

SHORT AND SWEET

Monkeying around with the gorillas in our midst: familiarity with an inattentional-blindness task does not improve the detection of unexpected events

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Abstract. When people know to look for an unexpected event (eg, a gorilla in a basketball game), they tend to notice that event. But does knowledge that an unexpected event might occur improve the detection of other unexpected events in a similar scene? Subjects watched a new video in which, in addition to the gorilla, two other unexpected events occurred: a curtain changed color, and one player left the scene. Subjects who knew about videos like this one consistently spotted the gorilla in the new video, but they were slightly less likely to notice the other events. Foreknowledge that unexpected events might occur does not enhance the ability to detect other such events.

When people perform a selective looking task by devoting attention to some aspects of a display while ignoring others, they often fail to notice unexpected information in the display. This phenomenon—first studied empirically in the 1970s by Ulric Neisser and his colleagues (Neisser and Becklen 1975; Neisser 1979)—has seen a resurgence of interest under the new moniker ‘inattentional blindness’ (Mack and Rock 1998; Simons and Chabris 1999). In one of Neisser’s better-known examples, subjects viewed a video and counted the number of times one group of players passed a ball while ignoring another group of players who also passed a ball. While performing this attention-demanding task, many observers failed to notice when a woman carrying an open umbrella unexpectedly walked through the scene (described in Neisser 1979).

In Neisser’s videos the players and the unexpected event all occupied the same physical space (to test whether attention focuses on objects or regions of space). A consequence of overlaying each of the videos is that all of the actors in the scene had a partially transparent, ghostly appearance. As such, they were not as visible as they would have been had the entire event been filmed with a single camera. Christopher Chabris and I replicated the original experiments using partially transparent players, but we also filmed choreographed sequences of all the actors in a single shot (Simons and Chabris 1999). In addition to the woman with an umbrella, we filmed a version with a woman in a gorilla suit. Our intuition was that these fully visible unexpected events would be noticed, but Neisser’s perceptual cycle model of attention (Neisser 1976; Most et al 2005) predicted that they might not. Our studies not only replicated Neisser’s original results with partially transparent events but also showed that people regularly miss fully visible unexpected events. In the most dramatic example, the ‘gorilla’ stopped in the middle of the action, turned to face the camera, thumped its chest, and exited after a total of 9 s on screen. Only 50% of observers noticed.

In part due to the counterintuitive nature of this finding—90% of people predict that they would notice the gorilla (Levin and Angelone 2008; see also Chabris and Simons 2010)—the ‘gorilla’ video has become a fairly well-known demonstration of the limits of visual awareness. Its notoriety presented an opportunity—the unexpected gorilla is, for many people, no longer unexpected; in the poetic but opaque phrasing of former US Secretary of Defense Donald Rumsfeld, it is a ‘known unknown’. When people know to expect an ‘unexpected’

event, will they be immune to inattention blindness in videos such as this one? Translated into Rumsfeld-ese, would the presence of an *expected* unexpected object alert them to the possibility of *unexpected* unexpected objects?

With the assistance of undergraduates in a seminar on visual awareness, I filmed a new version of the gorilla video, this time in front of a green-screen that allowed me to digitally replace the background with a red stage curtain and the floor with a wooden stage floor (figure 1a). As in the original video, three people wore white shirts and three wore black shirts, and each team passed a ball among the members of their group. Due to the arrangement of the space where we did the filming, the players moved more slowly than in the original, so the video was played to subjects at 120% of its filmed speed. The video as presented to subjects lasted 30 s. Sixteen seconds into the video, a man wearing a gorilla suit entered stage right (figure 1b), walked to the center of the scene, turned to face the camera (figure 1c), thumped his chest, and exited stage left (figure 1d), remaining on screen for 6 s. Just after the gorilla entered the scene, the curtain backdrop gradually faded from red to gold over a period of approximately 6 s, and one of the black shirted players casually backed off the right side of the screen and remained off camera for the remainder of the video (figures 1b–e).

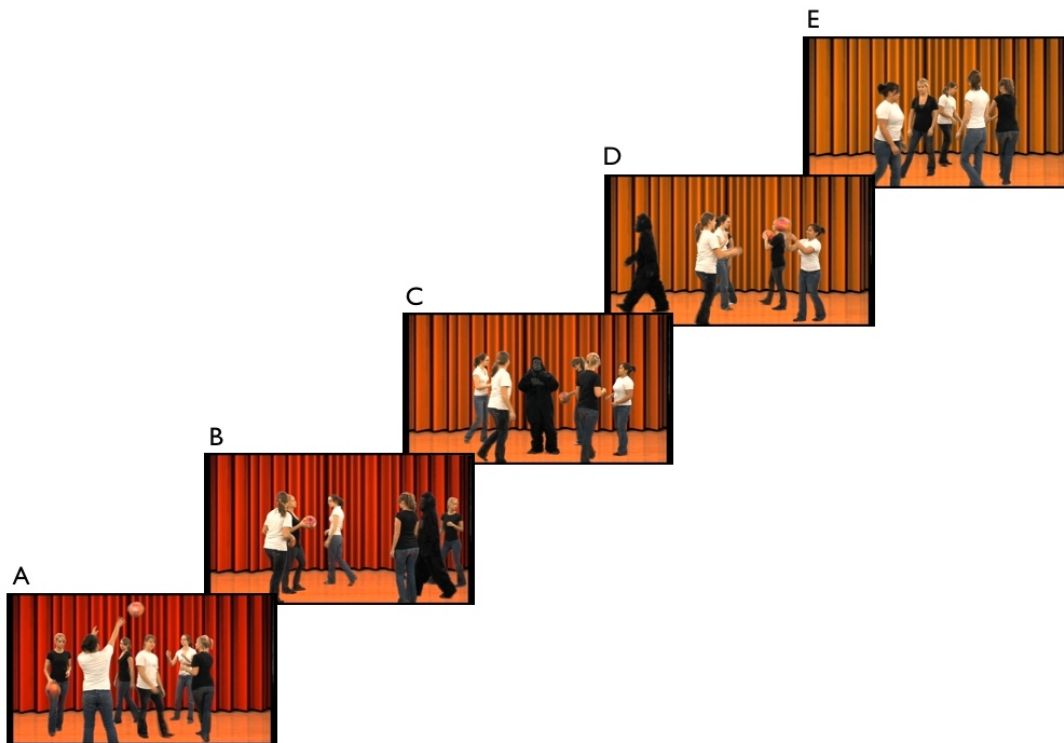


Figure 1. Five frames from the video depicting the gorilla event, the curtain change, and the change in the number of players wearing black. The video itself can be viewed at http://www.youtube.com/watch?v=IGQmdoK_ZfY. Frame A shows the scene before the appearance of the gorilla. Frame B shows the gorilla entering the scene and one of the players in black backing out of the scene, both on the right side of the image. Frame C shows the gorilla in the center of the scene thumping its chest. Frame D shows the gorilla exiting the scene on the left. Frame E shows the final appearance of the curtain and black team after the gorilla left the scene.

We tested a total of 76 subjects in the entryway to the student union building at the University of Illinois by playing a version of the video from a DVD on one of two laptops (one with a 13-inch display and one with a 12-inch display). Subjects were instructed to count the number of times the players wearing white shirts passed the ball, and after completing

the task, they were handed a packet with the following questions, each on a separate page (yes/no responses were made by checking a box):

- (1) How many passes did you count?
- (2) Did you notice anything unexpected happen during the video? If you answered 'yes', please describe what you noticed.
- (3) Have you heard about or seen a video like this one before? If you answered 'yes', please describe what happened in that video.
- (4) In the video you just watched, did you notice any of the following: a person in a gorilla suit, a person in a pirate suit, a person in a rabbit suit, a change to the curtain backdrop, a change in the number of players, a change in the number of balls, a change in the color of a ball.

Only 3 subjects in the entire sample spontaneously described a change to the curtain or the number of players in response to question 2. However, more subjects checked 'yes' for those items in response to question 4. In order to use the most liberal measure of detection, I coded detection from responses to item 4. Of the 76 subjects, 26 had previously heard about or seen the gorilla video or variants of it (the familiar group) and 50 had not (the unfamiliar group). For analysis, data from 12 subjects were excluded due to inaccurate counting (off by more than 2 passes from the total of 16) or falsely reporting having seen an unexpected event that had not occurred (a false alarm), or both. The resulting data set included 23 subjects in the familiar group and 41 in the unfamiliar group.

For those in the unfamiliar group, 56% noticed the gorilla (23 out of 41), a rate roughly comparable to that found with the original video. In contrast, 100% of subjects in the Familiar group spotted the gorilla. Across both groups, 11% of subjects noticed the curtain change, and 16% noticed the change to the number of players on the black team. Only 1 participant noticed both the curtain and the player change.

Although subjects who knew to look for a gorilla were much more likely to spot the gorilla, they were no more likely to notice the other unexpected events. In fact, they might even be less likely to notice (see [table 1](#)); only 17% of the subjects (4 out of 23) in the familiar group noticed either the curtain or the player, whereas 29% (12 of 41) in the unfamiliar group noticed one of the other events.

Table 1. Percentage of subjects noticing as a function of familiarity with the original gorilla/basketball video.

Unexpected event	Familiar (<i>n</i> = 23)	Unfamiliar (<i>n</i> = 41)	Familiar that noticed Gorilla (<i>n</i> = 23)	Unfamiliar that noticed Gorilla (<i>n</i> = 23)
Gorilla	100	56	100	100
Curtain	4	15	4	17
Player	17	15	17	17
Curtain or player	17	29	17	35
Curtain and player	4	0	4	0

Looking just at the 23 subjects in each group who noticed the gorilla, twice as many subjects in the unfamiliar group noticed one of the other events (unfamiliar 35%, familiar 17%). Although these differences in detection of other unexpected events were not statistically significant, the trends suggest that knowledge that an unexpected event might occur does not increase the likelihood that people will notice other unexpected events. If anything, familiarity with the task and the presence of a 'gorilla' actually decreases the likelihood of noticing other events in the same scene.

This trend is consistent with the phenomenon of ‘satisfaction of search’—people are less likely to search for additional targets once they have found their original target (Fleck et al 2010)—but extends it to the previously untested domain of inattention blindness and the detection of unexpected objects. In sum, looking for an *expected* unexpected event has an unexpected effect on the detection of other unexpected events.

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