Revisiting the unintentionality of the AMP effect

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*Pre-registration*

**Author note**

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**Background and rationale**

The Affect Misattribution Procedure (AMP: Payne et al., 2005) is a popular indirect measure of implicit attitudes (Nosek, Hawkins, & Frazier, 2012). It is often discussed as having the particular benefits of demonstrating large effect sizes, a relatively simple procedure, and high internal consistency relative to reaction time-based measures (Gawronski & Ye, 2015).

AMP effects are typically argued to be the consequence of unintentional misattribution of the valence of prime stimuli to target stimuli (i.e., a priming effect). However, alternative explanations for the effects obtained from this measure also exist in the literature. One such account holds that AMP effects are driven – in part – by the intentional evaluation of the valence of the primes (Bar-Anan & Nosek, 2012). In response to this claim, Payne et al. (2013) carried out a series of studies arguing for the unintentionality of the AMP effect. In particular, Experiment 3 from this paper demonstrated no differences in effect sizes between participants who completed a standard AMP versus those who completed an AMP which allowed participants to skip trials where they felt their responses would be influenced by primes.

In this study we highlight a potential flaw in Payne et al.’s (2013) reasoning concerning the role of unintentionality in AMP effects. Namely, that they relied on *inter*-individual differences in ratings of (un)intentionality in order to make *intra*-individual conclusions. Drawing such conclusions is highly problematic: it may be the case that one subset of participants intentionally used knowledge of the primes when responding to the targets whereas another subset did not. Aggregating (un)intentionality ratings across participants, as the authors did in their original study, in order to make inferences about mental processes operating within participants is both conceptually problematic and potentially misleading. A stronger test of their claim would require a fully within-participants design that provides two types of evidence: (a) intra-individual differences in intentionality ratings on the AMP and (b) moderation of the AMP effect by the subset of trials in which participants report that they were influenced by the primes. The current study represents such a design. We examine whether the AMP effect is driven by that subset of trials in which participants report that their evaluations were influenced by the primes. We will also examine whether there is a relationship between our ‘online’ method of assessing influence (i.e., responses after each trial) compared with the typical ‘offline’ method (i.e., post-hoc self-report), and which of these two methods best predicts AMP effects.

**Method**

**Sample**

Data will be collected online via the Prolific Academic website. Based on an expected mean duration of 15 minutes, participants will be paid £1.25.

***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 subjects 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 subjects would be required. We will collect data from 150 participants based on the availability of resources. Given the use of a fully within-subjects design and a high-powered analytic strategy (hierarchical modeling of trial-level data), this provides a reasonable expectation of sufficient power. 150 participants will be collected and exclusion criteria will be applied. Then participants will be added in batches of 10 until at there are at least 150 participants who meet both inclusion and exclusion criteria. Thereafter data collection will stop.

**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 AMP.

**Design**

One within-subjects factor with two levels is manipulated by the experimental design: the valence of the prime stimulus (positive vs negative primes) that precedes the presentation of a target stimulus (Chinese character) within the AMP.

**IVs.**

1. Valence of the prime stimuli used in the AMP (positive vs. negative).

2. 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).** None.

**Exploratory measures*.*** We will ask several exploratory questions after the AMP:

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 study.

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.”

Questions 3 and 4 will be presented in a counterbalanced order.

**Procedure**

Participants will complete the demographics questionnaire, the modified AMP, and then the exploratory measures.

**Measures**

A modified version of the Affect Misattribution Procedure (AMP; Payne et al., 2005) with the following parameters: 10 practice trials, 120 main trials, 12 positive and 12 negative valence images, and 120 of 200 possible Chinese characters. 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. 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.** 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.** The magnitude of the AMP effect will be predicted by the proportion of influenced trials to non-influenced trials.

**H3.** We will investigate the extent to which online and offline measures of influence correlate.

**H4.** The magnitude of the AMP effect should be predicted by the online measure of influence more greatly than the offline measure of influence.

**Results**

**Analytic strategy**

**Manipulation & hypothesis tests.** Using the R package *lme4*, we will construct a frequentist logistic mixed-effects model. This will be used to assess the evidence for both the main effect for prime valence (M1) and the interaction between prime valence and influence ratings (H1). The model will include subject ID as a random intercept to acknowledge the non-independence of the multiple ratings provided by each participant. 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 | 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 trials predicts a greater AMP effect size (H2). For this, we will compute an AMP effect size for each subject 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 subject, and standarise and recentre this value. The Wilkinson notation for this model is:

AMP\_effect\_size ~ proportion\_influenced

We will conduct a standard correlation analysis between the online and offline measure of influence (i.e., Q2 from the exploratory measures section) in order to address H3. For H4, we will conduct a similar regression analysis to that of H2, this time using both online and offline measures of influence as IVs. These IVs will be standardized and recentred as appropriate. The Wilkinson notation for this model is:

AMP\_effect\_size ~ proportion\_influenced + general\_influence

**Potential exploratory tests*.*** We may conduct exploratory analyses relating to the exploratory measures outlined above, in addition to the use of question 2 (general influence) in our confirmatory analyses.