Revisiting the unintentionality of the AMP effect: Experiment 2

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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](mailto:jamie.cummins@UGent.be). The preregistration, materials, and data for the first experiment from this project are available at <https://osf.io/p6e3c/>.

**Background and rationale**

Our first experiment demonstrated that AMP effect size was moderated by the rate of self-reported influence of the prime stimuli on target stimulus evaluations within the AMP procedure. However, this experiment employed a modified influence-assessment (IA)-AMP. Experiment 2 therefore seeks to provide evidence that this conclusion also applies to the standard, unmodified AMP that does not include online assessments of influence. Participants complete both a standard AMP and then the IA-AMP. Assuming that the rate with which one is influenced on a standard AMP is similar to the rate with which one is influenced on the IA-AMP, we assess whether the rate of influence in the IA-AMP moderates the AMP effect in the standard AMP.

This experiment will first replicate H1 and H2 of experiment 1: that the influence of prime stimuli on evaluations of the target stimuli in the IA-AMP is moderated by whether participants report having been influenced or not; and that the rate of influence reported in the IA-AMP is predictive of the AMP effect size (respectively). Second, we will also investigate whether the AMP effect of a participant in a standard AMP is predicted by rate of influence recorded by that participant in a subsequently-completed IA-AMP.

Finally, in order to integrate our results with the apparently conflicting conclusions reached by Payne et al. (2013), we address two issues in their analytic approach and provide what we feel is a more appropriate analysis using our data. Specifically, Experiment 3 in Payne and colleagues (i.e., similar to our modified AMP but combining evaluation and influence ratings into a single response) However, there are two important issues with this analytic approach and interpretation. First, Payne et al. drew inferences at the within-participant level based on between-participant data (i.e., the group that completed the standard AMP was different from that group which completed their modified AMP). Secondly, the authors inferred statistical equivalence between groups on the basis of not finding a statistically significant difference; however, absence of evidence of differences does not represent evidence of absence of such differences (cf. Lakens, 2017). We will ameliorate these issues within our own design: first, by employing a within-participants design; and second, by using the appropriate equivalence tests to infer statistical equivalence between the two AMP types. Similar to Payne et al., we investigate whether the AMP effect on trials that participants report were not influenced by the prime is weaker than the standard AMP effect. As such, for this analysis, only trials that were rated as uninfluenced will be used to calculate the IA-AMP effect.

**Method**

**Sample**

Data will be collected online via the Prolific Academic website. Based on an expected mean duration of 20 minutes, participants will be paid £1.66.

***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. The aforementioned power analysis is also applicable for our third analysis. A power analysis with the aforementioned 89 participants at 95% power for a paired-sample t-test (i.e., for analysis 4) determined that this would be sufficient to detect a Cohen’s d of .4 at these criteria. We will collect data from 150 participants based on the availability of resources.

Finally, the equivalence bounds for H4’s equivalence test based on what could be adequately powered based on this sample size using the TOSTER R package. 150 participants, a standard alpha level of 0.05, and a desired power level of 0.8, determined that we will set equivalence bounds of Cohen’s dz = +/- .25.

**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, and 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 modified intentional-assessment (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. intention-assessment).

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 Chinese character? 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 Chinese symbols 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. Intentional influence:

“How often did you *intentionally* base your rating of the Chinese symbol 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 Chinese symbol 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. 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 Chinese characters 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 standard Affect Misattribution Procedure (AMP; Payne et al., 2005) with the following parameters: 10 practice trials, 72 main trials, 12 positive and 12 negative valence images, and 72 Chinese characters. As well as this, a modified version of the Affect Misattribution Procedure (from experiment 1 of the current project; see <https://osf.io/uqs2d/>) with the same parameters, and 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 200 ms inter trial interval. The above sentence was removed from the screen following a response (although the response window was fixed regardless of whether a response was emitted or not).

**Hypotheses**

**M1 (manipulation check).** An AMP effect will be demonstrated for both the standard AMP and the 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 Chinese characters 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 standard 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 standard AMP. Should no evidence for differences be found, an equivalence test will be used to assess for practical equality.

**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 standard-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 standard 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 standard AMP 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).