of preoperational thought; the milestone check (copies a cross at 4) confirms the child is on track.

### 22.2 Vignette 2: the difficult infant meeting a rigid parent

**A temperament case that turns on goodness of fit, not on the temperament alone.** The trap here is to answer "difficult temperament, poor outcome" and stop. The tool the case actually tests is Chess and Thomas' **goodness of fit**: outcome is predicted by the *match* between the child's style and the environment's demands, so the same infant does well or badly depending on the parenting it meets (Kaplan and Sadock 2024).

CLINICAL ANCHOR

**Case (vignette).** A 10-month-old feeds and sleeps on no predictable schedule, screams loudly and for a long time at each new food or face, takes many exposures to settle to any change, and is generally irritable. Her father, a punctual and orderly man, keeps a strict feeding and sleeping timetable, reads her intense crying as wilful defiance, and responds by tightening the routine and raising his voice. Classify the temperament and predict the trajectory.

**The reasoning.** The infant's profile is the classic **difficult child** constellation: irregular rhythmicity, withdrawal from novelty, poor (slow) adaptability, high intensity of reaction and predominantly negative mood (Chess and Thomas, New York Longitudinal Study). Difficult children are about 10 percent of the sample and carry the highest risk of later disturbance, but that risk is not fixed. The decisive variable is the environment she meets. Here the fit is *poor*: a rigid, timetable-driven parent who misreads intensity as defiance and escalates is maximally mismatched to an irregular, intense, slow-adapting infant, setting up a coercive cycle.

**The read.** Difficult temperament plus a rigid, mismatched caregiving environment equals a *poor goodness of fit*, and it is the poor fit, not the temperament, that predicts stress, escalating conflict and later behaviour problems. State the counterfactual to prove you understand the construct: the identical infant paired with a calm, flexible parent who paces transitions gently and reframes intensity as style rather than misbehaviour has a good fit and a favourable trajectory. The clinical move is to treat the dyad, not the child, and to reframe temperament for the father as a style to work with, not defiance to be disciplined out.

### 22.3 Vignette 3: the Strange-Situation reunion that names the type

**An attachment classification read from reunion behaviour, plus the internal working model it encodes.** The tool is Ainsworth's **Strange Situation**, and the whole discriminator lives in the *reunion* episode, not in how much the infant cries at separation (Ainsworth and colleagues 1978). Get the reunion behaviour, name the letter and label, then state the internal working model of self and other that the pattern encodes.

CLINICAL ANCHOR

**Case (vignette).** A 14-month-old in the standardised procedure explores the toys only a little and stays close to her mother. When the mother leaves she becomes intensely distressed and cannot be settled by the stranger. On the mother's return she rushes to be picked up but then arches away, kicks and cannot be comforted, alternately seeking and resisting contact, and does not return to play. The mother's caregiving history is described as warm but unpredictable. Classify.

**The reasoning.** Separation distress alone does not classify, since both secure and insecure-ambivalent infants are highly distressed; the answer is read from reunion. The signature here, seeking contact yet simultaneously resisting it (approaching to be held, then arching and pushing away), unsettled and not returning to exploration, is the **insecure-ambivalent / resistant** pattern, Ainsworth's *Type C*. The little pre-separation exploration and clinginess fit the same type. The typical caregiving is *inconsistent and unpredictable*, which matches the "warm but unpredictable" history: the child cannot form a stable expectation of availability, so it maximises proximity-seeking and protest to keep an unreliable caregiver engaged.

**The read.** Type C, insecure-ambivalent (resistant), read from the contradictory seek-and-resist reunion. Its **internal working model** (Bowlby's mental template built from repeated interactions) is a model of the caregiver as *unreliably available*, sometimes responsive and sometimes not, paired with a model of the self as having to escalate distress to secure care and as not confidently worthy of consistent comfort. Contrast to fix the answer: had she avoided and ignored the mother on reunion with little separation distress, that is Type A avoidant (a model of the caregiver as rejecting); had she sought the mother and been readily comforted then returned to play, that is Type B secure (a model of the caregiver as reliably available and the self as worthy of care). The adult counterpart of Type C on the Adult Attachment Interview is the preoccupied classification.

### 22.4 Vignette 4: the arousal that is labelled two ways, and the jagged ability profile

**Two applications in one case: an emotion theory on the axis of sequence, and an intelligence model on the axis of number.** The emotion half tests Schachter-Singer's two-factor account, where the same undifferentiated arousal is named by context; the intelligence half tests where a spiky ability profile sits on CHC versus Gardner. The discriminator for emotion is *same arousal, different label*; for intelligence it is *whether the peaks are truly independent or nest under g*.

CLINICAL ANCHOR

**Case (vignette).** A man is given an injection that races his heart and makes him sweat, but he is not told the drug is arousing. Placed with a cheerful companion he reports feeling euphoric; on another day, identically injected but placed with an angry companion, he reports feeling angry. Separately, a schoolboy is assessed: he reasons superbly through novel puzzles and has a large vocabulary, plays music with rare skill and is socially deft, yet on formal testing his musical and interpersonal talents do not stand apart from his general ability, which is uniformly high. Read the emotion, then place the profile.

**The reasoning, part one (emotion).** The arousal is constant across both days; only the available cognitive interpretation changes, and with it the reported emotion. This is **Schachter-Singer** two-factor theory (1962): undifferentiated physiological arousal supplies the intensity, and a cognitive *label* drawn from the context supplies the identity, so the same pounding heart is felt as euphoria beside a happy confederate and as anger beside a hostile one. Because the man was not informed of the drug's effects, he had an *unexplained* arousal to attribute, the origin of *misattribution of arousal*. Note the sequence to avoid the classic trap: arousal comes *first*, then the label, so this is still body-first, not cognition-first; had the case turned on an appraisal preceding any arousal it would be Lazarus.

**The reasoning, part two (intelligence).** The boy shows apparent peaks (music, social skill) on top of strong general reasoning and knowledge. **Gardner** would read the peaks as separate *musical* and *interpersonal* intelligences, largely independent modules an IQ test misses (Gardner 1983). But the case supplies the decisive fact: on testing his talents do *not* dissociate from his general ability, which is uniformly high. That is the **positive manifold**, the robust finding that cognitive abilities correlate positively, and it is precisely what Gardner's independence claim cannot accommodate. The profile therefore sits best on **CHC** (Cattell-Horn-Carroll): a high general factor *g* at the apex (Stratum III) expressed through strong broad abilities (Stratum II) and narrow abilities (Stratum I), so his novel-puzzle skill is fluid reasoning (Gf), his vocabulary is crystallised knowledge (Gc), and even his musical and social strengths, while real, correlate with the same underlying g rather than floating free.

**The read.** Emotion: Schachter-Singer two-factor, one arousal labelled two ways by context (body-first, arousal-then-label). Intelligence: a jagged-looking profile that nonetheless obeys the positive manifold belongs on the CHC hierarchy (g over broad over narrow), not on Gardner's independent multiple intelligences, because the peaks do not dissociate from g. CHC is the currently accepted consensus for exactly this reason.

**COMMON TRAP**

The four discriminators the vignettes turn on, and the wrong answers they punish:

- **Vignette 1:** do not call a stage-appropriate conservation or false-belief failure "developmental delay". At 4 years, non-conservation and egocentric false-belief errors are *expected* preoperational features; the milestone check (copies a cross at 4) confirms the child is on track.
- **Vignette 2:** do not answer "difficult temperament, therefore poor outcome". Temperament alone does not predict outcome; *goodness of fit* does. Name the poor fit, and state the counterfactual (same infant, flexible parent, good outcome).
- **Vignette 3:** do not classify from separation distress. Both secure (B) and ambivalent (C) infants are highly distressed at separation; the type is read from *reunion*. Seek-and-resist is C, not B.
- **Vignette 4:** do not call Schachter-Singer "cognition-first" (arousal comes first, then the label). And do not accept a spiky profile as proof of Gardner's independent intelligences unless the peaks actually *dissociate* from g; if they correlate (the positive manifold), the profile is CHC.

**PEARL**

Every vignette answer has the same skeleton: name the tool the case is testing, apply it to the described behaviour, and state the single discriminator that carries the mark, then prove mastery with the counterfactual (what a different answer would have looked like). The discriminator is nearly always one fact: the failed conservation-and-false-belief pair means preoperational; the poor match means bad goodness of fit; the reunion behaviour means the attachment type; the constant arousal with a changing label means Schachter-Singer; the peaks that still correlate with g mean CHC, not Gardner.

**GOOD TO REMEMBER**

- **Vignette 1, the tool:** developmental-stage read (Piaget + Erikson + milestones), placing one age through several lenses.
- **Vignette 1, the read:** a 4-year-old failing conservation (centration, no reversibility) and false belief (egocentrism) is *preoperational* (Piaget, about 2 to 7 y); Erikson crisis = initiative vs guilt (virtue purpose, about 3 to 5 y); copies a cross at 4 y (square at 5) = milestones on track.
- **Conservation of quantity:** achieved in concrete operational stage (about 7 y), not before.
- **False-belief / theory of mind:** emerges about 4 years (Sally-Anne, Baron-Cohen, Leslie and Frith 1985; paradigm Wimmer and Perner 1983).
- **Vignette 2, the tool:** temperament plus goodness of fit (Chess and Thomas, New York Longitudinal Study).
- **Difficult child:** irregular rhythmicity, withdrawal, poor adaptability, high intensity, negative mood; about 10 percent; highest risk of later disturbance.
- **Goodness of fit:** the match between child temperament and environmental demand is the real predictor of outcome, not the temperament alone; difficult infant plus rigid parent = poor fit = coercive cycle; same infant plus flexible parent = good fit.
- **Vignette 3, the tool:** attachment classification from the Strange Situation (Ainsworth and colleagues 1978), read from reunion.
- **Type C, insecure-ambivalent / resistant:** intense separation distress, seeks yet resists contact on reunion (approach then arch away), not settled; caregiving inconsistent/unpredictable; internal working model = caregiver unreliably available, self must escalate for care; adult counterpart preoccupied.
- **Reunion, not separation, classifies:** both B (secure) and C (ambivalent) are distressed at separation; A (avoidant) ignores caregiver on reunion; B seeks and is readily comforted.
- **Internal working model (Bowlby):** paired mental template of caregiver-availability and of self-worth, built from repeated interactions, largely outside awareness.
- **Vignette 4, emotion:** Schachter-Singer two-factor (1962), same undifferentiated arousal labelled euphoria or anger by context; body-first, arousal-then-label; origin of misattribution of arousal.
- **Vignette 4, intelligence:** a jagged ability profile whose peaks still correlate with g (the positive manifold) belongs on CHC (Cattell-Horn-Carroll, g over broad over narrow), not on Gardner's independent multiple intelligences; CHC is the currently accepted consensus.
- **Positive manifold:** cognitive abilities correlate positively; the fact any theory denying g must explain away.

## 23 · Consolidate: mnemonic, retrieval and synthesis

**The last hour is where revision is made or lost.** General and developmental psychology fails on exam morning not because the facts were never read but because they were never **consolidated** into a single retrievable structure. This closing topic does three specific jobs, each a distinct memory operation. First it gives one master **mnemonic** that chains every strand of this material, from the five schools through the general-psychology functions to the developmental theorists, so that pulling one thread pulls the rest. Second it converts the material into **retrieval practice**, a set of answer-free prompts to be worked with the answers covered, because the act of retrieving is itself what fixes a memory (Kaplan & Sadock 2024). Third it names a whole-chapter **synthesis map** to redraw from memory, aligning the developmental theorists on one age axis with the general-psychology functions and the depth-psychology schools as branches.

**Why these three and not simple re-reading.** The consolidation literature is unambiguous that the two most effective study strategies are **retrieval practice** (testing yourself) and **spaced practice**, and that re-reading and highlighting, though they feel productive, are among the weakest (Dunlosky et al. 2013). The **testing effect** is the finding that recalling material strengthens later retention more than restudying the same material for the same time (Roediger & Karpicke 2006). A good mnemonic supplies the retrieval cues, active recall exercises the retrieval itself, and a redrawn map forces the relations between items to be reconstructed rather than merely recognised. Use this topic as the closing loop: read the mnemonic, then cover the answers and self-test, then redraw the map on blank paper.

**TRAP** Re-reading and highlighting feel productive but are among the **weakest** study strategies; retrieval practice and spaced practice are the strongest, and the testing effect means recall beats restudy for the same time (Dunlosky et al. 2013).

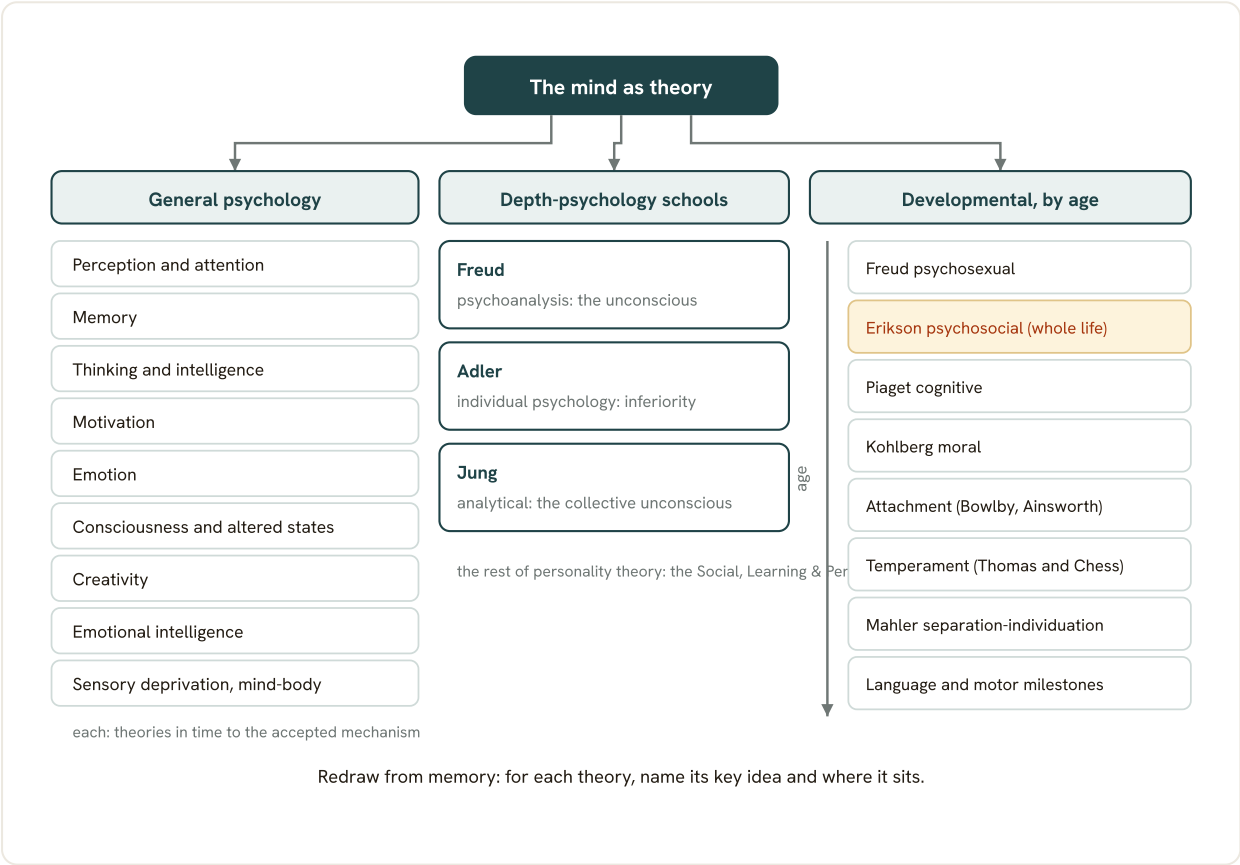



**Fig 4.8** The whole chapter on one page. General psychology supplies the functions, each taught as a history of theories converging on the accepted mechanism; the three depth-psychology schools (Freud, Adler, Jung) supply the map of the unconscious; and the developmental theorists line up along a single age axis, with only Erikson spanning the whole lifespan. Cover the panels and rebuild this from memory as a retrieval test.

## 23.1 The master mnemonic for the whole set of notes

**One chain from schools to functions to theorists.** This is the single memory anchor for the chapter: a three-part device whose first line seeds the five schools, whose second line seeds the general-psychology functions, and whose third and fourth lines seed the depth-psychology schools and the developmental theorists. The letters are cues, not content; each is unpacked

below to the item it must recover. Rehearse the four lines until they run without effort, then use each letter as a hook to reel in its full topic.

MNEMONIC

## Big Cats Bite Prey Hungrily · Please Make Time, Matey, Every Clever Creature Excels · Freud, Adler, Jung climb the iceberg · Every Playful Kid Anxiously Tests Mother's Milestones

**Line 1, the five schools, in appearance-and-argument order (Big Cats Bite Prey Hungrily). B**ig = *Biological* (the brain: genes, neurotransmitters, circuits, evolution). **C**ats = *Cognitive* (the computer metaphor; Neisser 1967). **B**ite = *Behavioural* (the black box; Watson 1913, Skinner). **P**rey = *Psychodynamic* (the iceberg; Freud, Adler, Jung). **H**ungrily = *Humanistic* (the growing self; Maslow, Rogers; descendant positive psychology, Seligman).

**Line 2, the nine general-psychology functions (Please Make Time, Matey, Every Clever Creature Excels). P**lease = *Perception* (currently accepted as predictive processing; neural correlate the sensory-association cortex and the two visual streams). **M**ake = *Memory* (Atkinson-Shiffrin then Baddeley then the systems synthesis; correlate hippocampus for declarative, basal ganglia and cerebellum for procedural, amygdala for emotional). **T**ime = *Thinking and intelligence* (currently accepted CHC model; correlate parieto-frontal integration theory and processing speed). **M**atey = *Motivation* (drive to incentive to the currently accepted multi-system view; correlate mesolimbic dopamine, hypothalamus). **E**very = *Emotion* (James-Lange to Cannon-Bard to Schachter-Singer to the currently accepted appraisal-plus-interoception-plus-construction synthesis; correlate the limbic system and Papez circuit, amygdala with LeDoux's two roads, insula for interoception). **C**lever = *Consciousness* (global workspace and its neural correlate). **C**reature = *Creativity* (the componential and systems view; correlate the default-mode, executive-control and salience networks). **E**xcels = *Emotional intelligence* (Salovey-Mayer ability model versus Goleman and Bar-On mixed models; correlate the "social brain," ventromedial prefrontal cortex, amygdala, insula), and the *mind-body* problem underneath them all (dualism to identity theory to functionalism).

**Line 3, the three depth-psychology schools (Freud, Adler, Jung climb the iceberg). Freud** = psychoanalysis: topographic and structural models, the psychosexual stages, defence and transference. **Adler** = individual psychology: organ inferiority, the inferiority feeling, striving for superiority, style of life, social interest. **Jung** = analytical psychology: the collective unconscious, archetypes (persona, shadow, anima and animus, self), complexes, introversion and extraversion.

**Line 4, the developmental strands (Every Playful Kid Anxiously Tests Mother's Milestones). E**very = *Erikson* (eight psychosocial crises, each with its virtue). **P**layful = *Piaget* (four cognitive stages: sensorimotor, preoperational, concrete operational, formal operational). **K**id = *Kohlberg* (three moral levels: preconventional, conventional, postconventional). **A**nxiously = *Attachment* (Harlow, Bowlby, Ainsworth; secure, avoidant, ambivalent, disorganised). **T**ests = *Temperament* (Chess and Thomas nine dimensions and three types; goodness of fit; Kagan's behavioural inhibition). **M**other's = *Mahler* (separation-individuation: the precursor phases autistic and symbiotic, then the four subphases differentiation, practising, rapprochement, consolidation). **M**ilestones = the *developmental milestones* ladder (social smile, sitting, pincer grasp, first words, walking, the copy-a-shape sequence, and their red flags). Freud's psychosexual stages, from Line 3, are the fifth stage theorist that runs down the same age axis.

### 23.2 Retrieval practice: work these with the answers covered

**Test yourself, do not re-read.** The following are deliberately answer-free. Use **active recall**: read each prompt, say or write the full answer from memory, and only then check it against the topic it came from. This is **retrieval practice**, the single highest-yield way to convert a day of reading into exam-durable memory, and it works only if you genuinely attempt recall before checking, so cover the answers.

RETRIEVAL PRACTICE, COVER THE ANSWERS

**Retrieval practice, cover the answers.** Answer each aloud or on paper before you look anything up. If a prompt is blank in your mind, flag it and return to that topic; a blank on a self-test now is a mark you would otherwise have lost in the exam.

1. Name the five schools of psychology and give each one's unit of analysis and its lead figure.
2. State the historical arc: which school fixed which gap, from introspection through behaviourism to the cognitive revolution, and where the psychodynamic and humanistic traditions sit.
3. For perception, give the evolution from the classical view to the currently accepted predictive-processing account, and name its neural correlate.
4. Lay out the memory systems and map each onto its structure: declarative versus procedural versus emotional, and the model sequence from Atkinson-Shiffrin to Baddeley's working memory.
5. State the currently accepted model of intelligence and its neural correlate, and distinguish fluid from crystallised ability.
6. Trace the emotion theories in order (James-Lange, Cannon-Bard, Schachter-Singer, appraisal, constructed emotion) and name the structures of the neural correlate.
7. Contrast the ability model of emotional intelligence with the mixed models, naming their authors.
8. Give Freud's topographic and structural models and list the psychosexual stages with their ages and zones.
9. State Adler's core concepts: organ inferiority, inferiority feeling, striving for superiority, style of life, and social interest.
10. Draw Jung's structure of the psyche and name the major archetypes, and state the boundary rule for complexes versus archetypes.
11. List Erikson's eight psychosocial stages with their ages and virtues.
12. Give Piaget's four stages with ages and one signature achievement or error each, then contrast Piaget with Vygotsky.
13. State Kohlberg's three levels and six stages, the dilemma used to elicit them, and the core scoring rule.
14. Name the four attachment classifications, the discriminator that separates them, and who added the fourth type.
15. List Chess and Thomas's three temperament types with their approximate proportions, define goodness of fit, and give Mahler's two precursor phases and four subphases of separation-individuation with their ages.

### 23.3 The whole-day synthesis map to redraw from memory

**Reconstruct the relations, do not just recognise the items.** The final consolidation act is to draw the whole set of notes as one **synthesis map** on a blank sheet and to redraw from memory until it flows without prompts. Put a single horizontal *age axis* across the page, from birth on the left to old age on the right. Along it, stack the five stage theorists who share that axis so their stages line up vertically: Freud's psychosexual stages, Erikson's eight psychosocial crises, Piaget's four cognitive stages, Kohlberg's three moral levels, and Mahler's separation-individuation sub-phases, with attachment phases and the motor-language milestone ladder threaded beneath as the relational and observable strands. Then branch upward off the map two further clusters that are not age-staged: the nine *general-psychology functions* (perception, memory, thinking and intelligence, motivation, emotion, consciousness, creativity, emotional intelligence, and the mind-body problem), each labelled with its currently accepted mechanism and neural correlate, and the three *depth-psychology schools* (Freud, Adler, Jung) as the roots feeding the psychodynamic lens. Redraw this from memory once and the material is genuinely consolidated: the age axis holds the developmental theorists in register, and the two branches keep the functions and the schools attached to the same single structure. A concept SVG of this map should be drawn to anchor the redraw.

HOLD THIS

**One age axis holds five stage theorists in register (Freud, Erikson, Piaget, Kohlberg, Mahler), with the functions and the depth-schools branching off.** Redraw it once from memory and the chapter is genuinely consolidated.

**GOOD TO REMEMBER**

- **Five schools (Line 1):** Biological (brain), Cognitive (computer; Neisser 1967), Behavioural (black box; Watson 1913, Skinner), Psychodynamic (iceberg; Freud, Adler, Jung), Humanistic (growing self; Maslow, Rogers; positive psychology, Seligman).
- **Nine functions (Line 2):** perception, memory, thinking and intelligence, motivation, emotion, consciousness, creativity, emotional intelligence, mind-body; each learned as evolution of theories to currently accepted mechanism to neural correlate.
- **Perception:** currently accepted = predictive processing; correlate = sensory-association cortex and the two visual streams (dorsal "where," ventral "what").
- **Memory:** Atkinson-Shiffrin then Baddeley working memory then systems synthesis; correlate = hippocampus (declarative), basal ganglia and cerebellum (procedural), amygdala (emotional).
- **Intelligence:** currently accepted = CHC (Cattell-Horn-Carroll); correlate = parieto-frontal integration theory and processing speed.
- **Emotion:** James-Lange to Cannon-Bard to Schachter-Singer to appraisal-plus-interoception-plus-construction; correlate = limbic system and Papez circuit, amygdala (LeDoux's two roads), insula.
- **Emotional intelligence:** Salovey-Mayer ability model vs Goleman and Bar-On mixed models; correlate = the "social brain," ventromedial prefrontal cortex, amygdala, insula.
- **Freud (Line 3):** psychoanalysis; topographic and structural models; psychosexual stages (oral, anal, phallic, latency, genital); staged by body zone.
- **Adler (Line 3):** individual psychology; organ inferiority, inferiority feeling, striving for superiority, style of life, social interest.
- **Jung (Line 3):** analytical psychology; collective unconscious; archetypes (persona, shadow, anima/animus, self); complexes; introversion/extraversion.
- **Erikson (Line 4):** eight psychosocial crises, each with a virtue (trust/hope to integrity/wisdom); psychosocial, added three adult stages beyond Freud's genital.
- **Piaget (Line 4):** sensorimotor (0 to ~2 y), preoperational (~2 to 7 y), concrete operational (~7 to 11 y), formal operational (~11 y onward).
- **Kohlberg (Line 4):** preconventional (to ~9 y), conventional (adolescence on), postconventional (only ~10 to 15% reach it); Heinz dilemma; reasoning fixes the stage.
- **Attachment (Line 4):** Harlow (contact comfort), Bowlby (behavioural system, secure base, internal working model), Ainsworth (Strange Situation); types A avoidant, B secure, C ambivalent, D disorganised (Main & Solomon).
- **Temperament (Line 4):** Chess and Thomas nine dimensions, easy (~40%), difficult (~10%), slow-to-warm-up (~15%); goodness of fit; Kagan behavioural inhibition (~10 to 15%).
- **Mahler (Line 4):** normal autistic (0 to ~1 mo), symbiotic (~1 to 5 mo), differentiation (~5 to 9 mo), practising (~9 to 16 mo), rapprochement (~16 to 24 mo), consolidation/object constancy (~24 to 36 mo).
- **Milestones (Line 4):** social smile ~6 to 8 wk, sits without support ~6 to 8 mo, pincer grasp 9 to 10 mo, first words ~12 mo, walks well 14 to 15 mo; copy-a-shape circle 3 y, cross 4 y, square 5 y, triangle 6 y, diamond 7 y.
- **Consolidation science:** retrieval practice and spaced practice are the highest-yield strategies (Dunlosky et al. 2013); the testing effect beats restudy (Roediger & Karpicke 2006); re-reading and highlighting are weak.

## Previously asked

Real long-essay (25-mark) and short-note (10-mark) questions from the general and developmental psychology territory, most-recent year shown.

### LONG ESSAYS (25 MARKS)

- Define emotions. Discuss the various theories of emotion and the psychopathological presentations related to emotion. MUHS 2017
- Describe the physiological basis of emotions. MUHS 2018
- Describe perceptual processes and the various disorders of perception. MUHS 2014
- Define the term consciousness. Describe the differential diagnosis of unconsciousness, and how you would investigate and manage a case of suspected dissociative (hysterical) unconsciousness. MUHS 2016

### SHORT NOTES (10 MARKS)

- Erik Erikson and the stages of psychosocial development. MUHS 2021
- Theories of motivation and their application in psychiatry. MUHS 2021
- Psychological development in adolescence and its relation to psychiatric disorders. MUHS 2020
- Carl Gustav Jung. MUHS 2017
- Emotional intelligence. MUHS 2018
- Principles of Gestalt psychology. MUHS 2018
- Freud's concept of the id. MUHS 2013
- Implicit memory. MUHS 2013
- Working memory. MUHS 2012
- Jean Piaget. MUHS 2011
- Sigmund Freud and his contribution to psychiatry. MUHS 2011
- Tests used to assess intelligence. MUHS 2011

Psychology is a dependable examiner's quarry: emotion theories and the physiological basis of emotion recur as full essays, and Freud, Jung, Erikson, Piaget, motivation, working and implicit memory, emotional intelligence and Gestalt appear regularly as short notes. Prepare each theorist well enough to give the core idea, the stages or components, and one clinical link in a few lines. Learning and classical or operant conditioning, theories of personality, social perception, the psychology of aggression and the psychology of rape are examined from this same territory but are taught on the Social, Learning & Personality Psychology notes; intelligence testing is taken up on the Psychometry, Assessment and Descriptive Psychopathology notes.

# Quick review

## The whole picture in one table

| | |
|---|---|
| SCHOOLS OF PSYCHOLOGY | Five lenses on the same mind: biological (brain, genes), cognitive (information processing), behavioural (observable stimulus and response), psychodynamic (the unconscious), humanistic (growth and meaning). Each arose partly to fix what the previous lens left out. The general-psychology topics below each run the same way: the theories in the order they appeared, then the currently accepted mechanism and its neural correlate. |
| PERCEPTION AND ATTENTION | Sensation to perception; Gestalt organisation; Gibson direct bottom-up versus Gregory constructivist top-down, now reconciled as predictive perception; signal detection (d-prime, criterion). Attention: Broadbent early filter to Treisman attenuation to Deutsch-Norman late selection to Kahneman capacity. Hallucination theories evolve from perceptual release (Hughlings-Jackson) through source monitoring and aberrant salience to predictive coding. Neural: ventral what and dorsal where streams. |
| MEMORY | Ebbinghaus forgetting curve; Atkinson-Shiffrin multi-store (sensory, short-term, long-term); Baddeley working memory (central executive, phonological loop, visuospatial sketchpad, episodic buffer); levels of processing; Tulving long-term taxonomy (episodic, semantic, procedural; explicit, implicit). Forgetting by decay, interference, retrieval failure. Neural: hippocampus and medial temporal lobe for declarative, prefrontal for working memory. |
| THINKING AND INTELLIGENCE | Heuristics and biases (availability, representativeness, anchoring); dual-process. Intelligence models: Spearman g, Thurstone primary abilities, Cattell fluid and crystallised, the Cattell-Horn-Carroll consensus, Gardner multiple, Sternberg triarchic. The argument is one thing versus many; CHC is the working consensus. Neural: parieto-frontal integration (P-FIT). Testing is on the Psychometry, Assessment and Descriptive Psychopathology notes. |
| MOTIVATION | Instinct to drive-reduction (Hull) to arousal or optimal-level (Yerkes-Dodson) to incentive to Maslow's hierarchy (deficiency then growth needs) to Murray and McClelland to Deci and Ryan self-determination (intrinsic and extrinsic; autonomy, competence, relatedness). Homeostasis cannot explain curiosity or achievement. Neural: mesolimbic dopamine incentive-salience. |

| The whole picture in one table | |
|---|---|
| EMOTION | James-Lange (body first), Cannon-Bard (simultaneous, thalamic), Schachter-Singer two-factor (arousal plus label), Lazarus appraisal (appraisal first), then basic (Ekman) versus constructed emotion (Barrett). The enduring debate is body-first versus cognition-first. Neural: limbic system and Papez circuit, amygdala (LeDoux), insula for interoception. |
| CONSCIOUSNESS | Level (arousal) versus content (awareness); the hard problem. Global workspace (Baars) and integrated information (Tononi). Altered states: sleep and dreaming, hypnosis, meditation, drug-induced, and clinical (delirium, dissociation, coma). Neural: ascending reticular activating system, thalamocortical loops, default-mode network. |
| CREATIVITY | Guilford convergent versus divergent thinking (fluency, flexibility, originality, elaboration); Torrance tests; Wallas four stages (preparation, incubation, illumination, verification); the threshold hypothesis; the creativity-psychopathology question. Neural: reduced latent inhibition, default-mode and executive dynamics. |
| EMOTIONAL INTELLIGENCE | Mayer and Salovey four-branch ability model (perceive, use, understand, manage) versus Goleman mixed or trait model; Bar-On. Ability versus trait debate; MSCEIT versus self-report; incremental-validity critique. Neural: ventromedial prefrontal cortex, amygdala, insula. |
| SENSORY DEPRIVATION AND MIND-BODY | Sensory deprivation (Hebb and McGill, Lilly): perceptual and cognitive effects, hallucinations; relevance to solitary confinement and ICU. Mind-body problem: dualism (Descartes) versus monism (physicalism, functionalism, emergentism); the explanatory gap and qualia; the biopsychosocial synthesis (Engel) as the working clinical stance. |
| FREUD (PSYCHOANALYSIS) | Topographic (conscious, preconscious, unconscious) and structural (id, ego, superego) models; psychosexual stages oral, anal, phallic (Oedipus), latency, genital; techniques (free association, dream analysis, transference). The Wednesday Psychological Society became the Vienna Psychoanalytic Society; Adler, Jung, Stekel and Rank defected over the primacy of sexuality. |
| ADLER (INDIVIDUAL PSYCHOLOGY) | Inferiority feeling driving striving for superiority; the inferiority and superiority complexes; holism and fictional finalism; the style of life; social interest as the mark of health; birth order and family constellation. Broke from Freud over libido; influenced CBT and humanistic therapy. |
| JUNG (ANALYTICAL PSYCHOLOGY) | Ego, personal unconscious (complexes), collective unconscious with archetypes (persona, shadow, anima and animus, the Self); introversion and extraversion with four functions (the MBTI typology); individuation as the goal; the word-association test; synchronicity. Broke from Freud over libido as general psychic energy. |

| The whole picture in one table | |
|---|---|
| ERIKSON (PSYCHOSOCIAL) | Eight lifespan crises with virtues: trust versus mistrust (hope), autonomy versus shame (will), initiative versus guilt (purpose), industry versus inferiority (competence), identity versus role confusion (fidelity), intimacy versus isolation (love), generativity versus stagnation (care), integrity versus despair (wisdom). Epigenetic principle; Marcia identity statuses. The only stage theory to span the whole life. |
| PIAGET, VYGOTSKY, THEORY OF MIND | Piaget: assimilation and accommodation; sensorimotor (object permanence), preoperational (egocentrism, no conservation), concrete operational (conservation, reversibility), formal operational (abstract). Vygotsky: sociocultural, the zone of proximal development, scaffolding (social versus individual construction). Theory of mind: the false-belief task, emerging near age 4, relevant to autism. |
| KOHLBERG (MORAL) | Three levels via the Heinz dilemma: preconventional (punishment-obedience, instrumental exchange), conventional (interpersonal conformity, law and order), postconventional (social contract, universal principles). The reasoning defines the stage, not the answer; not all reach postconventional. Gilligan critique: care versus justice. |
| ATTACHMENT | Harlow contact comfort overturned cupboard-love. Bowlby: an evolved system, secure base, monotropy, internal working model, protest-despair-detachment. Ainsworth strange situation: secure (B), avoidant (A), ambivalent-resistant (C), disorganised (D, Main and Solomon). Disorganised attachment carries the greatest psychopathology risk. |
| TEMPERAMENT | Thomas and Chess (New York Longitudinal Study): nine dimensions (activity, rhythmicity, approach-withdrawal, adaptability, intensity, threshold, mood, distractibility, persistence); three types (easy, difficult, slow-to-warm-up); goodness of fit between temperament and environment predicts outcome. Kagan behavioural inhibition; Rothbart reactivity. |
| MAHLER (SEPARATION-INDIVIDUATION) | Normal autistic (0 to 1 month) and symbiotic (1 to 5 months) phases, then four subphases: differentiation, practising, rapprochement (the crisis), and consolidation with object constancy (to 36 months). Rapprochement-failure is linked to borderline pathology. Klein, Winnicott and Fairbairn (object relations) are taught on the Social, Learning & Personality Psychology notes. |
| LANGUAGE AND MOTOR MILESTONES | Verified ages: social smile 6 to 8 weeks, head control 3 months, sits 6 months, stranger anxiety 8 months, pincer grasp 9 to 10 months, first words about 12 months, walks 12 to 15 months, two-word phrases 18 to 24 months. Language theory: Skinner operant versus Chomsky nativist (language acquisition device, universal grammar) versus interactionist; cooing, babbling, holophrastic, telegraphic. |
| DISCRIMINATE AND APPLY | Align the stage theorists (Freud, Erikson, Piaget, Kohlberg) down one age axis; only Erikson spans the whole life. Tell the emotion theories apart by the |

| The whole picture in one table | |
|---|---|
| | order of arousal, cognition and feeling; place the intelligence models on the one-versus-many spectrum. Apply by reading a child by stage, a temperament by goodness of fit, and an attachment by the strange situation. |

## References

This material is grounded in the standard texts (the source hierarchy below); each theory is attributed to its primary source, and landmark, contested or numeric claims carry a PubMed-verified journal citation. Every PMID here was checked against PubMed this build, and citations whose identifier did not resolve to the cited paper were corrected or dropped.


### SOURCE HIERARCHY (TEXTBOOKS)

1. Boland R, Verduin ML, eds. Kaplan & Sadock's Comprehensive Textbook of Psychiatry. 11th ed. Philadelphia: Wolters Kluwer; 2024. [primary depth bar; contributions of the psychological sciences, human development]
2. Sadock BJ, Sadock VA, Ruiz P. Kaplan & Sadock's Synopsis of Psychiatry. 11th ed. Philadelphia: Wolters Kluwer; 2015. [theories of personality and psychopathology; the schools of psychology]
3. Geddes JR, Andreasen NC, Goodwin GM, eds. New Oxford Textbook of Psychiatry. 3rd ed. Oxford: Oxford University Press; 2020. [psychology and human development chapters]
4. Tasman A, Kay J, Lieberman JA, First MB, Riba MB, eds. Psychiatry. 4th ed. Chichester: Wiley-Blackwell; 2015. [developmental and cognitive psychology]
5. Johnstone EC, Owens DGC, Lawrie SM, et al, eds. Companion to Psychiatric Studies. 8th ed. Edinburgh: Churchill Livingstone/Elsevier; 2010. [psychology of perception, memory, motivation, emotion]

### FOUNDATIONAL PRIMARY SOURCES

1. Neisser U. Cognitive Psychology. New York: Appleton-Century-Crofts; 1967. [names cognitive psychology; the information-processing metaphor]
2. Atkinson RC, Shiffrin RM. Human memory: a proposed system and its control processes. In: The Psychology of Learning and Motivation. Vol 2. New York: Academic Press; 1968:89-195. [multi-store model]
3. Baddeley AD, Hitch GJ. Working memory. In: The Psychology of Learning and Motivation. Vol 8. New York: Academic Press; 1974:47-89. [working-memory model]
4. Maslow AH. A theory of human motivation. Psychol Rev. 1943;50:370-396. [the hierarchy of needs]
5. Freud S. The Ego and the Id. London: Hogarth Press; 1923; and Introductory Lectures on Psycho-Analysis. 1916-1917. [the structural model; psychosexual theory]
6. Adler A. The Practice and Theory of Individual Psychology. London: Routledge; 1924. [inferiority, superiority, style of life, social interest]
7. Jung CG. The Archetypes and the Collective Unconscious. Collected Works, Vol 9, Part 1. Princeton: Princeton University Press; 1959. [archetypes, individuation]
8. Erikson EH. Childhood and Society. New York: Norton; 1950. [the eight psychosocial stages]
9. Piaget J. The Origins of Intelligence in Children. New York: International Universities Press; 1952. [the four cognitive stages]
10. Vygotsky LS. Mind in Society. Cambridge: Harvard University Press; 1978. [the zone of proximal development, scaffolding]
11. Chomsky N. A review of B.F. Skinner's Verbal Behavior. Language. 1959;35:26-58. [the nativist critique; the language acquisition device]
12. Kohlberg L. Essays on Moral Development. Vol 1: The Philosophy of Moral Development. San Francisco: Harper & Row; 1981. [the six moral stages]
13. Harlow HF. The nature of love. Am Psychol. 1958;13:673-685. [contact comfort; the rhesus-monkey studies]

14. Bowlby J. Attachment and Loss. Vol 1: Attachment. London: Hogarth Press; 1969. [attachment as an evolved system]
15. Ainsworth MDS, Blehar MC, Waters E, Wall S. Patterns of Attachment: A Psychological Study of the Strange Situation. Hillsdale: Erlbaum; 1978. [the strange-situation classifications]
16. Thomas A, Chess S. Temperament and Development. New York: Brunner/Mazel; 1977. [the nine dimensions; goodness of fit]
17. Mahler MS, Pine F, Bergman A. The Psychological Birth of the Human Infant. New York: Basic Books; 1975. [separation-individuation and its subphases]
18. Gardner H. Frames of Mind: The Theory of Multiple Intelligences. New York: Basic Books; 1983. And Sternberg RJ. Beyond IQ: A Triarchic Theory of Human Intelligence. Cambridge: Cambridge University Press; 1985. [plural models of intelligence]

### JOURNAL REFERENCES (PUBMED-VERIFIED, 11)

1. Schachter S, Singer JE. Cognitive, social, and physiological determinants of emotional state. Psychol Rev. 1962;69:379-99. PMID: 14497895.
2. Baddeley A. Working memory. Science. 1992;255:556-9. PMID: 1736359.
3. Tulving E. Episodic memory: from mind to brain. Annu Rev Psychol. 2002;53:1-25. PMID: 11752477.
4. Loftus EF. Planting misinformation in the human mind: a 30-year investigation of the malleability of memory. Learn Mem. 2005;12:361-6. PMID: 16027179.
5. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. Am Psychol. 2000;55:68-78. PMID: 11392867.
6. Mayer JD, Salovey P, Caruso DR. Emotional intelligence: new ability or eclectic traits? Am Psychol. 2008;63:503-17. PMID: 18793038.
7. Kapur S. Psychosis as a state of aberrant salience: a framework linking biology, phenomenology, and pharmacology in schizophrenia. Am J Psychiatry. 2003;160:13-23. PMID: 12505794.
8. Marcia JE. Development and validation of ego-identity status. J Pers Soc Psychol. 1966;3:551-8. PMID: 5939604.
9. Ainsworth MD, Bell SM. Attachment, exploration, and separation: illustrated by the behavior of one-year-olds in a strange situation. Child Dev. 1970;41:49-67. PMID: 5490680.
10. Wimmer H, Perner J. Beliefs about beliefs: representation and constraining function of wrong beliefs in young children's understanding of deception. Cognition. 1983;13:103-28. PMID: 6681741.
11. Baron-Cohen S, Leslie AM, Frith U. Does the autistic child have a "theory of mind"? Cognition. 1985;21:37-46. PMID: 2934210.

# Index


aberrant salience 16
alexithymia 65
behavioural inhibition 117
biopsychosocial model 71
collective unconscious 6
d-prime 11
emotional object constancy 123
epigenetic principle 95
fictional finalism 82
Glasgow Coma Scale 48
goodness of fit 117
Heinz dilemma 105
hierarchy of needs 6
individuation 7
internal working model 112
Kluver-Bucy syndrome 46
language acquisition device 129
law of Prägnanz 12
levels of processing 21
MSCEIT 67
Myers-Briggs Type Indicator 94
object permanence 100
Oedipus complex 79
P-FIT 32
Papez circuit 41
positive manifold 26
predictive processing 14
reactive attachment disorder 110
Remote Associates Test 58
Sally-Anne task 103
self-determination theory 38
signal detection theory 10
social interest 82
somatic marker hypothesis 45
Strange Situation 110
Thematic Apperception Test 38
Torrance Tests of Creative Thinking 59
working memory 18
Yerkes-Dodson law 37
zone of proximal development 100

## PRINTING AND DISTRIBUTION

Notes Next Door (NND), Delhi is the official printing and distribution partner for Weave Sprint. The soft-copy PDFs and the complete print-ready set are always available at weave.clinic/sprint, should you prefer to print the notes yourself. Weave Sprint is open source and free, and as part of Weave's commitment to residents it will stay that way, forever. We do, however, strongly recommend a printed set from Notes Next Door: in our experience, they have been the most reliable printing partner we have worked with.