

## PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

### ARTICLE DETAILS

<b>TITLE (PROVISIONAL)</b>	A protocol for developing a mental imagery intervention: A randomised controlled trial testing a novel implementation imagery e-health intervention to change driver behaviour during floods
<b>AUTHORS</b>	Hamilton, Kyra; Keech, Jacob; Peden, Amy; Hagger, Martin

### VERSION 1 – REVIEW

<b>REVIEWER</b>	Tracy Epton Manchester Centre for Health Psychology, University of Manchester, UK
<b>REVIEW RETURNED</b>	16-Aug-2018

<b>GENERAL COMMENTS</b>	<p>The protocol describes the proposed formative research and an RCT to evaluate the effect of an implementation imagery ehealth intervention designed to change driver cognitions and behaviour regarding driving into flood water.</p> <p>I thought this was a well designed study and just have a few points that would improve the clarity of the manuscript:</p> <ul style="list-style-type: none"><li>• P3 line 16 there is a type – an extra “a”</li><li>• The term planning is not used consistently throughout - planning is mentioned in the intro but goals are mentioned in the method</li><li>• I’m not sure what an implementation imagery intervention would be like (until I read the supplementary material) – could you give a brief example in the intro. This could also make it clearer of what the implementation adds to mental imagery used alone</li><li>• It’s not clear if the control education you refer to is the mass media video infographic that was developed from earlier research. If this is not the case what is the rationale for using something new?</li><li>• It seemed from the abstract that the pilot work on developing the intervention was at the proposal stage but from the method it seems that the work has already been conducted therefore I think this should be made clearer that the protocol is for the RCT and the formative research has already been conducted</li><li>• On p12 the past tense is used to describe fidelity</li></ul> <p>The limitations of not measuring intentions and not behaviour should be added to the discussion</p>
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<b>REVIEWER</b>	Frank Wieber ZHAW Zurich University of Applied Science, Institute for Health Sciences, 8401 Winterthur, Switzerland; University of Konstanz, Department of Psychology 78457 Konstanz, Germany
<b>REVIEW RETURNED</b>	21-Sep-2018

<b>GENERAL COMMENTS</b>	Thanks for the opportunity to read about this carefully crafted study program. I really like the protocol and the idea of implementation imagination but have some suggestions that might be helpful when
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	<p>writing the background and discussion:</p> <p>It would be nice to gain insights into the processes underlying the gender differences, e.g. directly asking participants whether they have often thought about the intervention content and/or about details of the intervention.</p> <p>Thinking further of the processes, the behavior change technique taxonomy came into my mind as there seem to be other techniques involved than only imagination and planning. For instance, there would be anticipated consequences/outcome imagery, social feedback for avoiding flooded roads, etc. This would help to categorize the "active ingredients".</p> <p>Potentially, prior studies on the combination of mental imagery and implementation intention could be discussed in greater detail in a subsequent research report.</p> <p>Finally, I was wondering about the outcome imagery. I noticed that participants first do the planning (imagining situation and response) and then they imagined the positive and negative consequences. According to the Rubicon model of action phases and other motivation/volition models, the order would be reversed, i.e. first imagining consequences and after a positive evaluation commitment to the goal (motivation), then planning (volition). There is some research, suggesting that the order if-then-why can be problematic (Wieber, Sezer &amp; Gollwitzer, 2014). There is also the literature on the mental contrasting and implementation intention strategies (MCII oder WOOP) that employ the order: wish, outcome, obstacle plan. This order question might be discussed and - potentially - be changed in the intervention condition.</p>
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### VERSION 1 – AUTHOR RESPONSE

Reviewers' Reports:

**Reviewer: 1**

Reviewer Name: Tracy Epton

Institution and Country: Manchester Centre for Health Psychology, University of Manchester, UK

Please state any competing interests or state 'None declared': None declared

REVIEWER'S COMMENT: The protocol describes the proposed formative research and an RCT to evaluate the effect of an implementation imagery ehealth intervention designed to change driver cognitions and behaviour regarding driving into flood water.

I thought this was a well designed study and just have a few points that would improve the clarity of the manuscript:

AUTHORS' RESPONSE: Thank you for taking the time to review and provide feedback on our manuscript. We have aimed to address each of your comments below.

REVIEWER'S COMMENT: P3 line 16 there is a type – an extra "a"

AUTHORS' RESPONSE: Thank you, this typo as now been corrected.

REVIEWER'S COMMENT: The term planning is not used consistently throughout - planning is mentioned in the intro but goals are mentioned in the method

AUTHORS' RESPONSE: Thank you for picking up on this lack of consistency. We believe that this was due to us not having indicated how the goal and plan fit together. Specifically, the goal is to avoid driving into floodwater if it is encountered on their route, and it is advised in the intervention that forming a plan of what to do can help to achieve this goal. The section describing Part 2 of the

intervention has now been clarified as follows “The second video is designed to encourage participants to form a goal to avoid driving into floodwater if they encounter it on their route and to indicate that by forming a plan of what do in this situation, they can achieve their goal and avoid driving into floodwater.” Any further inconsistency in terminology has also been rectified.

REVIEWER'S COMMENT: I'm not sure what an implementation imagery intervention would be like (until I read the supplementary material) – could you give a brief example in the intro. This could also make it clearer of what the implementation adds to mental imagery used alone

AUTHORS' RESPONSE: The distinction between implementation imagery and mental imagery has now been clarified, and an example of an implementation imagery exercise has now been provided in the Introduction of the revised manuscript. Please see page 5 of the revised manuscript.

REVIEWER'S COMMENT: It's not clear if the control education you refer to is the mass media video infographic that was developed from earlier research. If this is not the case what is the rationale for using something new?

AUTHORS' RESPONSE: The infographic we tested in Hamilton, Peden, Keech, and Hagger (2018) used behaviour change methods and is therefore not suitable for a “usual care” type of control condition. In the current study, the control condition comprises standard publicly information regarding the behaviour in order to isolate the effect of the implementation imagery intervention over and above the information commonly disseminated by public safety organisations. We have added the following information in the objectives section to clarify this: “The control condition receives the education-based messages alone, which are drawn from information commonly disseminated by public safety organisations. This represents a “usual care” control condition.” See page 6 of the revised manuscript.

REVIEWER'S COMMENT: It seemed from the abstract that the pilot work on developing the intervention was at the proposal stage but from the method it seems that the work has already been conducted therefore I think this should be made clearer that the protocol is for the RCT and the formative research has already been conducted

AUTHORS' RESPONSE: Reference to the pilot work and phases of development in the abstract has now been removed from the abstract to make it clear that the protocol is for the RCT. Information on the formative work that has already been conducted is still presented in the method section.

REVIEWER'S COMMENT: On p12 the past tense is used to describe fidelity

AUTHORS' RESPONSE: Thank you, this error has now been corrected.

REVIEWER'S COMMENT: The limitations of not measuring intentions and not behaviour should be added to the discussion

AUTHORS' RESPONSE: While this point was touched upon in the discussion section “While the outcomes are an extensive range of psychological variables established to predict driving into floodwater, the unpredictable and infrequent occurrence of flood events means that examining the effect of our intervention on actual behaviour is not feasible within the timeframe of the study”, we have now also included the following text to make this limitation more explicit, “A limitation of the study is therefore that the primary outcome is behavioural intentions rather than behaviour.”

### **Reviewer: 2**

Reviewer Name: Frank Wieber

Institution and Country: ZHAW Zurich University of Applied Science, Institute for Health Sciences, 8401 Winterthur, Switzerland; University of Konstanz, Department of Psychology 78457 Konstanz, Germany

Please state any competing interests or state 'None declared': none declared

REVIEWER'S COMMENT: Thanks for the opportunity to read about this carefully crafted study program. I really like the protocol and the idea of implementation imagination but have some suggestions that might be helpful when writing the background and discussion:

AUTHORS' RESPONSE: Thank you for taking the time to review and provide feedback on our manuscript. We have aimed to address each of your comments below.

REVIEWER'S COMMENT: It would be nice to gain insights into the processes underlying the gender differences, e.g. directly asking participants whether they have often thought about the intervention content and/or about details of the intervention.

AUTHORS' RESPONSE: This is a good point. At the conclusion of the intervention, we will include some open-ended questions to gain a better understanding of the mechanisms of the intervention that may also give us some richer insight into the differences related to gender.

REVIEWER'S COMMENT: Thinking further of the processes, the behavior change technique taxonomy came into my mind as there seem to be other techniques involved than only imagination and planning. For instance, there would be anticipated consequences/outcome imagery, social feedback for avoiding flooded roads, etc. This would help to categorize the "active ingredients".

AUTHORS' RESPONSE: Thank you for your comment, Table 1 outlines the various behaviour change methods that form the active ingredients of this intervention.

REVIEWER'S COMMENT: Potentially, prior studies on the combination of mental imagery and implementation intention could be discussed in greater detail in a subsequent research report.

AUTHORS' RESPONSE: Thank you, this is a great suggestion. We will take it into consideration when writing the subsequent research report.

REVIEWER'S COMMENT: Finally, I was wondering about the outcome imagery.

I noticed that participants first do the planning (imagining situation and response) and then they imagined the positive and negative consequences. According to the Rubicon model of action phases and other motivation/volition models, the order would be reversed, i.e. first imagining consequences and after a positive evaluation commitment to the goal (motivation), then planning (volition). There is some research, suggesting that the order if-then-why can be problematic (Wieber, Sezer & Gollwitzer, 2014). There is also the literature on the mental contrasting and implementation intention strategies (MCII oderWOOP) that employ the order: wish, outcome, obstacle plan. This order question might be discussed and - potentially - be changed in the intervention condition.

AUTHORS' RESPONSE: This is an interesting point. We agree that planning interventions will have little meaning for those who do not have an intention or goal to perform the target behaviour (avoiding driving through floodwater). This is why our intervention procedure provides participants with a persuasive communication in Part 2 to encourage respondents to form a goal intention to avoid driving into floodwater if it is encountered while driving (see Table 1). Part 2 has now been renamed "Formation of a goal intention" to better reflect its purpose. Participants then complete a single-item measure (which has now also been renamed "goal intention" to better reflect its purpose) indicating their willingness to form this goal in order to check that they have formed the goal intention. They then go on to complete the practice mental simulation, and then they imagine the steps they will take to avoid driving through floodwater if it is encountered and form the plan. Therefore, goal intention formation precedes the imagery and planning exercise. The outcome mental simulation that follows is merely designed to highlight the personal relevance of the plan and the script makes reference to the plan that has been made. The initial motivation phase therefore occurs before the volitional phase.

We have also now added the following text to clarify this order "The intervention is structured such that participants receive information, then form a goal intention, and then go on to make a plan. After imagining their plan and noting it down, participants are instructed to imagine the outcomes associated with enacting their plan to highlight personal relevance." See page 10. Further, to make it clear when the willingness to form a goal item is administered, we have added the following text "Following Part 2, participants will complete a single-item measure of goal intention, indicating

their commitment to the goal (See Supplementary Material B for question details).” See page 10 of the revised manuscript.

#### VERSION 2 – REVIEW

<b>REVIEWER</b>	Tracy Epton Manchester Centre for Health Psychology, University of Manchester, UK
<b>REVIEW RETURNED</b>	12-Dec-2018
<b>GENERAL COMMENTS</b>	My concerns have been addressed and this is now suitable for publication.
<b>REVIEWER</b>	Frank Wieber ZHAW Zurich University of Applied Science, Switzerland and University of Konstanz, Germany
<b>REVIEW RETURNED</b>	04-Dec-2018
<b>GENERAL COMMENTS</b>	I would like to thank the authors for the comprehensive revision. The revision rules out all the questions and I am very confident that readers will get an detailed impression of the planned study.