Revisiting influence-awareness in the AMP effect: Experiment 5

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*Pre-registration*

**Author note**

JC, IH, and SH, Department of Experimental Clinical and Health Psychology, Ghent University. This research was conducted with the support of Grant BOF16/MET\_V/002 to Jan De Houwer and Ghent University postdoctoral fellowship 01P05517 to IH. Correspondence concerning this article should be sent to jamie.cummins@UGent.be. The preregistration, materials, and data for the first experiment from this project are available at https://osf.io/p6e3c/. The preregistration, materials, and data for the second experiment from this project are available at https://osf.io/32cu7/. The preregistration, materials, and data for the third experiment from this project are available at https://osf.io/uv3wk/. The preregistration, materials, and data for the third experiment from this project are available at https://osf.io/mqp8v/.

**Background and rationale**

The four experiments thus far completed in this project have demonstrated a clear finding: that effects in the AMP generally are driven by a subset of trials, and a subset of participants, and this subset of participants consists of the same individuals across multiple AMPs. However, we are not the first to recognize that a subset of participants seems to drive effects in the AMP. For example, Bar-Anan and Nosek (2012) noted that “the AMP’s psychometric qualities are highly dependent on only a subset of the participants and that many people are unaffected by the procedure” (p. 1206). Additionally, Mann, Cone, Heggeseth, & Ferguson (2019) suggested that AMP data is typical bimodally-distributed, which is again indicative of a subset of participants driving effects within the AMP. In response to this finding, Mann et al. produced a modified AMP in order to reduce this bimodality. To do this, they added two manipulations to the standard AMP procedure. Firstly, rather than using Chinese characters as target stimuli, they instead used more visually-stimulating paintings. This was done in order to increase the likelihood that participants was be inclined to actually evaluate the target images. Secondly, the authors added a final page of instructions at the beginning of the procedure, which strongly implored participants to avoid intentional responding, as well as providing reassurance that it was acceptable if sometimes their evaluations of the primes and targets were the same (i.e., to prevent for overcorrection of responses). Mann et al. suggested that these modifications reduced bimodality in the distribution of AMP effects (and, by extension, reduced the extent to which only a subset of participants drove effects in their AMP).

Given that Mann et al.’s AMP is purported to reduce subset effects which are present in the standard AMP, the current experiment will seek to investigate the extent to which responses and effects in Mann et al.’s modified AMP are driven by influence-awareness. To do this, we will adapt the design of our second experiment (a standard AMP, followed by an IA-AMP) but will add Mann et al’s manipulations in both of these AMPs.

We will attempt to replicate the four hypotheses from Experiment 2. H1 asserts that, at the trial-level of analysis, the influence of prime stimuli on evaluations of the target stimuli in the IA-AMP will be moderated by whether participants report having been influenced or not. H2 asserts that, at the subject-level of analysis, the rate of influence reported in the IA-AMP will be predictive of the effect size in that IA-AMP. Our third hypothesis, H3, posits that the influence-awareness rate of a participant on the IA-AMP will predict their scores on the previously-completed standard AMP. Finally, our fourth hypothesis, H4, forwards that the AMP effect produced in the subset of uninfluenced trials in the IA-AMP will be smaller than the AMP effect produced in the standard AMP. Should no evidence for differences be found, an equivalence test will be used to assess for practical equality.

**Method**

**Sample**

Data will be collected online via the Prolific Academic website. Based on an expected mean duration of 12 minutes, participants will be paid £1.03.

**Planned sample size & stopping rules.** Power analyses for interactions in mixed-effects models are difficult to determine, therefore no power analysis was conducted for our first analysis. For our second analysis, we used the pwr package in R to compute the number of participants required to detect a medium f2 effect size (i.e., 0.15) in a regression analysis with a single IV, at the conventional alpha level (.05) and at 95% power. Given these criteria, 89 participants would be required. This power analysis is also applicable for our third analysis. Based on our results from Experiment 2, we expected a Cohen’s d effect size of approximately .3 in our within-subjects t-test (i.e., for H4). With 89 participants, we would have 80% power to detect such an effect. In order to increase this power level to 95%, we would require 146 participants. Based on this, and the availability of resources, we aimed to collect data from 150 participants (as in Experiment 2). As also used in the preregistration of Experiment 2, if no significant effect is found in H4, we will set equivalence bounds of Cohen’s dz = +/- .25 in the subsequent equivalence test.

**Inclusion criteria*.*** Age 18-65, fluent English , Prolific rating >= 90%, no participation in similar studies by our research group.

**Exclusion criteria.**Completion time on Prolific < 3 minutes, partial data on the demographics questionnaire or either AMP.

**Design**

Two within-participants factors, each with two levels, are manipulated by the experimental design: the type of AMP completed (standard AMP vs. the IA-AMP), and the valence of the prime stimulus (positive vs negative primes) that precedes the presentation of a target stimulus (Chinese character) within each AMP.

**IVs.**

1. Valence of the prime stimuli used in the AMP (positive vs. negative).
2. The type of AMP (standard vs. influence-awareness).

3. In the IA-AMP, subjective ratings for each trial of whether evaluation of the target stimulus was influenced by the prime stimulus or not. A Go/No-Go response format is employed: press spacebar if influenced, do not press if not influenced.

**DV.** Evaluations within the AMP as pleasant or unpleasant.

**Variables used for methodological counterbalancing (not analyzed).** Questions 3 and 4 in the self-report measures will be presented in a counterbalanced order.

**Self-report measures*.*** We will ask several exploratory questions after the IA-AMP, and specify that participants should answer them in relation to the IA-AMP only:

1. Influence awareness:

“Think back to the task you just completed. On how many trials was a valenced picture presented before the painting? It is important that you are honest here.”

[1 = None, 2 = A few, 3 = less than half, 4 = About half, 5= More than half, 6 = Most, 7 = All]

1. General influence:

“To what extent were your ratings of the paintings influenced by the pictures that appeared immediately before those paintings?”

[1 = Never, 2 = Very rarely, 3 = Somewhat rarely, 4 = Sometimes, 5 = Somewhat often, 6 = Very often, 7 = Almost always]

1. Intentional influence:

“How often did you *intentionally* base your rating of the painting on the image that immediately appeared before it?”

[1 = Never, 2 = Very rarely, 3 = Somewhat rarely, 4 = Sometimes, 5 = Somewhat often, 6 = Very often, 7 = Almost always]

1. Unintentional influence:

“How often do you think that your rating of the painting was *unintentionally* influenced by the pictures that appeared immediately before those symbols?”

[1 = Never, 2 = Very rarely, 3 = Somewhat rarely, 4 = Sometimes, 5 = Somewhat often, 6 = Very often, 7 = Almost always]

1. Explicit ratings:

We will take explicit ratings of pleasantness for each of the prime stimuli used within the AMPs (i.e., the 12 positive and 12 negative images). Each image will be presented, accompanied by the question “To what extent do you find this image pleasant/unpleasant?”.

[1 = Very unpleasant, 2 = Somewhat unpleasant, 3 = A little unpleasant, 4 = Neutral, 5 = A little pleasant, 6 = Somewhat pleasant, 7 = Very pleasant]

1. Political orientation:

“In terms of the political spectrum, where do you consider yourself to be?”

[ 1 = very liberal, 2 = somewhat liberal, 3 = a little liberal, 4 = moderate, 5 = a little conservative, 6 = somewhat conservative, 7 = very conservative]

1. Self-exclusion:

“In your honest opinion, do you think should we use your data in our analysis?

There are many reasons why you might feel that we should exclude your data, such as a computer malfunction or a distraction at an important moment during the experiment.

Note, however, that being influenced by the pictures that came before the paintings is NOT a reason to self-exclude from the study.

Your responses on this question will NOT affect your payment. However, if you choose 'No, exclude my data', please fill in the accompanying text box to let us know why.”

**Procedure**

Participants will complete the demographics questionnaire, the standard AMP, the IA-AMP, and then the self-report measures.

**Measures**

A modified Affect Misattribution Procedure (from Mann et al., 2019, Experiment 6) with the following parameters: 10 practice trials, 60 main trials, 12 positive and 12 negative valence images, and 60 paintings. This modified AMP also includes an additional page of instructions relative to the standard AMP (see Mann et al., 2019, for specific text). As well as this, we use a modified Affect Misattribution Procedure which includes an option after each trial for the participant to indicate that their response was based on influence from the prime stimulus (from experiment 1 of the current project; see <https://osf.io/uqs2d/>). This modified IA-AMP has the same parameters as the former AMP, with the following addition: at the end of each trial participants are given the opportunity to press the spacebar to indicate they were influenced by the prime when responding on that trial. This is achieved through the presentation of a cue to “press spacebar if you felt you were influenced by the picture” for a fixed 2000ms interval, presented after a 200ms inter trial interval.

**Hypotheses**

**M1 (manipulation check).** An AMP effect will be demonstrated for both the modified AMP and the modified IA-AMP. The target stimuli will be differentially evaluated based on the source stimuli that preceded them, such that targets preceded by negative primes will be rated more negatively than those preceded by positive primes.

**H1.** For the IA-AMP, the influence of prime valence on the valence rating of the targets will be moderated by that subset of trials in which participants report being influenced by the prime stimulus.

**H2.** For the IA-AMP, the magnitude of the AMP effect will be predicted by the proportion of influenced trials to non-influenced trials.

**H3.** The rate of online influence in the IA-AMP will predict the magnitude of AMP effect in the other AMP.

**H4.** The AMP effect produced in the subset of uninfluenced trials in the IA-AMP will be smaller than the AMP effect produced in the other AMP. Should no evidence for differences be found, an equivalence test will be used to assess statistical equivalence.

**Results**

**Analytic strategy**

**Manipulation & hypothesis tests.** Using the R package *lme4*, we will construct two frequentist logistic mixed-effects model to assess the evidence for the main effect of prime valence in both the AMP and the IA-AMP (M1). The model will include participant ID as a random intercept to acknowledge the non-independence of the multiple ratings provided by each participant. The Wilkinson notation for both models will be:

valence\_rating ~ prime\_valence + (1 | participant)

We will also construct a frequentist logistic mixed-effects model to quantify the interaction between prime valence and influence ratings in the IA-AMP (H1). The model will also include participant ID as a random intercept. In-line with best practices for such analyses, we will use effect coding for the IVs, rescaling each to -.5 and .5. The Wilkinson notation for the model is as follows:

valence\_rating ~ prime\_valence \* reported\_influence + (1 | participant)

If no interaction effect is found, Bayesian analyses may be used may be used to quantify the evidence for the null hypothesis using the R package *brms*. This would likely employ default priors that are designed to be uninformative (i.e., Students t distribution [students\_t(3, 0, 10)] placed on all parameters).

We will also construct a standard regression model to assess whether a greater number of influenced trials predicts a greater AMP effect size in the IA-AMP (H2). For this, we will compute an AMP effect size for each participant by subtracting the number of ‘pleasant’ responses when the target was preceded by a positive prime from the number of ‘pleasant’ responses when the target was preceded by a negative prime. We will also compute the proportion of influenced trials to uninfluenced trials for each participant, and standardise and recentre this value. The Wilkinson notation for this model is:

AMP\_effect\_size ~ proportion\_influenced

In order to assess H3, we will construct a similar regression model to that of H2, with the exception being that AMP\_effect\_size will now refer to the AMP effect from the first completed AMP (i.e., proportion of trials rated as positive that include the positive prime minus that which included the negative prime).

For H4, we will compute an ‘unintentional’ AMP effect size for the IA-AMP, such that only those trials which were not responded to as intentional are included. We will then conduct a paired-samples t-test between this unintentional AMP effect size and the other AMP’s effect size. If this result is not significant, then we will use an equivalence test with equivalence bounds of Cohen’s dz +/- .25 to assess evidence for the null hypothesis (i.e., that the two effect sizes are statistically-equivalent).