

Short Communication

# Metacognition and change detection: Do lab and life really converge?

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## Abstract

Studies of change blindness indicate that more intentional monitoring of changes is necessary to successfully detect changes as scene complexity increases. However, there have been conflicting reports as to whether people are aware of this relation between intention and successful change detection as scene complexity increases. Here we continue our dialogue with [Beck, M. R., Levin, D. T., & Angelone, B. (2007a). Change blindness blindness: Beliefs about the roles of intention and scene complexity in change detection. *Consciousness and Cognition*, 16, 31–51; Beck, M. R., Levin, D. T., & Angelone, B. (2007b). Metacognitive errors in change detection: Lab and life converge. *Consciousness and Cognition*, 16, 58–62] by reporting two experiments that show participants do in fact intuit that more intentional monitoring is needed to detect changes as scene complexity increases. We also discuss how this dialogue illustrates the need for psychological studies to be grounded in measurements taken from real world situations rather than laboratory experiments or questionnaires. © 2007 Elsevier Inc. All rights reserved.

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Recall the last time you were driving a car and approached a busy intersection while engaged in a deep conversation with a passenger. What did you do, if anything, to make sure that you safely navigated the busy intersection? Chances are you interrupted your conversation and focused more of your attention on the traffic in the intersection. What this common real-world example illustrates is that we are sensitive to the fact that as the complexity of the environment increases in real world situations more intentional monitoring is required to detect changes.

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Using a laboratory change blindness paradigm, Beck, Levin, and Angelone (2007a) recently found that, contrary to these intuitions, “participants do not have a *readily accessible* understanding about the role of intention in change detection.” Specifically, they found that within their “change blindness paradigm”, participants did not recognize that intentional monitoring becomes critical as scenes become more complex. What struck us, however, was that the failure of peoples’ intuitions in Beck et al.’s study seemed to be inconsistent with our experiences in the real world. Indeed, in the context of our driving example, it seems that people do understand that more intentional monitoring is needed to detect changes as scene complexity increases.

To illustrate that people can in fact intuit that more intentional monitoring is needed as scene complexity is increased, we presented a group of undergraduate and graduate students with either a driving or a purse theft scenario (Smilek, Eastwood, Reynolds, & Kingstone, 2007). Participants were required to rate how important intentional monitoring would be to successfully detect changes across situations that differed in scene complexity (high or low). The results showed that participants rated intentional monitoring to be more important in more complex situations. We suggested that these findings: (1) provide compelling evidence that people do, in fact, have insight into the impact of intention and scene complexity in change detection and (2) that asking people about real world events reveals this knowledge that seems to be absent in more artificial laboratory tasks (e.g., Beck et al., 2007a).

In their reply, Beck, Levin, and Angelone (2007b) suggested that participants in our study were able to intuit the interaction between scene complexity and intention because our questionnaire “made knowledge about the importance of intention and scene complexity readily available”. According to Beck et al., the questionnaire did this in two ways: (1) by including a brief *preamble* which explained that people sometimes monitor the environment with more or less intention and (2) by presenting scenarios with both high and low complexity on the same questionnaire and asking participants to make a *relative* judgment about the importance of intention.

To show that participants fail to intuit the relationship between intention and scene complexity when the questionnaire does not make this relationship readily accessible, Beck et al. (2007b) modified our questionnaire in three ways. First, they removed the preamble. Second, they included only one level of complexity in a given questionnaire so that participants made *absolute* judgments. And third, they removed the bold emphasis on the words communicating the relative nature of our manipulation of complexity (e.g., the words “more” or “less”). When these modifications were applied Beck et al. found that the difference in peoples’ judgments about the importance of intention across situations of low and high complexity did not reach statistical significance. Based on this null effect, they concluded that when people are not sensitized to the relationship between intention and scene complexity, they do not readily access that information irrespective of whether they are reflecting on real world or artificial laboratory situations.

It is worth noting however, that though the Beck et al. (2007b) effect did not reach statistical significance, as originally reported by Smilek et al. (2007) the participants’ mean ratings of the importance of intentional monitoring did increase with increases in complexity for both the traffic and theft scenarios. This raises the possibility that Beck et al.’s null effect could be a Type II error resulting from low power. The plausibility of a Type II error is reinforced by the observation that Beck et al. included only 12 participants per group and, in addition, they used a less powerful between-participant design than the within-participant design used by Smilek et al. Finally, the effect size may have been further reduced because participants were asked to make an absolute judgment of importance on a scale of 1–7. What this means is that for different participants the same numbers may represent very different levels of perceived importance, and conversely, different numbers may represent the same level of perceived importance. Naturally, this increase in inter-subject variability is magnified by an already weak between-subject design. Because Beck et al. (2007b) made a number of changes to our initial questionnaire, it is unclear which (if any) of these factors, or combination of factors, may have reduced the size of the effects.

To clarify matters, we asked a larger group of undergraduate students (288 undergraduate students at the University of British Columbia) to complete a questionnaire either about a driving or a theft scenario. We used this large sample to evaluate: (1) whether Beck et al.’s (2007b) null effects were due to low power, (2) whether peoples’ judgments would change depending on whether the scale was relative or absolute, and (3) whether peoples’ judgments would depend on giving bold emphasis to the manipulation of complexity.

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