Psychological Research
DOI 10.1007/s00426-011-0379-7

ORIGINAL ARTICLE

Setting sights higher: category-level attentional set modulates sustained inattentional blindness

Steven B. Most

Received: 26 June 2011 / Accepted: 30 August 2011

Abstract Previous research has shown that *inattentional blindness* is modulated by how people tune their "attentional set": the more featurally similar the unexpected object is to what people are trying to attend, the more likely it is that they will notice it. The experiments in this paper show that people can also establish attentional sets based on semantic categories, and that these high-level attentional sets modulate sustained inattentional blindness. In "Experiment 1", participants tracked four moving numbers and ignored four moving letters or vice versa, and the unexpected object was either a capital letter 'E' or its reverse, a block-like number '3'. Despite their featural similarity, participants were more likely to notice the unexpected object belonging to the same category as the tracked objects. "Experiment 2" replicated this effect in conditions where the unexpected object possessed a unique luminance and was less likely simply to be confused with other display items.

Introduction

Inattentional blindness refers to the common failure of people to notice salient unexpected objects when their attention is otherwise engaged (Mack & Rock, 1998; Most et al., 2001; Simons & Chabris, 1999). In a now famous experiment, participants watched a videotape in which two teams of people intermingled and passed basketballs among themselves, and they kept track of the passes made by one of the teams. Partway through the video, a person dressed as a gorilla entered the screen, walked through the middle of the players, and exited the opposite side of the screen, an event that—despite its intuitively attention-grabbing nature—about half of the participants failed to notice (Simons & Chabris, 1999). This experiment echoed earlier work on selective looking (e.g., Becklen & Cervone, 1983; Neisser, 1979), underscoring the fact that failures to notice unexpected stimuli can be sustained for several seconds or more.

Several factors influence the likelihood of inattentional blindness occurring, including the salience of the unexpected object (Most, Clifford, Scholl, & Simons, 2005), its spatial proximity to the focus of attention (Most, Simons, Scholl, & Chabris, 2000), and the difficulty of the primary task (Cartwright-Finch & Lavie, 2007). A particularly robust factor appears to be a person's *attentional set*—that is, how a person "tunes" his or her attention to prioritize certain features over others. For example, in one experiment, four black and four white items moved through a computerized display and participants kept track of either the black or white shapes during each of several trials. On a critical trial, a new, unexpected object entered the display and remained visible for about 5 s. Importantly, when the unexpected object was white, 94% of those tracking white items noticed it, but no one tracking black items did. When the unexpected object was black this pattern reversed, and when it was gray noticing rates were intermediate (Most et al., 2001). In other words, the more similar the unexpected object was to the targets' features, and the less similar it was to the distractors' features, the more likely it was to be seen. Similar modulation of inattentional blindness by attentional set has also been found when participants discriminated attended from ignored items on the

S. B. Most (✉)
Department of Psychology, University of Delaware,
Newark, DE 19716-2577, USA
e-mail: most@psych.udel.edu

Published online: 27 September 2011

basis of shape and by complex arrangements of features such as in faces belonging to different races (Most et al., 2005). Note that the literature has previously documented the role of attentional set in determining what captures attention implicitly using non-declarative measures such as response time (e.g., Folk, Remington, & Johnston, 1992). However, such implicit measures are distinct from conscious perception (e.g., see Simons, 2000), so the robust manner in which attentional set modulates conscious perception is striking.

In addition to being able to tune attention for features, people can establish attentional sets for semantic category (Brand, 1971; Potter, 1975). Research suggests that such abstract attentional tuning also can influence the likelihood that brief periods of inattentional blindness will occur. For example, in one experiment, participants saw 1-s displays, each containing two pictures of animals and two pictures of furniture. In a between-subjects manipulation they were asked to identify the stimuli from one of the categories or the other on each trial. On a critical trial, letters spelling out the name of a piece of furniture (e.g., "table") or the name of a type of animal (e.g., "cat") appeared among the pictures, and participants were more likely to notice the word when it belonged to the same category as the pictures they were attending (Koivisto & Revonsuo, 2007). Note that because the targets and non-targets in the primary task were pictures whereas the unexpected object was a word, this pattern cannot be attributed to visual similarity.

The finding that inattentional blindness can be influenced by the way people prioritize certain categories over others has implications for safety in the real world. For example, when driving down a highway, people might be on the lookout for other cars but less vigilant for motorcycles. Although cars and motorcycles differ in their visual features, it is possible that attentional prioritization of the category *car* might contribute to collisions with obstacles falling into other categories. Given findings that category-based attentional sets modulate inattentional blindness for briefly presented, static stimuli, it is important to determine whether such modulation generalizes to the noticing of dynamic stimuli that are otherwise visible for prolonged durations. The current experiments assessed whether attentional tuning on the basis of category membership can modulate rates of sustained inattentional blindness for dynamic stimuli.

Experiment 1

The design and procedure were similar to previous computerized sustained inattentional blindness experiments (e.g., Most et al., 2001; Most et al., 2005). However, instead of distinguishing targets from distractors based on simple features, participants distinguished between them based on categorical membership: numbers versus letters. When the unexpected object appeared, it was either a capital letter 'E' or its mirror image: a block-like number '3'.

Method

Participants

Ninety-two participants gave informed consent and were tested in a standalone experiment. Data from 13 were eliminated from analyses due to: prior knowledge of similar experiments (3), failure to report awareness on the final trial (8), improper following of instructions (1), or ambiguity of their self-report (1). The remaining 79 participants (46 male, 33 female; mean age = 19.4 years) were distributed across four experimental conditions.

Materials and procedure

Stimuli were presented on a Macintosh G3 PowerBook with a 14.1-in. display, using custom software written with the VisionShell C libraries (Comtois, 2002). Participants sat at a comfortable distance from the display and head position was not fixed. Stimuli appeared against a gray 13.2 × 17.3 cm display window (RGB values = 186, 186, 186) with a small blue central fixation point. Within this window, four letters (A, H, L, and U) and four numbers (2, 4, 7, and 9) moved independently on random paths at

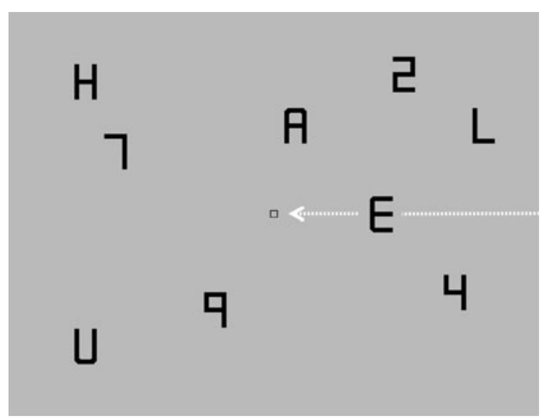


Fig. 1 A schematic representation of the dynamic display, which contained four numbers and four letters that moved about randomly. All figures were created by removing segments from the same block-like figure-8. In a 2 × 2 between-subjects manipulation, participants counted the times that either the numbers or the letters "bounced" off the display edges and either a capital letter 'E' or its mirror image, a block-like number '3', unexpectedly traveled through the display on the critical, divided-attention, and full-attention trials (trials 3, 4, and 5, respectively), on a linear path from right to left

variable rates (see Fig. 1). All items were black (RGB values = 0, 0, 0) and were created by removing segments from a block-like figure-8 measuring 1.4 cm high by 0.8 cm wide. As they moved, they occasionally "bounced" off the display's edges. Depending on the condition to which they were assigned, participants silently counted the total number of bounces made by either the numbers or the letters during each of five 18-s trials.

The first two trials contained no unexpected event. Five seconds into the third, *critical* trial, an unexpected object—either an 'E' or a '3'—entered the display from the right, moved horizontally across the center of the screen, passed behind the fixation point, and exited the left side of the display, remaining visible for a little over 7 s. Because participants were not forewarned about this event, its occurrence was unanticipated. Importantly, the 'E' and the '3' were visually identical, except that they were mirror images of each other. In sum, the experiment was a 2 (targets: numbers vs. letters) $\times$ 2 (unexpected object: E vs. 3) between-subjects design.

After the critical trial, participants responded to a two-item questionnaire. The first question read: "On the last trial, did you see anything other than the four numbers and four letters (anything that had not been present on the very first two trials)?" The second question read: "If you did see something on the last trial that had not been present during the very first two trials, please describe it in as much detail as possible." Regardless of their answers, participants also made a forced choice decision about what had or might have been present on that trial. Their choices included the figures 0, 3, 8, E, and C, all created by removing segments from a block-like figure-8. Participants then completed a fourth trial where the same unexpected object again appeared. Although they were not explicitly told to look for the additional item, the probes after the previous trial had alerted them to the possibility that it might appear. Therefore, this trial tested perception under *divided-attention*. Participants then responded to the same questionnaire as before.

On the fifth trial, participants were instructed not to count bounces. Thus, they could devote full attention to the formerly unexpected object. After this *full-attention* trial, they responded to the same questionnaire as before. This trial served as a control to ensure that they could understand and follow task instructions (see also Mack & Rock, 1998). Accordingly, participants who failed to see the unexpected object on this trial were excluded from the analyses and replaced.

Data analyses

The primary measure was whether or not participants could report the unexpected object on the critical trial. Participants were coded as *noticers* if they responded "yes" when asked whether they had noticed anything other than the original targets and distractors (question 1) and if they were able to report at least one accurate detail, such as its shape, color, direction of motion, or that something had exited the display (question 2). Most participants who responded affirmatively reported at least one accurate detail. Failure to meet these criteria resulted in participants being classified as *non-noticers*.[1] Reported noticing rates are rounded to the nearest whole percentage point.

A secondary measure of interest was the accuracy with which participants counted target bounces. These are reported in terms of percent error rates: for each participant, the difference between the reported number of bounces and the actual number was divided by the actual number of bounces, and the absolute value of this quotient was converted to the nearest whole percentage point. The higher this number, the less accurate the counting performance.

Results

The results of "Experiment 1" demonstrated that category-based attentional sets modulate sustained inattentional blindness. When the unexpected object belonged to the attended category, 66% of the participants noticed it on the critical trial. However, when it belonged to the unattended category, only 39% noticed it, $\chi^2(1) = 5.51$, $p = 0.019$. This pattern held up during the divided-attention trial as well, even after participants had been clued into the possibility of an unexpected object appearing. When the unexpected object matched the attended category, 83% noticed it on the divided-attention trial, but when it matched the unattended category, 58% noticed, $\chi^2(1) = 5.99$, $p = 0.014$.

The attentional set effect was stronger when the unexpected object was an 'E' than when it was a '3' (see Fig. 2), possibly because a block-letter character is more readily identifiable when it is an 'E' than when it is a '3'. Consistent with this interpretation, some noticers described the unexpected '3' as a "backwards E". When the unexpected object was an 'E', 71% of those attending to letters noticed it on the critical trial and only 39% of those attending to numbers did, $\chi^2(1) = 4.17$, $p = 0.041$. This pattern continued into the divided-attention trial, where

[1] On the critical trials across conditions, 7 participants responding affirmatively were coded as non-noticers: 2 described one of the original distractors, 3 were not sure or could not remember what they had seen, and 1 reported a stimulus unlike any in the display. Four responding negatively were coded as noticers, having given partial or precise descriptions in response to question 2.

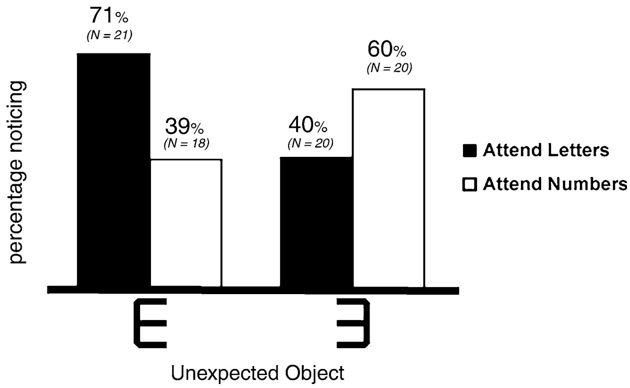


Fig. 2 Percentage of participants who noticed the unexpected object on the critical trial in "Experiment 1". When the unexpected object was an E, more people noticed it when they were attending to letters than when attending to numbers. When the unexpected object was the mirror reverse, a block-like 3, more people noticed it when they were attending to numbers than when attending to letters

81% of those attending to letters noticed the unexpected object and 50% of those attending to numbers noticed it, $\chi^2(1) = 4.18$, $p = 0.041$. When the unexpected object was a '3', the attentional set effect was weaker: 60% of those attending to numbers noticed it on the critical trial and 40% of those attending to letters did, $\chi^2(1) = 1.59$, $p = 0.206$. On the divided-attention trial, 85% of those attending to numbers noticed the unexpected '3' and 65% of those attending to letters did, $\chi^2(1) = 2.13$, $p = 0.144$.

The different rates of inattentional blindness between noticers and non-noticers is not likely attributable to different levels of attention devoted to the primary task: noticers and non-noticers did not differ in counting accuracy in the second, pre-critical trial, suggesting that they were "on task" to similar degrees (mean error rate for non-noticers = 20%, SD = 14%; mean error rate for noticers = 23%, SD = 10%; $t(37) = 0.97$, $p = 0.34$). The number of actual bounces on each trial was random, but across the first 4 trials, the average number of actual bounces was 16.2 (SD = 2.9).[2]

Experiment 2

Although the results from "Experiment 1" are consistent with the notion that attentional set for meaning modulates inattentional blindness (e.g., Koivisto & Revonsuo, 2007), an alternative interpretation is possible. It could instead be that participants were equally likely to notice the unexpected object regardless of condition, with the decreased report of the unexpected object when it belonged to the same category as the distractors attributable to participants' failure to compare the properties of the unexpected object to those of the distractors. This is plausible because, other than its specific identity and trajectory of motion, nothing about the unexpected object was unique while it was present in the display: it was the same size and luminance as the other items. By virtue of the task, participants did know the locations and (perhaps) the identities of the targets, but it is unlikely that they similarly kept track of the positions and identities of the distractors. Thus, participants might simply have failed to register that the unexpected object was unique in the display, despite having noticed it, when it belonged to the distractor category.

Experiment 2 addressed this possibility by adding a unique visual property to the unexpected object. Rather than being black, like the other items in the display, the unexpected object was a unique shade of gray,[3] minimizing its confusability with the distractors. In an additional change from "Experiment 1"—because of the relatively weak attentional set effect when the unexpected object had been a '3' in that experiment—the unexpected object was always a block-letter 'E'. Importantly, the display items were the same for all participants, with the only difference between groups being which subset of items constituted the targets.

Method

Participants

Fifty-eight students gave informed consent and were tested in a standalone experiment. Data from 11 were removed from analyses due to: prior knowledge of similar experiments (6), failure to report awareness on the final trial (1), or experimenter error (4). The remaining 47 participants (17 male, 30 female; mean age = 18.5 years) were distributed across the two experimental conditions.

Materials and procedure

Stimuli were presented on a Macintosh iMac desktop computer against a gray 13- × 17.3-cm display window

[2] Due to experimenter error, this data was only available in conditions where the unexpected object was an 'E'.

[3] Although this change decreased the contrast between the unexpected object and the background, noticing did not decrease overall. Rates of noticing the gray 'E' in both conditions were comparable to rates of noticing the black 'E' in Experiment 1. Such a pattern is consistent with previous findings that the role of "bottom-up" salience in the noticing of an unexpected object is substantially weaker than the role of attentional set (Most et al., 2005). In a previous experiment using a similar task, participants failed to see even a bright red object that was completely unique in the display (Most et al., 2001).

with a small blue central fixation point. The same black letters and numbers as in "Experiment 1", measuring 1.3 cm high by 0.8 cm wide, served as the targets and distractors. The unexpected object was a gray block-letter 'E' (RGB values = 141, 141, 141), and depending on the condition participants counted the bounces made by either the numbers or the letters. After the third, fourth, and fifth trials, participants were given 5-item questionnaires to probe their awareness of the unexpected object (see Appendix). In addition to being longer and more detailed than the questionnaires in "Experiment 1", these questionnaires gave participants the option of indicating that they were "not sure" if they had seen something new. In all other respects, the procedures were identical to those in "Experiment 1".

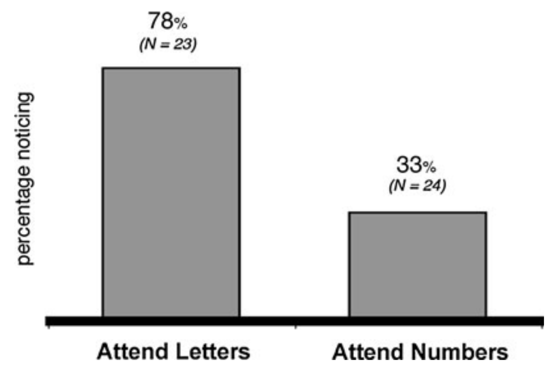


Fig. 3 Percentage of participants who noticed the unexpected gray E on the critical trial in "Experiment 2". Participants who attended to letters were more likely to notice it than participants who attended to numbers

Results

A significant attentional set effect emerged, despite the fact that the unexpected object contained a unique visual feature. In an initial analysis, participants who indicated that they (a) had not seen the unexpected object, (b) were not sure if they had seen it, or (c) had seen it were assigned scores of 0, 1, or 2, respectively. Those attending to numbers were significantly less likely to notice the unexpected 'E' than those attending to letters (mean score attending to numbers = 0.83, SD = 0.94; mean score attending to letters = 1.65, SD = 0.71; $t(44) = 3.36$, $p < 0.002$).[4] This pattern continued into the divided-attention trial as well (mean score attending to numbers = 1.38, SD = 0.92; mean score attending to letters = 1.87, SD = 0.46; $t(45) = 2.31$, $p = 0.026$). Across both conditions, only 5 participants selected the "not sure" option on the critical trial and, of these, almost all answered every open-ended and forced-choice question incorrectly, with one participant only correctly guessing the unexpected object's direction of motion. Thus, all five were coded as non-noticers for subsequent analyses.

With participants dichotomously partitioned into noticers and non-noticers, of those who attended to letters, 78% noticed the gray 'E' on the critical trial. Only 33% of those attending to numbers noticed it, $\chi^2(1) = 9.59$, $p = 0.002$ (see Fig. 3). This pattern continued into the divided-attention trial, where 91% of those attending to letters noticed the unexpected object and 63% of those attending to numbers did, $\chi^2(1) = 5.44$, $p = 0.020$.

Analyses of counting accuracy in the second, pre-critical trial suggested that noticers were not less engaged in the bounce-counting task than the non-noticers (mean error rate for noticers = 13%, SD = 12%; mean error rate for non-noticers = 19%, SD = 15%; $t(42) = 1.47$, $p = .149$). The number of actual bounces on each trial was random, but across the first four trials in both conditions, the average number of actual bounces was 13.8 (SD = 2.3).

Discussion

Contrary to the popular intuition that "seeing" is simply a matter of using one's eyes, people often fail to notice salient objects and events despite looking right at them. Failures to notice unexpected objects in everyday life can have serious consequences. For example, a common cause of traffic accidents is the failure of automobile drivers to notice a motorcycle turning into an intersection (Hurt, Ouellet, & Thom, 1981). Research on inattentional blindness suggests that such perceptual failures could stem from how drivers tune their attentional set. It is often the case the car drivers are vigilant for other cars, but less so for other objects on the roadway. It could be that such vigilance leads drivers to tune their attention for characteristic features of cars (e.g., double headlights, four wheels, etc.) and that it is this feature-based attentional set that contributes to inattentional blindness for motorcycles. Indeed, feature-based attentional set does appear to modulate the likelihood of colliding with obstacles on the road: in one study, participants drove through a virtual reality city and, to know which way to turn at each intersection, searched for the one yellow arrow among blue arrows on a road sign at each corner (or, for half the participants, for the one blue arrow

[4] One participant failed to circle a forced-choice option on the critical trial and was not included in this test. However, she answered all other questions incorrectly and was included as a non-noticer on subsequent tests.

among yellow arrows). At a critical intersection, a motorcycle that was itself either yellow or blue veered and stopped in front of the driver's car. When the color of the motorcycle was the same as the arrows that participants were ignoring, five times as many people collided with it than when it matched the arrow color they were searching for (Most & Astur, 2007).

Although feature-based attentional set powerfully influences conscious perception, a potentially simultaneous factor shaping visual awareness might be the way that people prioritize certain categories over others. In the example of drivers who fail to see motorcycles, it could be that they tune their attention not only for the *features* of cars, but also for the *category* "car", resulting in a failure to register unexpected objects that belong to non-car categories. The results from the current experiments support the notion that it is possible to tune attention on the basis of abstract categorical membership in ways that affect visual perception. A previous study found that category-based attentional set can modulate relatively brief periods of inattentional blindness for static stimuli (Koivisto & Revonsuo, 2007). The current experiments suggest that the influence of such high-level attentional set is strong enough to modulate noticing of dynamic unexpected objects that are visible for prolonged periods and move on trajectories unique within a visual scene.

The role of category-based attentional set in perception is consistent with suggestions that unexpected objects can undergo relatively advanced analysis prior to selection for awareness (Mack & Rock, 1998). It is tempting to draw conclusions from this regarding the classic dichotomy between early-selection and late-selection theories of attention (e.g., Broadbent, 1957; Deutsch & Deutsch, 1963). After all, a high level of analysis prior to awareness would seem to support the latter framework. However, the relationship between attention and perception is nuanced: because attentional selection likely manifests itself differently at different stages of visual processing (see Luck & Vecera, 2002), attempts to define attention broadly as reflecting either late or early selection may be quixotic. It may be that—despite the current evidence that selection for awareness is modulated by attentional set for semantic category—attentional selection of the unexpected object at earlier information processing stages is less affected by semantic category. And indeed, it remains an open question whether category-based attentional set can similarly modulate other, implicit indices of attentional capture as well (e.g., Folk et al. 1992). Adding complexity to the relationship between attention and perception, it has recently been hypothesized that there are different sub-types of inattentional blindness (e.g., *central* vs. *spatial* inattentional blindness), which are differentiated by the type of attention that is preoccupied when failures to notice occur (Most, 2010). Thus, the role of category-based attentional set in conscious perception could differ depending on whether circumstances implicate "central" or "spatial" attention mechanisms.

Although the current results may not necessarily support a late-selection theory of attention in general, they do suggest that selection of unexpected stimuli for subjective awareness can, in some situations, occur late in the stream of visual processing. The contents of our awareness—and the impact of our actions—hinge upon the manner in which we sift through otherwise overwhelming environmental input. It is an important and perhaps novel characteristic of human perception that what we notice depends not only on the visual features we sort by, but also on how we sort the meanings of what comes our way.

Acknowledgments This research was supported in part by NIH Grant # 1 F32 MH066572-O1A1 to the author. Thanks to Brian Scholl for his programming expertise, as well as to Erin Carey, Adam Grant, Katie Rattray, Debby Rin, Jason Tajima, and David Widders for help in collecting data.

Appendix

The 5-item questionnaire administered after the critical, divided-attention, and full-attention trials in Experiment 2 to probe awareness of the unexpected object. Questions were answered in sequence, and each numbered question appeared on a different page so participants could not view questions before answering previous ones.

1. On the last trial, did you see anything that had not appeared during the original two trials? For example, anything other than the four black numbers and the four black letters? (circle one)

   Yes **Not Sure** **No**

2. If you did see something during the last trial that had not been present during the original two trials, please describe it in as much detail as possible.

3a. If you did see something during the last trial that had not been present during the original two trials, what color was it?

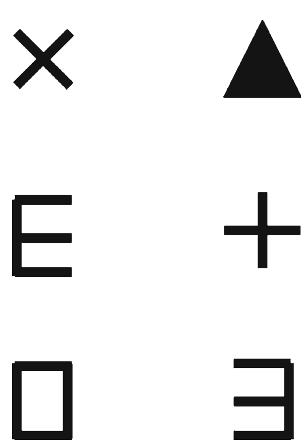
3b. If you did **not** see something during the last trial that not been present during the original two trials, please guess what color it might have been.

4. If you did see something during the last trial that had not been present during the original two trials, please draw an arrow on the "screen" below showing the direction in which it was moving. **If you did not see something**, please guess and indicate that you are guessing (by circling one option below).

   Saw **Guessing**

5. If you did see something during the last trial that had not been present during the original two trials, please circle the shape of the object below. **If you did not see something,** please guess and indicate that you are guessing (by circling either "saw" or "guessing").

   Saw **Guessing**



References

Becklen, R., & Cervone, D. (1983). Selective looking and the noticing of unexpected events. *Memory and Cognition, 11*(6), 601–608.

Brand, J. (1971). Classification without identification in visual search. *Quarterly Journal of Experimental Psychology, 23*, 178–186.

Broadbent, D. E. (1957). A mechanical model for human attention and immediate memory. *Psychological Review, 64*(3), 205–215.

Cartwright-Finch, U., & Lavie, N. (2007). The role of perceptual load in inattentional blindness. *Cognition, 102*, 321–340.

Comtois, R. (2002). VisionShell PPC. [Software libraries]. Cambridge, MA: author.

Deutsch, J. A., & Deutsch, D. (1963). Attention: Some theoretical considerations. *Psychological Review, 70*, 80–90.

Folk, C. L., Remington, R. W., & Johnston, J. C. (1992). Involuntary covert orienting is contingent on attentional control settings. *Journal of Experimental Psychology: Human Perception and Performance, 18*(4), 1030–1044.

Hurt, H. H., Ouellet, J. V., & Thom, D. R. (1981). *Motorcycle accident cause factors and identification of countermeasures. (DOT HS 805 862)*. Washington, DC: National Highway Traffic Safety Administration.

Koivisto, M., & Revonsuo, A. (2007). How meaning shapes seeing. *Psychological Science, 18*, 845–849.

Luck, S. J., & Vecera, S. P. (2002). Attention. In H. Pashler & S. Yantis (Eds.), *Stevens' Handbook of Experimental Psychology: Volume 1. Sensation & Perception* (3rd ed. ed.). New York: Wiley.

Mack, A., & Rock, I. (1998). *Inattentional blindness*. Cambridge, MA: MIT Press.

Most, S. B. (2010). What's "inattentional" about inattentional blindness? *Consciousness and Cognition, 19*, 1102–1104.

Most, S. B., & Astur, R. S. (2007). Feature-based attentional set as a cause of traffic accidents. *Visual Cognition, 15*, 125–132.

Most, S. B., Clifford, E. R., Scholl, B. J., & Simons, D. J. (2005). What you see is what you set: Sustained inattentional blindness and the capture of awareness. *Psychological Review, 112*, 217–242.

Most, S.B., Simons, D.J., Scholl, B.J., & Chabris, C.F. (2000). Sustained inattentional blindness: The role of location in the detection of unexpected dynamic events. *Psyche*, *6*(14), http://psyche.cs.monash.edu.au/v6/psyche-6-14-most.html.

Most, S. B., Simons, D. J., Scholl, B. J., Jimenez, R., Clifford, E., & Chabris, C. F. (2001). How not to be seen: The contribution of similarity and selective ignoring to sustained inattentional blindness. *Psychological Science, 12*(1), 9–17.

Neisser, U. (1979). The control of information pickup in selective looking. In A. D. Pick (Ed.), *Perception and its development: A tribute to Eleanor J. Gibson* (pp. 201–219). Hillsdale, NJ: Lawrence Erlbaum.

Potter, M. C. (1975). Meaning in visual search. *Science, 187*, 965–966.

Simons, D. J. (2000). Attentional capture and inattentional blindness. *Trends in Cognitive Sciences, 4*(4), 147–155.

Simons, D. J., & Chabris, C. F. (1999). Gorillas in our midst: Sustained inattentional blindness for dynamic events. *Perception, 28*, 1059–1074.