

## **Final exam topics**

### **General psychology**

- 1. Attention processes**
- 2. Visual information processing**
- 3. Additional dimensions of perception**
- 4. Adaptation: types and characteristics of learning processes**
- 5. Human memory – types of memory**
- 6. Human memory – practical aspects**
- 7. Motivational mechanisms, types of motivation, motivational theories**
- 8. Emotional processes, theories of emotions, research and studies on emotions**
- 9. Psychological aspects of language**
- 10. Human-specific/Higher-order cognitive processes**

# Keywords

## 1. Attention

- Visual attention
- Selective and divided attention, automaticity
- Limits of attention
  - spatial limitations: overt and covert visual attention; inattention blindness
  - temporal limitations: Change blindness, Repetition blindness, Attentional blink
- stimulus features influencing attention
  - Stimulus salience
  - Attentional capture
- visual search
  - Feature search, Conjunction search, Feature integration theory
- Attentional networks
  - Orienting attention network, Executive attention network
- Research methodology:
  - Stroop task, Posner paradigm, Visual search task, Rapid serial visual presentation (RSVP) paradigm
  - EEG, EDA

## 2. Sensation and perception 1 (Visual perception)

- Color perception
  - wavelengths of light; hue, saturation, brightness
  - additive and subtractive color mixing
  - trichromatic theory of color vision
  - the opponent-process theory of color vision
  - Color afterimages, Simultaneous color contrast; color and lightness constancy
  - Biological aspects
    - retina, fovea, classes of cone photoreceptors
    - anomalous trichromacy, Dichromacy, Monochromacy
- Object perception
  - top-down processing and bottom-up processing in object perception
  - Perceptual Organization – Grouping, Segregation
  - Figure-ground organization
  - the gestalt laws and perceptual grouping
  - Biological aspects
    - Inferotemporal area; Fusiform face area, Occipital face area; Prosopagnosia
- Depth and size perception
  - Cue approach to depth perception
  - Monocular depth cues, Oculomotor Cues, Binocular Cues
  - Size Perception and Constancy
  - Visual Illusions of Size and Depth
  - the Müller–Lyer Illusion, the Ponzo Illusion, the Ames Room Illusion, the Moon Illusion
- Motion perception
  - Motion and Motion Thresholds
  - Real and Apparent Motion, Induced motion
  - Biological Motion - Point-light walker display
  - Motion Aftereffects
  - Biological aspects

- Reichardt detectors: motion-sensitive neurons
  - Eye Movements – *Vergence*, Saccades, Smooth-Pursuit Eye Movements
  - Corollary Discharge Theory
- Research methodology:
  - Psychophysics
  - Signal-detection theory
  - Reaction time analysis
  - Neuroscientific methods

### **3. Sensation and perception 2 (Acoustic perception, Somatosensory perception, Chemical perception)**

- Acoustic perception
  - Pure tones: amplitude and loudness, frequency and pitch
  - Complex sounds: fundamental frequency and harmonics, timbre
  - The auditory system:
    - outer, middle and inner ear
    - place and temporal coding
    - auditory Cortex
  - sound localizations
    - interaural time and level difference
    - Cone of confusion
  - Auditory scene analysis
    - Temporal and spatial segregation, Spectral segregation
- Somatosensory perception: Touch and pain
  - The Skin and its Receptors
  - Mechanoreception
    - slow- and fast adapting receptors
  - Proprioception
    - Muscle spindles, Joint receptors
  - Thermoreception
    - Cold fibers, Warm fibers
  - Nociception and the Perception of Pain
    - A-delta fibers, C-fibers
  - Somatosensory Cortex
    - Somatotopic map and Homunculus
  - Haptic Perception
    - Exploratory procedures, Braille alphabet system
  - The Perception of Balance
    - Vestibular system and Semicircular canals
- Chemical perception: Olfaction and taste
  - Olfaction
    - Odors and odorants
    - The nose
    - Olfactory Perception
    - detection
    - identification, Tip-of-the-nose phenomenon
    - Odor Imagery
    - Olfactory Illusions
  - Taste Perception
    - Taste and tastants, flavor

- Anatomy of the Tongue and Taste Coding
  - Individual Differences in Taste Perception
    - Tasters, Nontasters, Supertasters
- Research methodology:
  - Psychophysics
  - Signal-detection theory
  - Reaction time analysis
  - Neuroscientific methods

#### 4. Learning and conditioning

- Types of and approaches to learning
  - associative, complex; behavioral, cognitive, social, biological
- Classical conditioning
  - Pavlov
  - components and steps of classical conditioning
  - Experimental factors influencing classical conditioning
    - Temporal factors
      - paradigms of CC
      - contiguity, contingency/predictability
      - extinction, spontaneous recovery
    - Stimulus characteristics
      - intensity, salience
      - generalization, differentiation/discrimination, Second-order conditioning or “higher-order conditioning”
  - Applications of classical conditioning: PTSD, test anxiety, implicit attitudes, insomnia, drug tolerance
- Behavioral learning
  - instrumental conditioning
    - Thorndike, puzzle box, learning curve
    - law of effect
  - Operant conditioning
    - Skinner and skinner box
    - Operant Conditioning Theory
    - components and steps of operant conditioning
    - Kinds of operant conditioning
      - Reinforcement
        - Kinds of reinforcers: positive, negative, conditioned reinforcers
        - Schedules of Reinforcement
          - Ratio and interval schedules
        - Shaping and response chains
      - Avoidance Conditioning
        - learned helplessness
      - Punishment
- Cognitive learning
  - Cognitive phenomena in classical and operant conditioning: contingency; learned helplessness
  - early cognitive view – Tolman
    - spatial expectations, place and response learning in maze, cognitive map
    - reward and motivation; latent learning

- gestaltist view – Köhler
  - problem solving, insight learning
- cognitive turn - information theory
- the Atkinson-Shiffrin model of memory
  - primacy and recency effect in word list learning
  - limitations affecting learning – capacity limit, limited duration
  - causes of information loss: decay, interference, inhibition
- working memory model
  - the role of verbal WM/visual WM/episodic buffer/central executive in learning
  - factors influencing conscious Learning
  - rehearsal time - ease-of-learning, judgment-of-learning, feeling-of-knowing
  - repetition - massed, spaced, distributed practice
  - rehearsal strategies - elaborative, maintenance rehearsal; organization/chunking
- Social learning
  - trial-error learning vs. learning by observation
  - Social learning theory - Miller & Dollard
  - imitation, learning from a model, Bandura
    - reciprocal causation
    - mirror neurons
  - factors influencing learning
    - Attribution Theory: locus of efforts, internal and external attribution, self-serving bias, mindset
    - Self-Efficacy Theory: high and low self-efficacy
    - Self-Regulation Theory: self-regulation, monitoring, control
- Research methodology:
  - Surveys and Interviews
  - Memory Diaries
  - Experiments
  - Performance task – performance indicators
  - Word list learning; Paired-associate technique
  - Dual task method - Selective interference tasks
  - Implicit learning tasks
  - Recall test, Recognition test
  - Metamemory judgments

## 5. Human memory – types of memory

### A – Main topics

- Sensory memory
- Short-term memory
- Long-term memory
- Working memory and executive functions
- Episodic memory: organization and recall
- Semantic memory and stored knowledge

### B – Methodological aspects

Research methods:

- Iconic memory: Sperling's partial reporting paradigm
- Encoding:
  - Depth of processing ( Craik and Tulving, 1975)
  - Encoding/retrieval congruence
  - Intentional forgetting
- Retrieval: recall vs. recognition
- Working memory:
  - Role of chunking
  - Brown-Peterson paradigm
  - Serial position effect
  - Interference paradigms
  - Digit, reading, auditory sentence span, pseudoword repetition test
  - Examination of spatial-visual working memory: Corsi block test
- Examination of executive functions:
  - Inhibition: Stroop task, Go/No go task, Simon task
  - Updating: Verbal and visual fluency tasks, 5-point test, N-back tasks
  - Switching: Trail Making Test
  - Complex tasks: Wisconsin Card Sorting Test, Tower of London

C – Biological aspects

- Frontal lobe and temporal lobe
- Hippocampus
- Spatial memory
  - Egocentric space (PPC: body image and spatial attention)
  - Allocentric space (hippocampus; place cells, grid cells, boundary cells, and head direction cells)

## **6. Human memory – practical aspects**

A – Main topics

- Theory of autobiographical memory and autobiographical memory disorders
- Forgetting

- Childhood memory
- Memory and aging
- Amnesia

#### B – Methodological implications

- Research methods in the study of memory disorders
- The constructive nature of memory
  - o DRM paradigm
  - o The role of context
  - o Bartlett and schemas
  - o The study of memory distortions
- Examination of autobiographical memory
  - o Cueing procedures
  - o Autobiographical interviews
  - o Experimental studies of age effects

#### C – Biological aspects

- Korsakoff syndrome, Alzheimer's disease, H.M. and amnesia

### 7. Motivational mechanisms, types of motivation, motivational theories

#### A – Main topics

- Basic concepts of motivation (instinct, need, drive, homeostasis, incentive)
  - o drive reduction theory
- Primary motivations: regulation of temperature, fluid intake and nutrition
  - o thirst: peripheral, osmotic, emotional; “set-point” hypothesis;
  - o regulation of nutrition
- Psychological aspects of sexuality
  - o human sexual response cycle, Kinsey report, theories of homosexuality
- Motivation of aggressive behavior, forms of aggression, aggression theories
- Motivation of escape behavior: fear, anxiety, their types
  - o “Flight or fight” reaction, fear vs. anxiety
- Stress and stressors, the general adaptation syndrome
  - o life events, Lazarus' transactionalist model, allostatic model, coping strategies, psychological immune system,
- Motivation of helping behavior, theories explaining altruism
  - o genuine vs. pseudaltruism; Latané and Darley's decision model;
  - o negative state reduction; empathy-altruism theory
- The concept of intrinsic motivation, its basic phenomena, self-determination theory (Ryan and Deci)

- sensory deprivation experiments; competence, autonomy, need for affiliation
- Basic phenomena of cognitive motivations: exploration, research motivation
  - need for transcendence
- Performance/achievement motivation
- implicit motivation
  - TAT

#### B - Methodological aspects

- Measuring the physiological aspects of motivation
- Examining the behavioral and subjective aspects of motivation

#### C – Biological aspects

- The limbic system
- Hypothalamus + amygdala
- HPA axis
- Vegetative nervous system (autonomic nervous system)
- Biological background and effect of chronic stress



## **8. Emotional processes, theories of emotions, examination of emotions**

### **A – Main topics**

- Components of emotions, classification of emotions
  - affective phenomena; basic emotions; secondary emotions; emotion families; emotion components; negative bias
- Classical theories of emotions
  - James-Lange theory of emotion; Cannon and Bard's central theory; Schachter and Singer's two-factor theory
- Newer emotion theories
  - false feedback experiments; facial feedback theory, amygdala; Lazarus-Zajonc debate; cognitive appraisal; Lazarus-cognitive emotion theory, psychological constructivism
- Emotional expression, Perception of emotions, empathy
  - FACS; emotion reading; embedded simulation; facial mimicry; mirror neurons; detection rules; microfacial expressions
- Social interpersonal emotions
  - affective prediction
- Pathological emotional phenomena,
  - hedonic adaptation
- Emotion regulation strategies and alexithymia
- The relationship between emotion and cognition, the effect of emotions on cognitive processes
  - somatic marker hypothesis

### **B - Methodological aspects**

- Measuring the subjective experience of emotion
- Measuring the physiological aspects of emotion
- Measuring the cognitive aspects of emotion
- Measuring the behavioral aspects of emotion
- Examining facial expressions

### **C – Biological aspects**

- The limbic system
- Autonomic nervous system
- Hemispheric lateralization of emotions, localization of emotions
- Mirror neurons

## 9. Psychological aspects of language

### A – Main topics

- The nature of language ability
- Speech perception, speech comprehension, and the mental lexicon
- Speech production, theories of speech production
- Reading and reading disorders
- Language and brain function
- Models and basic processes of communication

### B – Methodological aspects

- Research methods in linguistics: priming, tip-of-the-tongue phenomenon, pauses, case studies, methods for studying aphasia and dyslexia

### C - Biological aspects

- Motor (Broca's) and sensory (Wernicke's) aphasia; hemispheric lateralization, neuroplasticity

## 10. Thinking and reasoning

- Intelligence
  - Implicit and expert view on the concepts of intelligence
  - Pioneering works:
    - Galton – quantitative approach
    - Binet – mental testing, mental age
    - Stern, Terman, Wechsler – IQ
  - Models
    - Psychometric models
      - factor analytic approach – Spearman, Thurstone,
        - two-factor theory, g factor; primary mental abilities
      - gf-gc model: fluid intelligence, crystallized intelligence - Cattell, Horn,
      - the three-stratum model - Carroll
    - Cognitive process approaches – Sternberg
      - Metacomponents, Performance components, Knowledge-acquisition components
    - System approach:
      - Multiple intelligences Model – Gardner
      - The triarchic model – Sternberg
        - analytic, practical, creative intelligence
    - Personal and emotional intelligence – Mayer
  - Measuring intelligence
    - Achievement and aptitude tests
    - Psychometric standards for intelligence tests
      - Reliability, Validity, Standardization
      - normative scores, bell curve
      - static testing, dynamic testing

- Cultural fairness
- Biological Bases of Intelligence
  - brain size, brain efficiency, prefrontal cortex
- Genetic influences
  - Family studies, Twin studies, Adoption studies
- Environmental Influences
  - biological environment, social environment
  - Flynn effect
- Individual and group differences
  - Sex Differences
  - Racial or Ethnic Differences
  - Test Bias – outcome and predictive bias
  - Social factors, Stereotype threat, self-fulfilling prophecy
- Creativity – Guilford
  - Cube model, divergent thinking, convergent thinking
  - measuring creativity: originality, fluency, flexibility
  - stages of creative problem solving
- Problem solving
  - types of problems
    - well- and ill-defined problem, knowledge rich problems, closed ended and open ended problems; convergent and divergent problems
  - early approaches
    - introspective approach; psychometric approach; behaviorism: trial-and-error problem solving
  - gestalt view – insight problems; reproductive thinking and productive thinking, aha experience: feelings of “warmth”
  - information-processing approach – Newell, Simon
    - General Problem Solver; Problem space, algorithm, heuristics
  - cognitive view
    - Representational change theory – Ohlson
    - Stages of problem-solving – Wallas
    - Hindering factors: incubation effect, Mental set, functional fixedness, Cognitive control, Problem representation
    - Problem solving strategies
      - algorithm, heuristics, planning
  - Dual process account of problem solving
    - Type 1 system - intuitive processes
    - Type 2 system - reflective processes
  - research methods
    - the mutilated draughtboard, the nine-dot problem, matchstick problems, the Water jug problem, the candle box problem, the two-string problem, the bird and trains problem, the monk problem, The Tower of Hanoi/London problem, Cognitive Reflection Test
- Imagination
  - history: Wundt, behaviorism, cognitive turn
  - imagery debate
    - spatial representations, spatial correspondence assumption - Kosslyn
    - propositional explanation - Pylyshyn
      - tacit knowledge
  - Behavioral and physiological evidences
  - Research methodology:

- mental rotation task, Shepard, Metzler
- mental scanning task, Kosslyn
- visual field manipulation
- letter visualization experiment

