Review – round 1

Title: *Camera-monitor systems as an opportunity to compensate perceptual errors in time-to-contact estimation*
Journal: Vision

The study by Wögerbauer, Hecht and Wessels tested if two visual biases: 1) overestimating TTC for accelerating objects while underestimating it for decelerating objects and 2) overestimating TTC for small objects while underestimating it for large objects (size-arrival effect) can cancel each other, and if this cancellation can be exploited in a camera-monitor system mounted in a car to increase driving safety. This is an interesting idea, albeit difficult to study, because of the large number of mutually dependent variables involved. The study provides a proof-of-concept for it and has the potential to inform further research. The article is well-written overall, but there are still places where additional clarifications are needed. I list them below. While I would be happy to review the revised manuscript, I think the Editor will be able to adequately judge if my comments have been addressed and accept the paper without sending it to me again.

Comments line by line:

8 (Abstract) A brief explanation of what time-to-contact is would help grasp the study's subject quickly.

25 Please explain what a camera-monitor system (CMS) is. Please explain what a camera-monitor system (CMS) is. Although it can be inferred from the context, the lack of explicit explanation might confuse a reader.

53-63 An example of a driving situation provided in these lines is instructive but hard to follow. Consider describing two possible scenarios (*…and either slows down to yield, or accelerates to quickly move out of the way*) and their consequences one after the other.

66-69: *The size-arrival effect* ***consists in a misattribution of retinal size to approach or distance****: Large objects are estimated to arrive earlier than small objects that approach in the same environment and at the same speed.* The part in bold is unclear; please rephrase.

94 Please clarify from the start that the task was presented on a computer screen.

96 The term *ego vehicle* is unclear, and using it does not seem to serve any particular purpose (*subject's vehicle* should be sufficient). You might consider removing it. If this term is common in the literature on driving, then please state that.

107-108 *For constant-speed approaches, the car size was original, increased or decreased.* This sentence is unclear. More generally, it was not entirely clear to me (until the discussion) if the animations presented to the observers took into account the 'natural', gradual change in the perceived size of the approaching car, resulting from shortening the distance between it and the subject (if not, this should be listed among caveats and discussed thoroughly). Please make this clear (also: were all the size manipulations added 'on top' of these changes?).

134 A brief clarification of what Wizard 7 is would be helpful (or/and a reference).

137 *They adjusted the settings of their respective monitors to mimic a typical monitor size of a CMS.* Please provide more details here.

139 Please provide the display area size in degrees of visual angle.

143-145 I advise highlighting that at least some of these variables depend on each other.

156 *3.2 Design* Please see comment on lines 107-108.

203-204 The term *first-order TTC estimate* is not explained prior to being used; it is explained only in lines 245-245. Moreover, its meaning seems to change from paragraph to paragraph – see comment on lines 466-468.

210 Please report what software was used to run the statistical analyses.

210 Before reporting the results of each of the two ANOVAs, consider writing exactly what variables were included in them.

F**igure 4** X axis includes TTCs of 4,5 and 6 seconds which were not used in the experiment; consider removing them.

224 The phrase *3-size condition* etc. is unclear; consider replacing it with *3-times-size condition* or *300% size condition*.

232-233 (and in many other places in the text) *In Experiment 1, the visual angle of the car was not only influenced by the size variation but also by the distance of the car.* What is a *visual angle* here (or *optical angle* in lines 339-343)? Size of the car measured in the degrees of the visual angle? Please clarify/rephrase (here and in other places).

233-234 Was the initial distance between the cars constant? It would be advisable to remind this here (and provide this information around lines 157-175; it is difficult to find).

303 *occlusion velocity* -> velocity at occlusion?

Table 4 The empty cell under *-2.0 m/s²* seems unnecessary; consider removing it.

336-337 *Beyond the replication of the size-enhancement effects found in Experiment 1, Experiment 2 also considered negative acceleration.* ***In the case of such deceleration****, we…* The bit in bold sounds odd; consider rephrasing it.

348 and below The text is hard to follow. Reminding the reader what the *first-order pattern* is might help.

Figure 5 The legend is incomplete – line types and some colours are not explained. Also, consider writing about *ground truth* instead of an *ideal observer* because *ground truth* might be easier to understand and is less loaded with meaning in other research fields (e.g., psychophysics).

Figure 6 Consider adding the add actual TTCs to the plot or presenting them in a separate panel, like in Figure 5 (but then make it clear that the same information is presented twice).

408-9 *Each* ***column*** *indicates an occlusion velocity*. –> row?

466-468 *In short, observers seem to neglect the acceleration and judge the TTC as if the object would travel at constant speed after it is occluded. We interpret this as a first-order estimation strategy.* It is unclear what the *first-order estimation strategy* is – around line 224, it is defined as an *overestimation of contact time increases with actual TTC.* Please clarify.

489-490 *They differ according to whether not one assumes the underlying processes to be, in principle, capable of accurate acceleration perception.* This sentence does not seem to be correct; please rephrase it.

494 *temporal change in tau* This statement is unclear. I suggest either explaining what *tau* is and how it relates to the tau-theory mentioned in line 46 or removing this statement.

537-538 *We did control for this by manipulating the size not only in accelerated but also in constantvelocity approaches.* So, the experiment accounted for the changes in size resulting from the decreasing distance between the two cars, right? This information should be easier to find (see one of the previous comments) – maybe it can be provided in the caption for Figure 3.

563-566 *An explicit motion stimulus can inform about acceleration and alter TTC-estimates in the desired direction, however, unlike the intuitive size manipulation used in the current experiments, is presumably unintuitive.* What is an *explicit motion stimulus*? Is there any reference to support the statement made here? If the Authors refer to reference [26], this paragraph needs to be rephrased to clarify it.

568-571 *However, in the design of CMS, size enhancement can capitalize on intuitive perceptual processes that* ***do not require cognitive penetration and thus keeps the cognitive load low in a primitive fashion****, which is desirable for smooth interactions with the CMS.* The text in bold makes strong statements without supporting them with references and refers to complex issues (cognitive penetrability of perception) but treats them superficially. I suggest removing it.