

Chapter 3: Attention in Perception and Display Space

Multiple Choice Questions

Correct answers are indicated by *

1. Attention can be described in terms of a flashlight metaphor. Which of the following best characterizes focused attention?

- *a. the narrowness of the flashlight beam
- b. selecting different parts of the scene
- c. the wideness of the beam
- d. the flashlight battery

2. Attention can be described in terms of a flashlight metaphor. Which of the following best characterizes selective attention:

Selective attention can best be described as:

- a. The narrowness of the beam
- *b. Selecting different parts of the scene
- c. The wideness of the beam
- d. The flashlight battery

3. Which of the following would NOT be an example of an area of interest (AOI):

- a. a speedometer of a car
- b. the surgical cavity of a patient
- * c. the point of gaze of an observer
- d. an open window on a computer screen

4. What are the four components of the SEEV model?

- *a. salience, effort, expectancy, value
- b. search, effort, extraction, volition
- c. salience, effort, eye field, value
- d. signal, enhance, expectancy, volition

5. The term _____ is used to describe those situations when changes in the environment are not noticed.

- a. irrelevant change effect
- b. inattentional blindness
- c. habituation
- * d. change blindness

6. Which of the following disruptions to the visual scene is NOT found to accompany change blindness?

- * a. flash
- b. blink

- c. blank screen
- d. physical object occluding the scene

7. Change blindness is less likely if the event is _____:

- a. improbable
- * b. probable
- c. infrequent
- d. frequent

8. Which of the following does NOT refer to the term change blindness?

- a. oblivious to our own change blindness
- b. overconfidence in our ability to detect change
- * c. implicit memory for objects not noticed explicitly
- d. overestimation of the degree to which we can detect change

9. Inattention blindness is related to the:

- a. frequency of the unexpected event
- b. frequency of the primary task
- * c. difficulty of the primary task
- d. perceived urgency of the primary task

10. The serial self-terminating search (SSTS) model says that

- a. people search starting on the upper right of a display
- b. there is always a specific order of search through the search field
- * c. when the target is found, the search is “self-terminated”
- d. as the set size increases, search time decreases

11. When a target is present, search time is roughly half the time it takes when a target is absent. Why is that?

- * a. on average, the target will be found halfway through the search
- b. the target is always placed halfway down the screen
- c. the target will be found if it is present
- d. the distractors are different if the target is not present

12. Target popout is an example of:

- a. serial search
- * b. parallel search
- c. conjunction search
- d. none of the above

13. When is search easier (i.e., more likely to be parallel)

- * a. when distractors are homogeneous and targets are defined by having a feature present
- b. when distractors are heterogeneous and targets are defined by having a feature present
- c. when distractors are homogeneous and targets are defined by having a feature absent
- d. when distractors are heterogeneous and targets are defined by having a feature absent

14. Extensive training in target search can lead to

- * a. automaticity
- b. degraded performance
- c. varied mapping
- d. serial search

15. Which of the following is NOT a factor that increases the number of search errors (misses):

- a. target is not fixated (search does not blanket the search region)
- b. target is fixated, but still not detectable
- *c. the target is placed in a known location
- d. a premature stopping policy

16. Disorganizational clutter refers to:

- a. distractors near the target
- b. N
- * c. randomness of distractor locations
- d. how different the distractors are from each other

17. In attentional guidance, a *central* cue:

- a. points away from the imperative stimulus
- *b. points towards the imperative stimulus
- c. is placed at the imperative stimulus
- d. is *less* cognitively driven than a peripheral cue

18. In attentional guidance, a *peripheral* cue:

- a. is located at the central cross
- b. will provide a benefit even if at the wrong location
- *c. is more perceptually driven than a central cue
- d. takes more time to process

19. Which of the following statements about cue reliability is false?

- a. when the cue is wrong, penalties are incurred
- b. as the reliability of cueing improves, benefits when it is correct increase
- c. the more correctly the cue indicates the location of a target, the less likely it is that the observer will examine other areas
- * d. cue characteristics that benefit cueing when it is correct reduce costs when it is wrong

20. Which of the following statements about cue reliability is true?

- a. a more reliable peripheral cue will make it more likely that the observer will examine other display areas
- * b. when a cue is wrong only a small percentage of the time, it is more likely to be believed when it is wrong
- c. attentional guidance through cueing is unrelated to highlighting in lists and menus
- d. as the reliability of cueing improves, the costs when it is wrong are decreased

21. Which of the following is NOT a basic principle that causes stimuli to be preattentively grouped together in a display?

- * a. function

- b. proximity
- c. similarity
- d. closure

22. Pre-attentive processing is also known as:

- a. implicit processing
- b. feature processing
- c. local processing
- * d. global processing

23. An emergent feature is a:

- * a. global property of a set of stimuli that is not evident when each is seen in isolation
- b. unit that is processed quicker than others
- c. local property of a single stimulus that is evident when seen as part of a set of stimuli
- d. property which is used to recognize words by their shape

24. A head-up display (HUD) places critical instrument readings on the cockpit window. Which of the following statements best characterizes its advantages?

- * a. it facilitates parallel processing of scene and symbology
- b. it facilitates processing of an unexpected obstacle
- c. it disrupts focused attention
- d. it violates spatial proximity

25. In the flanker paradigm, which condition produced the fastest response times?

- a. R L R
- b. L R L
- c. N R X
- * d. L L L

26. If focused attention on a particular display element is required, decreasing the distance between display elements (bringing them closer together) will

- a. decrease clutter
- * b. increase spatial proximity
- c. inhibit divided attention
- d. decrease perceptual competition

27. In the Stroop task, which condition will produce the slowest response times?

- a. the word blue in blue ink
- b. a row of four Xs (XXXX) in blue ink
- * c. the word red in blue ink
- d. the word red in red ink

28. Which of the following advantages is not object-based?

- a. conformal imagery on a HUD
- b. polygon displays
- c. an emergent feature
- * d. redundancy gain in the flanker task

29. A group of similarly-colored objects in an otherwise cluttered visual field can be easy to pick out. This is an example of:

- a. abutment
- b. connections
- * c. close proximity in color
- d. close proximity in space

30. If text instructions about how to manipulate a control are connected with a line to a picture of the control on the equipment, we are using which form of display proximity?

- a. close proximity in space
- b. abutment
- c. homogeneous features
- * d. connections

31. An aircraft pilot might want to compare actual speed to a target speed. Based on your knowledge of PCP, what display format should be most effective?

- * a. each speed represented by the height of a bar, connected by a line
- b. one speed expressed spatially and the other by color code
- c. a display in which the two values are spatially separated
- d. a display in which the two values are part of separate objects

32. It is possible to design a display that is effective for both integration and focused attention tasks. Which of the following statements best describes why?

- * a. it is sometimes possible to find separations that help integration but do not hurt focused attention.
- b. it is sometimes possible to find separations that help focused attention but do not help integration.
- c. decreasing separation from 20 to 2 degrees hurts focused attention
- d. rendering two items the same color helps focus attention

33. With an object display, the shape of the object can indicate whether values are in normal (symmetric) or abnormal (asymmetric) ranges. The shape of the object primarily serves:

- a. to designate individual values
- b. to demonstrate close proximity in space
- c. as a separated display
- * d. as an emergent feature

34. Which of the following is NOT a characteristic of the auditory modality?

- a. receives information at almost all times
- b. omni-directional
- c. transient
- * d. almost limitless capacity

35. Auditory input in an unattended channel remains in a pre-attentive short-term auditory store for

- a. 300-600 milliseconds
- * b. 3-6 seconds
- c. 3-6 minutes
- d. 3-6 hours

36. Which of the following type of auditory input characteristic does NOT grab our attention?

- a. personalized (e.g., own name)
- b. loudness
- * c. non-speech sounds (e.g., tones)
- d. semantically-related to the primary task

37. Which of the following effects can be NOT be caused by loud auditory material:

- a. increased levels of stress
- * b. reduced fatigue
- c. disruption to cognitive performance
- d. annoyance

38. Quieter, attention grabbing auditory warnings are known as:

- a. earcons
- * b. attensors
- c. spearcons
- d. alarms

39. The cocktail party effect refers to:

- a. the attention-grabbing properties of spoken material containing your own name
- b. our inability to selectively attend to one speaker when under the influence of alcohol
- c. our inability to focus on a task in a noisy environment
- * d. our ability to selectively attend to one speaker in a noisy environment

40. The use of physical characteristics of sound to focus our attention selectively is known as:

- * a. auditory streaming
- b. binaural cues
- c. monaural cues
- d. phonetics

41. Which of the following is NOT used to organize sound into perceptually-distinct auditory objects?

- a. timbre
- b. pitch
- * c. meaning
- d. timing

42. If the pitch separation between tones increases, at some point we would perceive:

- a. the fusion of two distinct streams into a single stream
- b. no discernible change
- c. a change in timing
- * d. the fission of a single stream into two distinct streams

43. The spatial links between auditory, visual and proprioceptive attention seem to be:

- * a. obligatory
- b. conscious

- c. weak
- d. transitory

44. The irrelevant sound effect refers to:

- a. the difficulty in remembering meaningless sounds
- * b. the distraction of our attention by extraneous sound
- c. our preference of sounds over speech
- d. more efficient cognitive work when listening to music

45. The irrelevant sound effect is most pronounced for tasks that:

- a. involve memory for non-words
- b. involve speech-related tasks
- c. are perceived to be frustrating
- * d. involve the maintenance of item order in memory

46. _____ is the main disruptive factor underlying the irrelevant sound effect.

- a. similarity to speech
- b. similarity between the primary task and irrelevant sound
- * c. acoustic change
- d. loudness

47. Long-term exposure to moderate levels of aircraft noise has been found to:

- * a. impair children's reading comprehension
- b. reduce appetite
- c. improve sleeping patterns in older adults
- d. impair children's mathematical abilities

48. Banbury and Berry (1998) found that habituation to background sound can be reduced by:

- a. switching tasks
- * b. relatively short periods of quiet
- c. reducing the level of background sound
- d. adding white noise

49. Which of the following is NOT an effective means to reduce the disruptive effects of office noise:

- * a. reduce noise level
- b. reduce variability of the noise
- c. re-design office tasks to reduce load on working memory
- d. add low-level continuous white noise

50. A study by Schlittmeier and Hellbrück (2009) found that instrumental music in offices:

- a. improved job satisfaction
- b. reduced levels of disruption
- c. improved employee retention
- * d. did not significantly reduce levels of disruption

Short Answer Essay Questions

1. Draw a graph showing the relationship between the spatial separation between two items and information access effort (IAE). Label the three different regions of the graph.
2. Consider guided search, and how experience changes the search process.
3. Describe the factors that decrease the likelihood of detecting changes to our environment.
4. Why do we sometimes look, but fail to see?
5. What is our Useful Field of View?
6. In what ways is the auditory modality different from the visual modality?
7. What is the Cocktail Party Effect?
8. What acoustic factors do we use to organise sound into perceptually-distinct auditory objects?

Essay Questions

1. Compare and contrast the phenomena of change blindness and inattention blindness.
2. Discuss the proximity compatibility principle and what it means for display design.
3. Using the flashlight metaphor, characterize the different types of attention.
4. Discuss how we are able to attend selectively to one source of auditory information while excluding all others? Using this knowledge, how can auditory warnings be made more effective?
5. Why is office noise distracting and what can be done about it?