Knowing when to Quit
Searching for Information

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Information Search Example

- Suppose that I want to ask the question:
Information Search Example

• Suppose that I want to ask the question:

  *What can eye movements teach us about visual search?*
Information Search Example

• Suppose that I want to ask the question:

What can eye movements teach us about visual search?
Visual search is a type of perceptual task requiring attention that typically involves an active scan of the visual environment for a particular object or feature (the target) among other objects or features (the distractors).[1] Visual search can take place with or without eye movements. The ability to consciously locate an object or target amongst a complex array of stimuli has been extensively studied over the past 40 years. Practical examples of using visual search can be seen in everyday life, such as when one is picking out a product on a supermarket shelf, when animals are searching for food amongst piles of leaves, when trying to find your friend in a large crowd of people, or simply when playing visual search games such as Where's Wally? Many visual search paradigms have used eye movement as a means to measure the degree of attention given to stimuli.[2][3] However, vast research to date suggests that eye movements move independently of attention, and therefore are not a reliable method to examine the role of attention. Much previous literature on visual search uses reaction time in order to measure the time it takes to detect the target amongst its distractors. An example of this could be a green square (the target) amongst a set of red circles (the distractors).

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Visual search

From Wikipedia, the free encyclopedia

**Visual search** is a type of perceptual task requiring attention that typically involves an active scan of the visual environment for a particular object or feature (the target) among other objects or features (the distractors).[^1] Visual search can take place with or without eye movements. The ability to consciously locate an object or target amongst a complex array of stimuli has been extensively studied over the past 40 years. Practical examples of using visual search can be seen in everyday life, such as when one is picking out a product on a supermarket shelf, when animals are searching for food amongst piles of leaves, when trying to find your friend in a large crowd of people, or simply when playing visual search games such as *Where's Wally?* Many visual search paradigms have used eye movement as a means to measure the degree of attention given to stimuli.[^2][^3] However, vast research to date suggests that eye movements move independently of attention, and therefore are not a reliable method to examine the role of attention. Much previous literature on visual search uses reaction time in order to measure the time it takes to detect the target amongst its distractors. An example of this could be a green square (the target) amongst a set of red circles (the distractors).

[^1]: [1](#)
[^2]: [2](#)
[^3]: [3](#)
Stop searching, the answer is here! Give up, sell eye-trackers, etc.

Visual search is a type of perceptual task requiring attention that typically involves an active scan of the visual environment for a particular object or target amongst distractors that share certain features (the distractors). Visual search can take place with or without eye movements. Saccades are rapid eye movements directed to an object or target amongst a complex array of stimuli that have been extensively studied over the past 40 years. Practical examples of using visual search can be seen in everyday life, such as when one is picking out a product on a supermarket shelf, when animals are searching for food amongst piles of leaves, when trying to find your friend in a large crowd of people, or simply when playing visual search games such as Where's Wally? Many visual search paradigms have used eye movement as a means to measure the degree of attention given to stimuli. However, vast research to date suggests that eye movements move independently of attention, and therefore are not a reliable method to examine the role of attention. Much previous literature on visual search uses reaction time in order to measure the time it takes to detect the target amongst its distractors. An example of this could be a green square (the target) amongst a set of red circles (the distractors).
Information Search Example

Visual search

Visual search is a type of perceptual task requiring attention that typically involves an active scan of the visual environment for a particular object or target amongst a complex array of stimuli. Visual search can take place with or without attentional cues to facilitate detection. For example, finding a red letter amongst a random array of letters has been extensively studied over the past 40 years. Practical examples of using visual search can be seen in everyday life, such as when one is picking out a product on a supermarket shelf, when animals are searching for food amongst piles of leaves, when trying to find your friend in a large crowd of people, or simply when playing visual search games such as Where's Wally? Many visual search paradigms have used eye movement as a means to measure the degree of attention given to stimuli. However, vast research to date suggests that eye movements move independently of attention, and therefore are not a reliable method to examine the role of attention. Much previous literature on visual search uses reaction time in order to measure the time it takes to detect the target amongst its distractors. An example of this could be a green square (the target) amongst a set of red circles (the distractors).
Information Search

- Common everyday activity
Information Search

• Common everyday activity
• Not just for Wikipedia: critical for success in intelligence and police operations
Information Search

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- Goal was to establish basic principles connecting information search with visual search
• Common everyday activity
• Not just for Wikipedia: critical for success in intelligence and police operations

• Goal was to establish basic principles connecting information search with visual search
  – Focused on exhaustiveness and search termination
Method

- Participants were asked to answer a question in relation to a passage of text

- The answer was situated in a critical sentence in each passage

- Two conditions:
  - **Search**: Question given before the passage of text
  - **Reading**: Question given after the passage of text (baseline condition)
• Question: **Did the dog chase the leaf?**
  
  – **Present/Yes Trial:** “...It was a particularly windy day and the dog was chasing a leaf around the garden...”

  • *can quit after reading this sentence*
• Question: **Did the dog chase the leaf?**
  – **Present/Yes Trial:** “...It was a particularly windy day and the dog was chasing a **leaf** around the garden...”
    • *can quit after reading this sentence*
  – **Absent/No Trial:** “...It was a particularly windy day and the dog was chasing a **bird** around the garden...”
    • *need to continue in case the dog chases the leaf at another point in the passage*
Critical Sentences

• Question: Did the dog chase the leaf?
  – Present/Yes Trial: “...It was a particularly windy day and the dog was chasing a leaf around the garden...”
    • can quit after reading this sentence
  – Absent/No Trial: “...It was a particularly windy day and the dog was chasing a bird around the garden...”
    • need to continue in case the dog chases the leaf at another point in the passage

• Present/Yes response required on 50% of trials
Exhaustiveness in Information Search

• In the search condition, participants should...
  – ...quit searching soon after reading the critical sentence on present/yes trials
  – ...engage in an exhaustive search on absent/no trials

• In the reading condition, participants should...
  – ...continue after reading the critical sentence on present/yes trials
  – ...engage in an exhaustive search on absent/no trials
Response Times

![Bar chart showing response times for 'Absent' and 'Present' target presence. The chart compares 'Reading' and 'Search' conditions, with error bars indicating variability.](image)
Response Times
Proportion of Sentences Fixated

- Absent Target Presence
  - Reading: 1.00
  - Search: 0.95

- Present Target Presence
  - Reading: 1.00
  - Search: 0.75
Reading Beyond The Critical Sentence

![Graph showing the probability of continuing after a critical sentence with and without a target present.](image-url)
Putting it Together

• In the search condition, participants should...
  – ...quit searching soon after reading the critical sentence on present/yes trials - **OFTEN YES**
  – ...engage in an exhaustive search on absent/no trials - **NOT EXACTLY**

• In the reading condition, participants should...
  – ...continue after reading the critical sentence on present/yes trials - **YES**
  – ...engage in an exhaustive search on absent/no trials - **YES**
Response Accuracy

- Reading
- Search

Target Presence: Absent, Present

Response Accuracy: 0.00, 0.75, 1.00
Response Accuracy

![Response Accuracy Graph]

- **Graph Description**:
  - The graph illustrates the response accuracy for 'Absent' and 'Present' target presence conditions.
  - Two conditions are compared: 'Reading' and 'Search'.
  - Error bars indicate the variability in the data.

- **Key Observations**:
  - For 'Absent' condition, 'Reading' and 'Search' show similar response accuracy.
  - For 'Present' condition, 'Search' has a significantly higher response accuracy compared to 'Reading'.
Response Accuracy

Did the dog chase the leaf?
- Dog mentioned
- Trees mentioned
- Leaf not mentioned
- When skimming/searching, easy to miss
- When reading, difficult to remember
Information Search

• Blend of visual search and reading
• Participants ‘skim-read’ when asked to search, rather than searching/reading exhaustively
  – This leads in particular to errors based on context in target-absent trials
Attention

From Wikipedia, the free encyclopedia

This article is about the psychological concept of attention. For other uses, see Attention (disambiguation).

Attention is the behavioral and cognitive process of selectively concentrating on a discrete aspect of information, whether deemed subjective or objective, while ignoring other perceivable information. It is the taking possession by the mind in clear and vivid form of one out of what seem several simultaneous objects or trains of thought. Focalization, concentration of consciousness are of its essence. Attention has also been referred to as the allocation of limited processing resources.[1]

Attention remains a major area of investigation within education, psychology, neuroscience, cognitive neuroscience, and neuropsychology. Areas of active investigation include determining the source of the sensory cues and signals that generate attention, the effects of these sensory cues and signals on the tuning properties of sensory neurons, and the relationship between attention and other behavioral and cognitive processes like working memory and vigilance.

A relatively new body of research, which expands upon earlier research within neuropsychology, is investigating the diagnostic and interventional potential of attention in a variety of populations, including individuals with autism spectrum disorder, individuals with attention-deficit/hyperactivity disorder, and those with psychopathic traits.