Revisiting influence-awareness in the AMP effect: Experiment 5

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*Pre-registration*

**Author note**

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**Background and rationale**

The four experiments thus far completed in this project have repeatedly demonstrated replicated a common finding: that effects in the AMP generally are driven by a subset of ‘influence aware’ 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. The rationale here was to increase the likelihood that participants would be inclined to evaluate the target images rather than the primes. Secondly, the authors added an additional page of instructions at the beginning of the procedure which strongly implored participants to avoid intentionally responding to the primes, 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). That is, Mann et al. treat bimodality as a symptom of an underlying cause (i.e., the AMP effect being driven by a subset of participants), and attempt to treat this symptom. In light of the studies we have presented so far, it is unclear whether the modified Mann et al. AMP serves to remedy the underlying issue that our studies have highlighted, i.e., that AMP effects are driven predominantly by a subset of participants and a subset of their trials, in which they are influence-aware.

The current experiment therefore investigates whether the AMP effect in the modified Mann et al. AMP are still driven by influence-awareness. If so, then regardless of whether the Mann et al. modified AMP serves to limit bimodality of AMP effects (e.g., one symptom of an underlying issue), it might not treat the underlying issue that would serve to threaten the AMP’s utility. To do this, we adapt the design of our second experiment (a standard AMP followed by an IA-AMP). However, this time we will use Mann et al.’s modified AMP in both cases (i.e., Mann et al.’s AMP followed by a modified IA AMP).

We will attempt to replicate the first three of the four hypotheses from Experiment 2. However, we noted over the course of the previous four experiments that in many cases, hypotheses that we have formerly treated as separate (e.g., influenced/noninfluenced trials predicting AMP effects, and influence rates predicting AMP effects) were in fact related hypotheses which went about answering the same question (i.e., does influence-awareness predict effects in the AMP?) in different ways. As such, the hypotheses which were treated as H1 and H2 in Experiment 2 will be treated here as H1a and H1b, respectively. In writing the manuscript containing these five experiments, our organization of hypotheses in the earlier four experiments will also be changed to reflect this. H1a asserts that, at the trial-level of analysis, the influence of prime stimuli on evaluations of the target stimuli in the modified IA-AMP will be moderated by whether participants report having been influenced or not. H1b asserts that, at the subject-level of analysis, the rate of influence reported in the modified IA-AMP will be predictive of the effect size in that Modified IA-AMP. Finally, our second, and key, hypothesis, H2, posits that the influence-awareness rate of a participant on the Modified IA-AMP will predict scores on a previously-completed modified AMP.

**Method**

**Sample**

Data will be collected online via the Prolific Academic website. Based on an expected mean duration of 11 minutes, participants will be paid £0.95.

**Planned sample size & stopping rules.** Power analyses for interactions in mixed-effects models are relatively difficult to conduct due to the large number of parameters to be estimated, therefore no power analysis was conducted for analyses using mixed models. Due to the greater number of data points being employed (i.e., less information loss to the AMP scoring metric), the power of mixed models analyses will typically be better than those done on traditional fixed effects only models, for which power calculations are relatively easier. For our analysis in H1b, we determined on the basis of previous studies to power our analysis to detect a medium Pearson’s r effect size (i.e., 0.30). Using the pwr package in R, we computed the number of participants required to detect this medium effect size in a regression analysis with a single IV, at the conventional alpha level (.05) and at 95% power. Given these criteria, 138 participants would be required. For our H2 analysis, we expected (based on our previous studies) a slight reduction in the effect size relative to our second analysis. As such, we ran an identical power analysis to the former, but lowered the Pearson’s r to 0.20. For 95% power to detect this effect size, we would require 320 participants. These power criteria (i.e., 95% power to detect a Pearson’s r of 0.20) are also applicable to our analysis for H1b.

We opted to collect data from 320 participants. For our sampling strategy, we will firstly collect data from 320 participants. Then we will apply exclusion criteria, and will then sample in batches of 10 until a minimum of 320 eligible participants have been collected. Following this, data collection will be stopped.

**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 (modified standard AMP vs. the Modified IA-AMP), and the valence of the prime stimulus (positive vs negative primes) that precedes the presentation of a target stimulus (paintings) 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 Modified 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 Modified IA-AMP, and specify that participants should answer them in relation to the Modified 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. 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, a standard (Mann) AMP, the Modified IA-AMP, and then 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 modified AMP above, 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. That is, both the AMP and the IA-AMP were modified relative to Experiment 2 to include both of Mann et al.’s (2019, Experiment 6) modifications to the AMP.

**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 prime stimuli that preceded them, such that targets preceded by negative primes will be rated more negatively than those preceded by positive primes.

**H1a.** For the modified IA-AMP, the influence of prime valence on the valence rating of the targets will be moderated by influence awareness (whether between trials [H1a] or between participants using proportion of influenced trials [H1b]).

**H1b.** For the modified IA-AMP, the magnitude of the AMP effect will be predicted by the proportion of influenced trials.

**H2.** The rate of online influence in the modified IA-AMP will predict the magnitude of AMP effect in the modified AMP.

**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 (M1) and the IA-AMP (M2). 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 awareness ratings in the IA-AMP (H1a). 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 (i.e., coding as -.5 and .5). The Wilkinson notation for the model is as follows:

rating ~ influenced \* prime\_type + (1 | subject)

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 awareness trials predicts a greater AMP effect size in the IA-AMP (H1b). 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 influence awareness trials to non-influence aware trials for each participant, and standardize and recentre this value. The Wilkinson notation for this model is:

IA\_AMP\_effect\_positive\_negative ~ influence\_rate

In order to assess H2, we will construct a similar regression model to that of H1b, 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).

AMP\_effect\_positive\_negative ~ influence\_rate