Empirical Research Paper

When Objective Ambivalence Predicts Subjective Ambivalence: An Affect–Cognition Matching Perspective

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Abstract

Understanding when people are likely to feel ambivalent is important, as ambivalence is associated with key attitude outcomes, such as attitude-behavior consistency. Interestingly, the presence of conflicting positive and negative reactions (objective ambivalence) is weakly related to feeling conflicted (subjective ambivalence). We tested a novel situation that can influence the correspondence between objective and subjective ambivalence: whether a message and a recipient's topic match in affective versus cognitive orientation. When a person encounters a message with an affective or cognitive match to the topic, conflicting reactions may be more accessible, increasing feelings of ambivalence. Across five studies, greater objective–subjective ambivalence correspondence occurred with an affective–cognitive match between message and topic orientation. Studies 4 and 5 also demonstrated that this primarily occurred when the message was counterattitudinal. This work contributes to the literature explaining the gap between measures of objective and subjective ambivalence as well as how messages can influence attitude strength properties.

Keywords

ambivalence, affect, cognition, attitudes, matching

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Having both positive and negative reactions (ambivalence) is common. Receiving flu vaccination can provide immunity but cause temporary discomfort; sweet beverages are delicious but can lead to jitters; a friend may be honest but unsympathetic. Indeed, ambivalence is of interest to researchers across many fields including psychology (Priester & Petty, 1996; van Harreveld et al., 2015), political science (Luttrell et al., 2020; McGraw et al., 2003), communications (S. Kim et al., 2019), and consumer behavior (Roster & Richins, 2009). Ambivalence is particularly interesting because, on one hand, it can indicate attitude weakness (see Krosnick & Petty, 1995; Thompson et al., 1995), with ambivalent attitudes demonstrating less influence on behavior (see Armitage & Conner, 2004) and less durability (e.g., Hodson et al., 2001). Moreover, ambivalence is typically an aversive state (see van Harreveld et al., 2015) that people attempt to reduce or avoid using strategies like information processing or selective exposure (e.g., Clark et al., 2008; Nordgren et al., 2006). On the other hand, ambivalence can reflect an adaptive function of attitudes (see Maio & Haddock, 2004), protecting against potential rejection (Reich & Wheeler, 2016) or conveying a positive self-image for controversial issues (Pillaud et al., 2013). Given the wide-ranging impact of ambivalence, it is important to understand when people are likely to experience it.

Objective and Subjective Ambivalence

Researchers have documented two related but distinct ambivalence constructs. The first is objective ambivalence, which is the simultaneous presence of positive and negative evaluations (Jonas et al., 2000; Thompson et al., 1995). To measure objective ambivalence, researchers have typically used unipolar measures of positive and negative reactions and then used a formula to compute the degree of conflict between the two (e.g., Priester & Petty, 1996). This approach has been widely used to measure conflicts for overall evaluations, emotions (Larsen et al., 2001; Williams & Aaker,

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2002), and beliefs (Armitage, 2003; Pillaud et al., 2013; see Eagly & Chaiken, 1993). The second construct is subjective ambivalence or the extent to which people *feel* conflicted; it is measured by how "mixed," "conflicted," and "undecided" people feel about an attitude object (Priester & Petty, 1996).

Initially assumed to be highly correlated (Hass et al., 1992; Maio et al., 1996), research on the objective–subjective ambivalence relation later showed weak empirical support (Newby-Clark et al., 2002; Nordgren et al., 2006). In fact, objective ambivalence does not consistently predict subjective ambivalence, even when using objective ambivalence formulas developed specifically to predict subjective ambivalence (rs = .36–.52, or ≤27% of variance explained; Priester & Petty, 1996). Because research suggests that subjective ambivalence drives at least some of the influence objective ambivalence has on outcomes such as attitude-behavior consistency and information search (DeMarree et al., 2014; van Harreveld et al., 2009), understanding when objective ambivalence predicts subjective ambivalence to a greater extent is important. Therefore, the current work tests a novel situational feature that might impact the strength of the objective–subjective ambivalence relation: the affective versus cognitive emphasis of a message and its match to an affective versus a cognitive topic.

Moderators of Objective–Subjective Ambivalence Relation

Previous research has documented both situational and dispositional factors that can influence the correspondence between objective and subjective ambivalence. Many of these moderators relate to increasing awareness of conflicting reactions. For example, Newby-Clarke et al. (2002) found that simultaneous awareness of both sides of an issue increases objective–subjective ambivalence correspondence. Similarly, deciding between binary options also increases this correspondence because it increases awareness of each option's opportunity cost (van Harreveld et al., 2009). One possibility is that people may be most likely to become aware of their conflicting reactions when they encounter messages that match their attitudes in affective–cognitive orientation. In this article, we examine whether an affective versus cognitive message might influence the objective–subjective ambivalence relation for affective versus cognitive topics.

Affect–Cognition Matching

Prior work has suggested matching an emotional or cognitive message to a topic's affective or cognitive orientation can result in better outcomes. This includes greater reading interest, faster reading speed, and more positive evaluations when comparing a match to a mismatch (Keer et al., 2013; See, Petty, & Fabrigar, 2013; van den Berg et al., 2006). Matching also seems to improve processing fluency and memory for the message (Haddock et al., 2008; Mayer & Tormala, 2010) as well as the accessibility of the relevant attitude object attributes (Giner-Sorolla, 2004).

Topic orientation has been examined across features in a persuasion situation. For example, one approach treats it as an individual difference, with some people more likely to have affectively oriented attitudes and others more likely to have cognitively oriented attitudes (see Haddock & Maio, 2019). Another approach treats affective–cognitive orientation as a feature of the topic. Although few, if any, topics are universally considered affective or cognitive, when averaged across people, some topics are normatively considered more affective or cognitive (Crites et al., 1994; Eagly et al., 1994; See, Petty, & Fabrigar, 2013; see Zanna & Rempel, 1988). Existing theories have suggested that a topic's normative affective or cognitive orientation may stem from the topic's function (see Maio & Olson, 2000; see also Shavitt, 1990). For instance, objects that fulfill self-expressive or hedonic functions (e.g., fast food) tend to be normatively affectively oriented whereas those that serve instrumental or utilitarian needs (e.g., toaster) tend to be cognitively oriented (Millar & Tesser, 1986; Rocklage & Fazio, 2020). In addition to people and topics having chronic orientations, it is possible to experimentally or situationally induce more of an affective or cognitive orientation (e.g., Farley & Stasson, 2003; Millar & Tesser, 1986; See & Luttrell, 2021; Teeny & Petty, 2018). Importantly, topic orientation can be situationally or experimentally shifted from baseline, even if that baseline is more affectively or cognitively oriented.

Current Research

Although research has explicated some factors that affect the objective–subjective ambivalence relation (e.g., Haddock et al., 2017; Newby-Clark et al., 2002), none has examined the influence of encountering an affective versus cognitive message, a task the current research pursues. When people seek to persuade others, they likely want to create durable attitudinal changes and motivate actions consistent with those attitudes. Because subjective ambivalence can mediate the effects of objective ambivalence on outcomes like attitude–behavior consistency (DeMarree et al., 2014; see van Harreveld et al., 2009), it is important to understand when a particular message will influence the objective–subjective ambivalence relation. Thus, the current work parallels previous work that not only examines whether different types of persuasive messages influence persuasion but how they influence the strength of attitudes (e.g., Tormala & DeSensi, 2008). Below, we describe two possible predictions for the effects of affective versus cognitive messages on objective–subjective ambivalence correspondence.

First, as subjective ambivalence captures *feelings* of conflict (van Harreveld et al., 2009), it is possible that simply drawing participants' attention to their feelings with an affective message would always result in greater objective–subjective ambivalence correspondence. Statistically, this prediction

would result in an interaction between the affective–cognitive message factor and objective ambivalence when predicting subjective ambivalence, resulting in greater objective–subjective ambivalence correspondence with an affective versus a cognitive message.

Another possibility is that a match between the affective and the cognitive orientation of the topic and the affective–cognitive message factor would result in greater objective–subjective ambivalence correspondence. That is, an affective message would result in greater objective–subjective ambivalence correspondence for affective topics than cognitive topics. However, a cognitive message would result in greater correspondence for cognitive topics than affective topics. This would result in an interaction between affective–cognitive message-topic match (rather than message) and objective ambivalence when predicting subjective ambivalence, resulting in greater objective–subjective ambivalence correspondence when messages and topics match in affective–cognitive orientation.

This latter prediction would be consistent with previous affect–cognition matching research demonstrating that a match increases processing fluency, which allows people to attend to their internal experiences (Mayer & Tormala, 2010). Other work suggests that a match can increase accessibility, which may allow conflicting reactions to come to mind more easily (Giner-Sorolla, 2004; See, Valenti, et al., 2013). Thus, if a person holds conflicting views, the greater accessibility or processing of these conflicting views from a match should translate into more subjective ambivalence. Conversely, if a person has primarily one-sided views, the greater accessibility or processing would only bring univalent reactions to awareness, resulting in less subjective ambivalence.

Overview of Studies

In five studies, we tested how affective versus cognitive messages might influence the objective–subjective ambivalence relation for affective and cognitive topics. Study 1 was a preliminary investigation in which participants encountered either a cognitive or an affective message for a normatively cognitive topic. Studies 2 and 3 manipulated the affective–cognitive orientation of the attitude and examined the effects of matched versus mismatched messages. Studies 4 and 5 examined a potential moderator of these effects: whether the messages supported or countered preexisting attitudes. We elaborate on this moderation hypothesis in an interim discussion in the introduction to Study 4. Studies 1 to 4 were conducted in Singapore, whereas Study 5 was conducted in the United States; thus, the current paper also provides a cross-cultural examination of these hypotheses.

These studies were not preregistered but employed identical exclusion criteria and analytic approaches. Hence, the analyses were not tailored to specific studies after the results were known and do not reflect selective reporting. In addition, once the analyses were conducted, no additional data were collected. All measures and manipulations used in this research are reported and provided in the Online Supplement. The data and analysis scripts are available on Open Science Framework: (https://osf.io/p8u5g/).

Study 1

In Study 1, we tested our hypotheses by using a normatively cognitive topic, flu vaccination, and presented participants with an affective or cognitive message. Prislin et al. (1998) and S. Kim et al. (2019) found that vaccination attitudes tend to be based on cognitive factors, such as beliefs about disease protection, immunity, and efficacy. Using a cognitive topic was a useful place to begin, as our competing hypotheses would result in different patterns of effects because the affective message would represent a mismatch while the cognitive message would represent a match to the cognitive topic. If affective versus cognitive messages simply increase objective–subjective ambivalence correspondence, we should observe the *affective* message increasing the influence of objective ambivalence on subjective ambivalence. However, if messages that are matched in affective–cognitive orientation increase objective–subjective ambivalence correspondence, we should instead observe the *cognitive* message increasing the influence of objective ambivalence on subjective ambivalence.

Method

Participants and design. Because no prior study had examined the current hypotheses, we collected data from as many participants as possible within one semester. In total, 136 undergraduates (M_{age} = 20.18, SD = 1.55, 75.70% female) at the National University of Singapore (NUS) participated for partial course credit or SGD5 (5 Singapore dollars).

Procedures. Participants completed the in-person computerized study in visually isolated cubicles. As part of an ostensible first study, participants completed the objective ambivalence measure toward flu vaccinations. Negative and positive unipolar items were randomly presented and later used to compute the index of objective ambivalence (Refling et al., 2013).

In an ostensible second study, which occurred in the same session, participants randomly received a message that had either affectively or cognitively oriented adjectives outlining the benefits of receiving flu vaccinations. Participants then reported their subjective ambivalence toward receiving flu vaccinations and their demographic information. In this and all later studies, they were debriefed and thanked.

Predictor variables

Objective ambivalence. We based our objective ambivalence measure on those most commonly used in the literature

Table 1. Zero-Order Correlations for Study 1.

Variables	1	2	3
1. Affective–Cognitive message factor	—	.189*	–.025
2. Objective ambivalence		—	.092
3. Subjective ambivalence			—

*$p < .05$. **$p < .01$.

(Crites et al., 1994; Smith & Nosek, 2011) in which participants respond to positive ($M = 3.645$, $SD = 1.200$, $\alpha = .665$) and negative ($M = 3.885$, $SD = 1.524$, $\alpha = .761$) unipolar items adapted from previous research ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The three positive unipolar items included "happy," "delightful," and "exciting." For example, "I feel happy about receiving yearly flu vaccination." The three negative unipolar items included "sad," "disgusting," and "bored." For example, "it can feel sad to receive yearly flu vaccination." Objective ambivalence ($M = 2.015$, $SD = 1.662$) was calculated using the Thompson et al. (1995) formula: [(P + N) / 2] – (P − N)], where "P" and "N" are the average of positive and negative responses. Scores could range between −2 to +7, and larger positive scores indicate more objective ambivalence.[1]

Affective–cognitive message. In the affective message, emotional adjectives described the positive outcomes of flu vaccination. For example, "most people are happy and excited to learn that receiving yearly flu vaccination greatly reduces their risk of getting sick with flu and flu-associated hospitalization." The cognitive message focused on beliefs such as, "most people know that a yearly flu vaccination is safe, and greatly reduces their risks of getting sick with flu and flu-associated hospitalization."

Outcome variable

Subjective ambivalence. Subjective ambivalence was measured on the scale adapted from Priester and Petty (1996) ranging from 1 (*not at all*) to 9 (*totally*). The three items were, "to what extent do you feel [conflicted/mixed/undecided] about receiving yearly flu vaccinations?" The responses were averaged, with higher scores indicating greater subjective ambivalence ($M = 3.583$, $SD = 1.975$, $\alpha = .945$).

Results and Discussion

Table 1 shows the zero-order correlations for the variables. Consistent with the assumption that objective ambivalence and subjective ambivalence are different constructs, objective ambivalence and subjective ambivalence did not correlate ($r = .092$, $p = .287$).

A hierarchical multiple regression was conducted with subjective ambivalence as the outcome. Participants' objective ambivalence and the affective–cognitive message factor (coded as: 0 = *cognitive*, 1 = *affective*) were entered before the interaction term. In all regression analyses, effects were interpreted in the first model that they appear, and all continuous predictors were centered (Cohen et al., 2003).

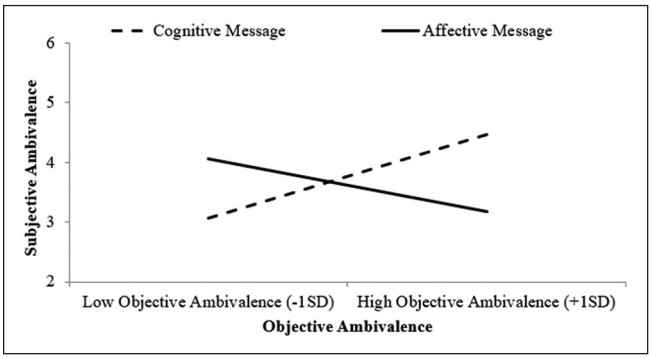

Figure 1. A matched cognitive message to the normatively cognitive flu vaccination topic showed stronger objective–subjective ambivalence correspondence than a mismatched affective message.

The analysis revealed no main effect of objective ambivalence, $B = 0.119$, 95% confidence interval (CI): [−0.087, 0.326], $t(133) = 1.140$, $p = .256$, $r_{partial} = .098$, or the affective–cognitive message factor, $B = -0.173$, 95% CI: [−0.857, 0.511], $t(133) = -0.500$, $p = .618$, $r_{partial} = -.043$. More importantly, there was significant interaction between objective ambivalence and the affective–cognitive message factor, $B = -0.690$, 95% CI: [−1.090, −0.290], $t(132) = -3.410$, $p = .001$, $r_{partial} = -.285$.

Decomposition of the interaction demonstrated that for the cognitive (matched) message, objective ambivalence positively predicted subjective ambivalence, $B = 0.424$, 95% CI: [0.158, 0.691], $t(132) = 3.153$, $p = .002$, $r_{partial} = .262$. However, for the affective (mismatched) message, objective ambivalence did not positively predict subjective ambivalence, and if anything, a negative trend was observed, $B = -0.267$, 95% CI: [−0.566, 0.032], $t(132) = -1.764$, $p = .080$, $r_{partial} = -.146$ (Figure 1). That is, consistent with predictions, objective–subjective ambivalence correspondence was greater in matched than mismatched condition.

This study provides initial evidence that matching messages to the topic's affective–cognitive orientation increases the correspondence of objective–subjective ambivalence compared with mismatching messages. It also provides evidence against the notion that affective messages necessarily increase objective–subjective ambivalence correspondence.

Study 2

Study 2 aimed to provide a more comprehensive test of the matching hypothesis. Study 1's results leave open the possibility that cognitive rather than matched messages would lead to increased objective–subjective ambivalence correspondence, regardless of the topic's affective–cognitive orientation. Thus, Study 2 examined the matching hypothesis by manipulating participants' perceptions of the topic's orientation as primarily affective or cognitive rather than relying on the topic's normative affective or cognitive orientation. As mentioned earlier, although topics can be normatively affective or cognitive in their orientation, it is also possible to manipulate orientation for the same topic, regardless of the topic's baseline normative orientation. Hence, we employed an Objective Ambivalence × Affective–Cognitive Message Factor × Affective–Cognitive Topic Design, which we then examined as an interaction between objective ambivalence and matched–mismatched message factor.[2]

Method

Participants and design. Based on the observed effect size from Study 1 ($r_{partial} = -.285$; $f^2 = .088$), an a priori power analysis suggested that $N = 141$ would provide 80% power to detect the interaction between objective ambivalence and message-topic orientation match at $a = .05$ (Faul et al., 2009). We recruited 157 NUS undergraduates ($M_{age} = 19.99$, $SD = 1.06$, 75.70% female) who participated for partial course credit.

Procedures. Participants completed the in-person computerized study in visually isolated cubicles. They were randomly assigned to be induced with an affective ($N = 79$) or cognitive ($N = 78$) orientation for the flu vaccination topic. Then, participants completed the objective ambivalence measure. After this, participants were randomly assigned to encounter an affective ($N = 78$) or cognitive ($N = 79$) flu vaccination promotion poster, before reporting their subjective ambivalence.

Predictor variables

Affective–cognitive topic orientation. To manipulate whether participants viewed flu vaccination as primarily affective or cognitive, we adapted a procedure from prior research (See & Luttrell, 2021; Teeny & Petty, 2018). In the affective orientation condition, participants responded to the Need for Affect scale (Appel et al., 2012) and then the Need for Cognition scale (Cacioppo & Petty, 1982). In the cognitive orientation condition, participants completed the scales in reverse order. Next, participants responded to semantic differential scales for the topic of flu vaccination anchored with affective words in the affective condition (e.g., angry vs. happy; tensed vs. calm) or cognitive words in the cognitive condition (e.g., useless vs. useful, foolish vs. wise; Crites et al., 1994). Finally, participants received false feedback that their attitudes toward flu vaccinations were affectively or cognitively based, ostensibly based on the scales they completed.

Objective ambivalence. To address potential concerns about using only affective objective ambivalence items in Study 1, in this study, we included both affective and cognitive unipolar items that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*) to test for the generalizability across these types of measures. The added positive cognitive items included the adjectives "useful," "beneficial," and "valuable," whereas the negative cognitive items included "troublesome," "unnecessary," and "useless." The affective items were identical to Study 1. We obtained similar coefficient alphas for positive ($\alpha = .632$) and negative items ($\alpha = .633$), both collapsed across cognitive and affective items. The objective ambivalence index ($M = 1.760$, $SD = 1.365$) was calculated in the same way as before.

Affective–cognitive message. Similar to Study 1, participants read either an affective or a cognitive message regarding the benefits of receiving yearly flu vaccinations. We used a different poster to ensure that the observed effects are not restricted to the idiosyncratic versions of affective and cognitive messages used in the previous study. The affective message described the positive emotions of receiving flu vaccines such as "Flu vaccination can make you feel relieved and less stressed about not missing school or work." The cognitive message described the health benefits of receiving flu vaccines such as "flu vaccinations prevent up to 91,000 hospitalizations yearly, proving their effectiveness and usefulness."

Outcome variable

Subjective ambivalence. Subjective ambivalence was measured using the same items as in Study 1 ($M = 2.840$, $SD = 1.631$, $\alpha = .914$).

Results and Discussion

Table 2 shows the zero-order correlations for the variables. This time, objective ambivalence was significantly correlated with subjective ambivalence ($r = .491$, $p < .001$), highlighting the inconsistent nature of the objective–subjective ambivalence relation.

First, we tested the possibility that cognitive messages would increase objective–subjective ambivalence correspondence regardless of participants' topic orientation, a possibility left open by Study 1's design. We regressed subjective ambivalence on objective ambivalence and the affective–cognitive message factor (coded as: 0 = *cognitive*, 1 = *affective*) first, before entering the interaction term. Objective ambivalence positively predicted subjective ambivalence, $B = 0.584$, 95% CI: [0.418, 0.751], $t(154) = 6.929$, $p < .001$, $r_{partial} = .488$. However, the affective–cognitive

Table 2. Zero-Order Correlations for Study 2.

Variables	1	2	3
1. Affective–Cognitive Message Factor	—	–.098	–.067
2. Objective Ambivalence		—	.491**
3. Subjective Ambivalence			—

*$p < .05$. **$p < .01$.

message factor, $B = -0.063$, 95% CI: [−0.516, 0.390], $t(154) = -0.275$, $p = .784$, $r_{partial} = -.022$, and the interaction between objective ambivalence and the affective–cognitive message factor were not significant, $B = 0.117$, 95% CI: [−0.216, 0.451], $t(153) = 0.694$, $p = .489$, $r_{partial} = .056$. This speaks against the alternative possibility left open in Study 1 that a cognitive versus affective message would always increase objective–subjective ambivalence correspondence.

Next, we tested the matching hypothesis. A similar hierarchical multiple regression was conducted where the affective–cognitive message factor was replaced by a "matching or mismatching" message factor, in which the factor was coded to indicate whether the message matched participants' topic base (coded as: 0 = *mismatched*, 1 = *matched*). The analyses revealed that objective ambivalence was associated with subjective ambivalence, $B = 0.587$, 95% CI: [0.421, 0.753], $t(154) = 6.997$, $p < .001$, $r_{partial} = .491$. There was no effect of the matched-mismatched message factor, $B = -0.076$, 95% CI: [−0.528, 0.375], $t(154) = -0.335$, $p = .738$, $r_{partial} = -.027$. Importantly, there was a significant interaction between objective ambivalence and the matched-mismatched message factor, $B = 0.371$, 95% CI: [0.041, 0.701], $t(153) = 2.223$, $p = .028$, $r_{partial} = .177$.

Decomposing the interaction revealed that when the message and topic were matched, objective ambivalence strongly predicted subjective ambivalence, $B = 0.756$, 95% CI: [0.534, 0.977], $t(153) = 6.731$, $p < .001$, $r_{partial} = .478$. However, when the message and topic mismatched, objective ambivalence predicted subjective ambivalence to a much weaker extent, $B = 0.384$, 95% CI: [0.139, 0.628], $t(153) = 3.105$, $p = .002$, $r_{partial} = .243$ (Figure 2). Thus, Study 2 conceptually replicated the matching effect observed in Study 1. In addition, by manipulating the affective–cognitive topic orientation in Study 2, we ruled out alternative explanations and demonstrated that the affect–cognition matching effects can occur for both affectively and cognitively oriented topics.

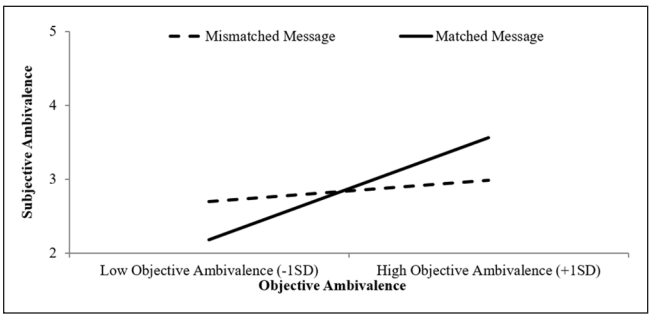

Figure 2. Matching a message to the manipulated topic's affective or cognitive orientation increased the objective–subjective ambivalence relation relative to a mismatched message.

Study 3

Study 3 aimed to address an additional alternative explanation for the matching effect observed in Studies 1 and 2. Because in the prior studies objective ambivalence was measured before the message and subjective ambivalence was measured after the message, one possibility is that the message, especially a mismatched message, would have changed participants' objective ambivalence. This could result in reduced objective–subjective ambivalence correspondence because the objective ambivalence had changed by the time subjective ambivalence was measured and not because of reduced correspondence between the measures. To address this, we examined the effects of both pre- and post-message objective ambivalence. If the results observed in the previous study simply reflect a change in levels of objective ambivalence from pre-message to post-message, we should not find an interaction between the message-topic match and post-message objective ambivalence; we should simply observe high post-message objective–subjective ambivalence correspondence regardless of whether the message and topic matched. We also employed a new topic—sweetened drinks—to show that the matching effects are not unique to the topic of flu vaccination.

Method

Participants and design. We recruited 184 NUS undergraduates ($M_{age} = 19.70$, $SD = 1.10$, females = 76.60%) who participated for partial course credit.

Procedure. The procedures were nearly identical to Study 2, except that the topic was sweetened drinks, and participants completed the objective ambivalence measures in two instances: before and after receiving the message, before reporting their post-message subjective ambivalence.

Table 3. Zero-Order Correlations for Study 3.

Variables	1	2	3	4	5
1. Affective–Cognitive Message Factor	—	.051	.007	–.020	.047
2. Pre-Objective Ambivalence		—	.644**	.461**	.172*
3. Post-Objective Ambivalence			—	.345**	.269**
4. Subjective Ambivalence				—	.371**
5. Initial Attitudes					—

*$p < .05$. **$p < .01$.

Predictor variables

Pre–post objective ambivalence. We included both affective and cognitive unipolar items that ranged from 1 (*strongly disagree*) to 7 (*strongly agree*) to measure responses toward sweetened drinks. As examples of the positive items, one cognitive item was "Drinking sweetened drinks can be a smart choice," and an affective item was "I feel happy from drinking sweetened drinks." As examples of the negative items, one cognitive item was, "Drinking sweetened drinks can be a risky behavior," and an affective item was, "I feel guilty from drinking sweetened drinks." We obtained similar coefficient alphas for positive ($\alpha_{pre} = .821$; $\alpha_{post} = .791$) and negative items ($\alpha_{pre} = .774$; $\alpha_{post} = .841$). Objective ambivalence ($M_{pre} = 3.156$, $SD_{pre} = 1.235$; $M_{post} = 2.876$, $SD_{post} = 1.330$) was calculated in the same way as before.

Outcome variable. Subjective ambivalence was measured using the same items but adapted to the sweetened drinks topic ($M = 4.819$, $SD = 1.641$, $\alpha = .806$).

Result and Discussion

Table 3 shows the zero-order correlations among the variables. Both pre-message ($r = .461$, $p < .001$) and post-message objective ambivalence ($r = .345$, $p < .001$) were correlated with subjective ambivalence. Pre- and post-message measures of objective ambivalence were highly related ($r = .644$, $p < .001$), suggesting relative stability of objective ambivalence following the message.

We first examined the matching hypothesis with identical regression procedures from Study 2. As before, premessage objective ambivalence was associated with subjective ambivalence, $B = 0.614$, 95% CI: [0.442, 0.787], $t(181) = 7.024$, $p < .001$, $r_{partial} = .463$, but the matched-mismatched message factor was not associated with subjective ambivalence, $B = 0.174$, 95% CI: [−0.251, 0.600], $t(181) = 0.808$, $p = .420$, $r_{partial} = .060$.

Importantly, a significant interaction between premessage objective ambivalence and the matched-mismatched message factor was observed, $B = 0.519$, 95% CI: [0.147, 0.892], $t(180) = 2.753$, $p = .007$, $r_{partial} = .201$.Specifically, when the message and topic matched, objective ambivalence predicted subjective ambivalence, $B = 0.776$, 95% CI: [0.570, 0.981], $t(180) = 7.458$, $p < .001$, $r_{partial} = .486$.

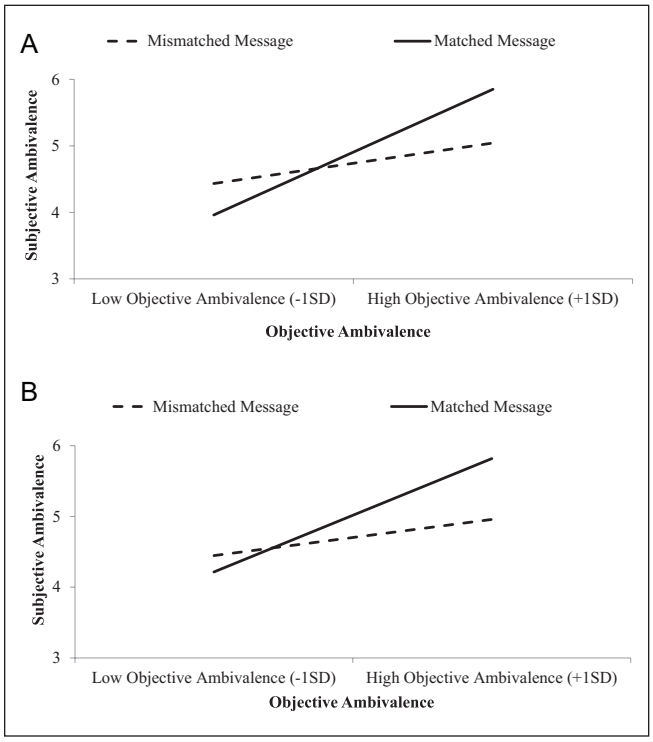

Figure 3. A message matched to the manipulated topic orientation showed stronger (A) premessage objective–subjective ambivalence correspondence than a mismatched message. (B) A message matched to the manipulated topic orientation showed a stronger post-message objective–subjective ambivalence relation than a mismatched message.

However, when the message and topic mismatched, objective ambivalence did not predict subjective ambivalence, $B = 0.255$, 95% CI: [−0.053, 0.563], $t(180) = 1.633$, $p = .104$, $r_{partial} = .121$ (Figure 3A). Thus, this replicated the results from Studies 1 and 2, in which a message matched to a topic's affective or cognitive orientation resulted in greater correspondence between objective ambivalence measured before the message and subjective ambivalence measured after the message.

Next, we examined whether this effect would still occur when using the post- rather than premessage objective ambivalence measure as the predictor to rule out the possibility that the effects are accounted for by the message changing

levels of objective ambivalence. Post-message objective ambivalence was associated with subjective ambivalence, $B = 0.446$, 95% CI: [0.275, 0.618], $t(181) = 5.014$, $p < .001$, $r_{partial} = .357$. However, there was no effect of the matched-mismatched message factor on subjective ambivalence, $B = 0.340$, 95% CI: [−0.115, 0.794], $t(181) = 1.474$, $p = .142$, $r_{partial} = .109$. Importantly, there was a significant interaction between post-message objective ambivalence and the matched-mismatched message factor, $B = 0.410$, 95% CI: [0.060, 0.759], $t(180) = 2.315$, $p = .022$, $r_{partial} = .170$.When the message and topic were matched, objective ambivalence was positively related to subjective ambivalence, $B = 0.608$, 95% CI: [0.390, 0.827], $t(180) = 5.497$, $p < .001$, $r_{partial} = .379$. However, when the message and topic were mismatched, objective ambivalence was not related to subjective ambivalence, $B = 0.198$, 95% CI: [−0.074, 0.469], $t(180) = 1.438$, $p = .152$, $r_{partial} = .107$. Hence, these results further support the matching hypothesis, as stronger objective–subjective ambivalence correspondence was observed in matched compared with mismatched conditions regardless of whether we examined premessage or post-message objective ambivalence. This suggests that the results do not simply reflect mismatched messages changing objective ambivalence, but rather reflect differences in correspondence between the measures, even when they are measured at the same time.

Study 4

In Study 4, we tested a theoretically derived boundary condition for the affective–cognitive matching effects between message and topic orientation on objective–subjective ambivalence correspondence: These effects may be greater among participants for whom the message is counterattitudinal. Receiving a message that is discrepant from one's overall attitude may bring to mind reactions that conflict with one's overall attitude; alternatively, it may be salient that one does not have any reactions that are similar to the discrepant message. However, receiving a message that is consistent with one's overall attitude may not bring to mind responses that conflict with one's overall attitude or the message. Because subjective ambivalence increases as a function of conflicting (i.e., counterattitudinal) responses, more so than congruent (i.e., pro-attitudinal) responses (Priester et al., 2007; Priester & Petty, 1996), and because objective ambivalence is more likely to correspond with subjective ambivalence when conflicting responses are salient (Newby-Clark et al., 2002), bringing those conflicting responses (or lack thereof) to mind should increase objective–subjective ambivalence correspondence. For example, if someone's initial view of vaccines is negative, receiving a provaccine message should bring to mind any positive reactions that person may have that conflict with their overall negative attitude; it may also highlight a lack of positive reactions if they have none. However, if that same person receives an anti-vaccine message, they may only be attentive to their dominant, negative reactions. Therefore, we expect the matching effects to be greater for counterattitudinal messages than the pro-attitudinal messages. Thus, beyond replicating the previous studies, Studies 4 and 5 also examine whether premessage attitudes would moderate the matching effect.

Method

Participants and design. In Study 4, we manipulated whether the message was affective or cognitive for a normatively cognitive topic, as in Study 1. As no prior research has examined the focal effect of this Objective Ambivalence × Message Factor × Initial Attitudes interaction, we extended the data collection period from one semester (as was done in Study 1) to 1 year. This yielded 290 participants ($M_{age} = 21.53$, $SD = 2.19$, 69.30% female) at NUS who participated for SGD5.

Procedures. The procedures were conducted in person and were nearly identical to Study 1 except that initial attitudes were also measured. To avoid multi-collinearity issues, initial attitudes were measured using items that assessed overall evaluations (see Crites et al., 1994) prior to separate items measuring objective ambivalence. In this study, we employed cognitive items to measure the objective ambivalence to examine whether the matching effects would generalize beyond the affective items used in Study 1 and the mix of cognitive and affective items used in Studies 2 and 3.

Predictor variables

Initial attitudes. Six separate unipolar items ranging from 1 (*totally disagree*) to 7 (*totally agree*) adapted from Crites et al. (1994) measured initial attitudes toward receiving flu vaccination ($M = 4.302$, $SD = 1.186$, $\alpha = .898$). For example, participants were asked, "To what extent are your attitudes toward receiving yearly flu vaccination [negative/positive]?" Negatively worded items were recoded so that averaged higher scores indicated more positive attitudes.

Objective ambivalence. Three positive ($M = 5.426$, $SD = 1.183$, $\alpha = .898$) and three negative ($M = 3.975$, $SD = 1.220$, $\_ = .540$) unipolar cognitive items ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) measured responses toward receiving flu vaccination. The objective ambivalence index was computed the same way as before ($M = 2.626$, $SD = 1.720$).

Affective–cognitive message. The affective or cognitive messages were identical to Study 1.

Outcome variable

Subjective ambivalence. The same items as before were used and averaged ($M = 4.466$, $SD = 1.928$, $\_ = .942$).

Table 4. Zero-Order Correlations for Study 4.

Variables	1	2	3	4
1. Affective–Cognitive Message Factor	—	–.023	–.073	–.025
2. Objective Ambivalence		—	.411**	–.334**
3. Subjective Ambivalence			—	–.404**
4. Initial Attitudes				—

*$p < .05$. **$p < .01$.

Results and Discussion

Table 4 shows the correlations among the variables.

Outcome variable: Subjective ambivalence. To replicate the two-way interaction observed in the previous three studies, we first regressed subjective ambivalence on objective ambivalence, the affective–cognitive message factor, and their interaction. This analysis revealed that objective ambivalence predicted subjective ambivalence, $B = 0.458$, 95% CI: [0.340, 0.577], $t(287) = 7.617$, $p < .001$, $r_{partial} = .410$, but the affective–cognitive message factor did not, $B = -0.246$, 95% CI: [−0.653, 0.161], $t(287) = -1.192$, $p = .234$, $r_{partial} = -.073$. More importantly, a marginal interaction effect was observed, $B = -0.199$, 95% CI: [−0.436, 0.037], $t(286) = -1.658$, $p = .098$, $r_{partial} = -.098$. In the cognitive message (matching) condition, objective ambivalence positively predicted subjective ambivalence, $B = 0.563$, 95% CI: [0.392, 0.735], $t(287) = 6.462$, $p < .001$, $r_{partial} = .357$. However, this relation was weaker in the affective message (mismatch) condition, $B = 0.364$, 95% CI: [0.201, 0.527], $t(287) = 4.391$, $p < .001$, $r_{partial} = .251$. Thus, this study directionally replicated the previous studies.

Next, to examine if initial attitudes would moderate the interaction pattern, a hierarchical multiple regression predicting subjective ambivalence was conducted. Initial attitudes, objective ambivalence, and affective–cognitive message factor (coded as: 0 = cognitive, 1 = affective) were entered first. Then, all possible two-way interactions were included before the three-way interaction (Table 5).

Importantly, we observed a significant three-way interaction, $B = 0.213$, 95% CI: [0.043, 0.383], $t(282) = 2.460$, $p = .014$, $r_{partial} = .145$. We decomposed this by examining individuals with positive versus negative attitudes toward flu vaccination. Among participants with negative attitudes (i.e., message was counterattitudinal), there was a significant interaction between objective ambivalence and the affective–cognitive message factor, $B = -0.672$, 95% CI: [−0.995, −0.349], $t(282) = -4.095$, $p < .001$, $r_{partial} = -.237$ (Figure 4A). For the cognitive message (matched condition), objective ambivalence positively predicted subjective ambivalence, $B = 0.630$, 95% CI: [0.399, 0.862], $t(282) = 5.355$, $p < .001$, $r_{partial} = .304$. However, for the affective message (mismatched condition), no objective–subjective ambivalence correspondence was observed, $B = -0.043$, 95% CI: [−0.268, 0.183], $t(282) = 5.355$, $p = .709$, $r_{partial} = -.022$.

Among those with positive attitudes (i.e., message was pro-attitudinal), there was no significant interaction between objective ambivalence and the affective–cognitive message factor, $B = -0.167$, 95% CI: [−0.463, 0.130], $t(282) = -1.107$, $p = .269$, $r_{partial} = -.066$ (Figure 4B). In both the affective (matched), $B = 0.433$, 95% CI: [0.216, 0.649], $t(282) = 3.937$, $p < .001$, $r_{partial} = .228$, and cognitive (mismatched) message conditions, $B = 0.266$, 95% CI: [0.063, 0.469], $t(282) = 2.575$, $p = .011$, $r_{partial} = -.022$, objective ambivalence positively predicted subjective ambivalence. Thus, as expected, the effect of matching on objective–subjective ambivalence correspondence was greater among those for whom the message was counter- rather than pro-attitudinal.

Study 5

Study 5 investigated whether the moderation by premessage attitudes observed in Study 4 would generalize to a normatively affective topic. Thus, we returned to the normatively affective topic of sweetened drinks (Gibson, 2006; J. Kim et al., 2017). In addition, all previous studies were conducted in Singapore. Past research has documented differences in Eastern and Western cultures in both their preferred message and in their comfort with ambivalence. That is, Asians tend to prefer emotional messages while Westerners prefer cognitive messages (e.g., Lin, 2001). Moreover, East Asians are more comfortable with holding conflicting thoughts compared with their Western counterparts (Ng et al., 2012; Peng & Nisbett, 1999). Given these cross-cultural differences, we wanted to examine if the effects observed in previous studies would generalize to a Western context. We therefore recruited a sample of participants in the United States from Mechanical Turk.

Method

Participants and design. Existing lab resources allowed recruitment of 280 Mechanical Turk participants ($M_{age} = 34.79$, $SD = 11.81$, 54.30% female)[3] from the United States, which is comparable in size to Study 4.

Procedures. The procedures were similar to Study 4 except that the study was conducted online using Qualtrics and the message advocated against sweetened drinks.

Table 5. Subjective Ambivalence Regressed on Initial Attitudes, Objective Ambivalence, Affective–Cognitive Message, and Their Two- and Three-Way Interactions in Study 4.

Predictor	*B*	*t*	*p*	95% confidence interval	Partial *r*	R^2_{Change}
Step 1						
Initial Attitudes	−0.493***	−5.588	<.001	[−0.666, −0.319]	−.314	.254
Objective Ambivalence	0.345***	5.679	<.001	[0.225, 0.465]	.318	
Affective–Cognitive Message Factor	−0.284	−1.444	.150	[−0.672, 0.103]	−.085	
Step 2						
Initial attitudes × Objective Ambivalence	0.040	0.921	.358	[−0.045, 0.125]	.055	.035
Initial attitudes × Affective–Cognitive Message Factor	−0.467**	−2.614	.009	[−0.820, −0.115]	−.154	
Objective Ambivalence × Affective–Cognitive Message Factor	−0.394**	−3.281	.001	[−0.630, −0.158]	−.191	
Step 3						
Initial attitudes × Objective Ambivalence × Affective–Cognitive Message Factor	0.213*	2.460	.014	[0.043, 0.383]	.145	.015

Note. $R^2 = .304$.
*$p < .05$. **$p < .01$. ***$p < .001$.

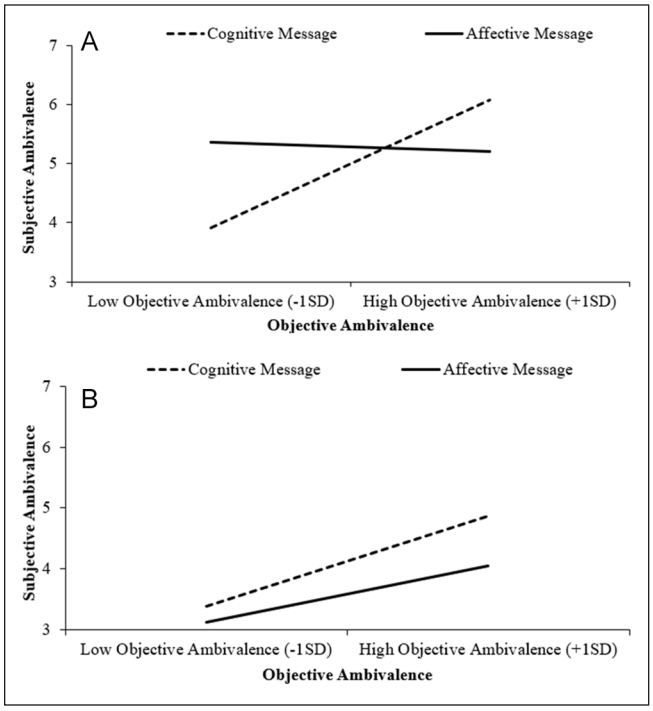

Figure 4. (A) The counterattitudinal message led to stronger objective–subjective ambivalence correspondence for a matched cognitive than a mismatched affective message. (B) The pro-attitudinal message did not show significant differences in objective–subjective ambivalence correspondence regardless of the message type.

Predictor variables

Initial attitudes. Participants' initial attitudes ($M = 3.943$, $SD = 1.157$, $\alpha = .763$) toward consuming sweetened drinks were measured with six unipolar items adapted from Crites et al. (1994) ranging from 1 (*not at all*) to 7 (*totally*). For example, "To what extent are your attitudes toward drinking sweetened drinks [*negative*/*positive*]?" Negatively worded items were recoded before being averaged, with higher scores indicating more positive attitudes.

Objective ambivalence. Three positive ($M = 4.141$, $SD = 1.771$, $\alpha = .918$) and three negative unipolar items ($M = 5.012$, $SD = 1.128$, $\alpha = .574$) ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) assessed participants' responses to sweetened drinks. A positive example item is "Drinking sweetened drinks is valuable for my health," while a negative example is "Drinking sweetened drinks is useless as it has a lot of sugar in it." The objective ambivalence index was computed as before ($M = 3.090$, $SD = 2.352$).

Affective–cognitive message. Participants were randomly assigned to read an affective or cognitive message that described the negative outcomes of drinking sweetened drinks. The *affective message* described negative emotional outcomes such as feeling unhappy after the sugar high ends. In contrast, the *cognitive message* described negative instrumental outcomes such as how drinking sweetened drinks increases risks of diseases.

Outcome variable

Subjective ambivalence. As before, responses were averaged ($M = 5.406$, $SD = 2.392$, $\alpha = .937$).

Results and Discussion

Table 6 shows the zero-order correlations among the variables.

We employed the same analysis plan as Study 4 to first examine the interaction between objective ambivalence and the affective–cognitive message factor on subjective ambivalence.

Table 6. Zero-Order Correlations for Study 5.

Variables	1	2	3	4
1. Affective–Cognitive Message Factor	—	−.038	.005	−.017
2. Objective Ambivalence		—	.688**	.326**
3. Subjective Ambivalence			—	.307**
4. Initial Attitudes				—

*$p < .05$. **$p < .01$.

Table 7. Subjective Ambivalence Regressed on Initial Attitudes, Objective Ambivalence, Affective–Cognitive Message, and Their Two- and Three-Way Interactions in Study 5.

Predictor	*B*	*t*	*p*	95% confidence interval	Partial *r*	R^2_{Change}
Step 1						
Initial Attitudes	0.192*	2.023	.044	[0.005, 0.378]	.121	.481
Objective Ambivalence	0.670***	14.353	<.001	[0.578, 0.762]	.654	
Affective–Cognitive Message Factor	.151	0.728	.467	[−0.257, 0.559]	.044	
Step 2						
Initial Attitudes × Objective Ambivalence	−0.197***	−4.430	<.001	[−0.284, −0.109]	−.259	.037
Initial Attitudes × Affective–Cognitive Message Factor	−0.233	−1.240	.216	[−0.604, 0.137]	−.075	
Objective Ambivalence × Affective–Cognitive Message Factor	0.067	0.737	.462	[−0.112, 0.246]	.045	
Step 3						
Initial Attitudes × Objective Ambivalence × Affective–Cognitive Message Factor	0.292**	3.334	.001	[0.120, 0.464]	.198	.019

Note. $R^2 = .537$.
*$p < .05$. **$p < .01$. ***$p < .001$.

The analyses revealed that objective ambivalence predicted subjective ambivalence, $B = 0.701$, 95% CI: [0.613, 0.788], $t(277) = 15.792$, $p < .001$, $r_{partial} = .688$. However, the affective–cognitive message factor, $B = 0.149$, 95% CI: [−0.262, 0.560], $t(277) = 0.714$, $p = .476$, $r_{partial} = .043$, and the two-way interaction, $B = 0.060$, 95% CI: [−0.115, 0.234], $t(276) = 0.670$, $p = .503$, $r_{partial} = .040$, did not predict subjective ambivalence. Recall, however, that we expect this two-way interaction to be more likely among those for whom the message was counterattitudinal. Therefore, to examine moderation by initial attitudes, a hierarchical multiple regression identical to that in Study 4 was performed (Table 7).

As hypothesized, there was a significant three-way interaction, $B = 0.292$, 95% CI: [0.120, 0.464], $t(272) = 3.334$, $p = .001$, $r_{partial} = .198$. We decomposed this by examining effects among individuals with positive versus negative attitudes. Among those with positive attitudes (for whom the message was counterattitudinal), there was a significant interaction between objective ambivalence and the affective–cognitive message factor, $B = 0.456$, 95% CI: [0.167, 0.744], $t(272) = 3.105$, $p = .002$, $r_{partial} = .185$. For those in the affective message (matched) condition, there was a strong objective–subjective ambivalence relation, $B = 0.659$, 95% CI: [0.445, 0.873], $t(272) = 6.068$, $p < .001$, $r_{partial} = .345$. However, for those in the cognitive message (mismatched) condition, there was a much weaker objective–subjective ambivalence relation, $B = 0.202$, 95% CI: [0.008, 0.397], $t(272) = 2.047$, $p = .042$, $r_{partial} = .123$ (Figure 5A).

A different pattern was observed for those with negative initial attitudes (i.e., message was pro-attitudinal): there was no interaction between objective ambivalence and the affective–cognitive message factor, $B = −0.220$, 95% CI: [−0.464, 0.024], $t(272) = −1.776$, $p = .077$, $r_{partial} = −.107$. When the message was pro-attitudinal, objective ambivalence was associated with subjective ambivalence, for both the affective message, $B = 0.752$, 95% CI: [0.578, 0.925], $t(272) = 8.537$, $p < .001$, $r_{partial} = .460$, and the cognitive message, $B = 0.972$, 95% CI: [0.800, 1.144], $t(272) = 11.130$, $p < .001$, $r_{partial} = .559$ (Figure 5B).

Hence, the results replicated that the effect of affective–cognitive matching on objective–subjective ambivalence correspondence was greater for those with attitudes discrepant from the message than for those with attitudes consistent with the message. Moreover, these effects were obtained for a normatively affective topic and among individuals from a Western culture, demonstrating that these effects generalize from the normatively cognitive topic and Asian context in Study 4.

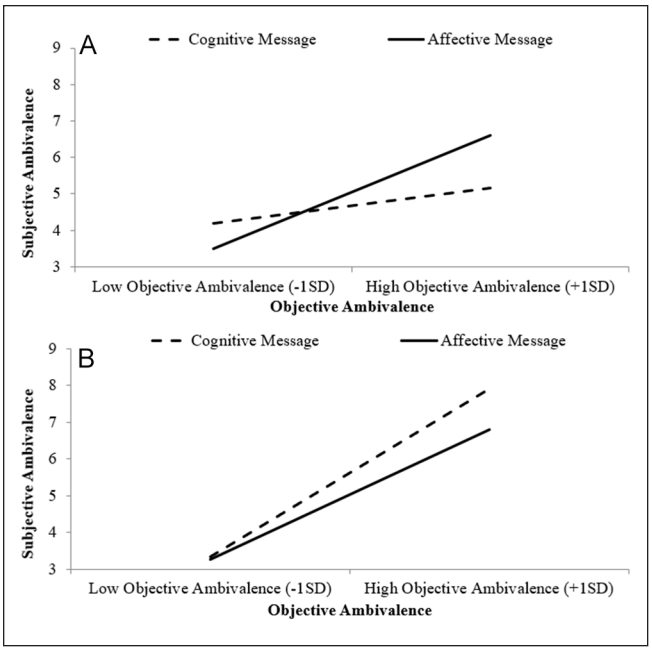

Figure 5. (A) The counterattitudinal message resulted in stronger objective–subjective ambivalence correspondence with a matched affective versus a mismatched cognitive message. (B) The pro-attitudinal message did not show significant differences in objective–subjective ambivalence correspondence regardless of the message type.

General Discussion

The primary objective of this research was to test a novel factor that could influence the objective–subjective ambivalence relation: encountering a message that matched a topic's affective or cognitive orientation. Studies 1 to 3 demonstrated that when encountering a matched versus mismatched message, there was a stronger objective–subjective ambivalence relation. Studies 4 and 5 elucidated that these effects were greater among those for whom the message was counterattitudinal. This moderation by attitudes is also supported across a meta-analysis of the current five studies (using the objective ambivalence items from Studies 1–3 to compute an attitude index as they did not include separate measures of attitudes), $r = .101$, $Z = 3.292$, $p = .001$ (see online supplement, pp. 8–12). These studies, which employed samples from both Eastern and Western cultures, also demonstrated that the effects can generalize across both groups (Henrich et al., 2010).

Implications

Objective–subjective ambivalence relation. The present findings build on past research examining why only a modest objective–subjective ambivalence relation exists by identifying cases when the relation between the two is stronger versus weaker (e.g., Priester & Petty, 1996). Beyond those already documented, the current work highlights another situational feature, specifically that the message one encounters can interact with topic orientation to predict the objective–subjective ambivalence relation.

Consequences of affective–cognitive messages for attitude strength. The current work also builds on previous work emphasizing the importance of not just examining the effects of messages on attitude change but also on attitude strength (e.g., Tormala & DeSensi, 2008). It is often a goal of persuasion attempts for recipients to take a favorable action or avoid taking an unfavorable action. When considering whether participants will act or not, it is important to consider the strength of their attitudes beyond their attitude itself. This is particularly important for counterattitudinal messages because even if messages do not change people's attitudes, they can still impact the strength of the unchanged attitudes and possibly reduce the likelihood of bad behavior (see Petty & Wegener, 1999; Tormala & Petty, 2002). Of particular relevance to the current research, previous work has suggested that attitudes held with ambivalence versus univalence tend to be weaker and that these effects seem to be driven by subjective ambivalence (DeMarree et al., 2014), suggesting that increasing subjective ambivalence may be a means of reducing negative attitude-consistent behaviors. Studies 4 and 5 documented effects especially among participants for whom the message was counterattitudinal. For example, in Study 5, the matching effects occurred among participants who viewed sweetened drinks positively, which was discrepant from the message arguing that people should not consume them. This is a case where the communicator might wish that the recipient would not act on their favorability toward sugary drinks. Even if the communicator is not successful at changing the recipients' minds, they could weaken their attitudes by making them feel ambivalent to reduce their consumption likelihood. The current work suggests that when addressing an audience that is likely to be high in objective ambivalence, provide them with a matched message to maximize subjective ambivalence. Alternatively, when addressing an audience that is likely to be low in objective ambivalence, provide them with a mismatched message. Thus, this work provides practical insight into how practitioners might encourage people to avoid negative health behaviors, even if they cannot change their minds.

Affect–cognition matching. The present findings also build on past literature, which found better outcomes with a match to dispositional variables like individual differences in affective–cognitive meta-bases and Need for Affect or Need for Cognition (e.g., Haddock et al., 2008; Keer et al., 2013; See et al., 2008). The current research highlights that matching effects can also occur when matching to the topic's normative attitude orientation or situationally induced attitude orientation. This would be especially useful when individual differences in affective–cognitive preferences are not known or are difficult to obtain. Furthermore, we look forward to

future work examining the implications of the current findings for cognitive–affective ambivalence (Conner et al., 2020; see Conner & Sparks, 2002).

Limitations and Future Directions

Potential mediators for matching effects. One limitation of the current work is that we did not establish any underlying mechanism for these matching effects. We speculate that increased processing fluency (Mayer & Tormala, 2010)[4] and/or increased accessibility of attributes (Giner-Sorolla, 2004) might play a role in these effects. Alternatively, increased awareness of conflicting reactions (Newby-Clark et al., 2002) or increased perceived validity of conflicting reactions (DeMarree et al., 2015) might also underlie these matching effects. Importantly, the findings in Studies 4 and 5 suggest that the among the plausible mechanisms, the more likely ones would be the processes that arise from facing a counterattitudinal message.

Employing parallel measures of positive and negative reactions to compute objective ambivalence. We replicate our effect of interest across a number of different measures of objective ambivalence, including those that employ both affective and cognitive items or one versus the other. In the review process, it was raised that the positive and negative items we employ are not perfectly parallel to one another. Our approach mirrors prior work, which has also not always used parallel items for each valence (e.g., Glick & Fiske, 1996; Jonas et al., 2000). Nevertheless, to the extent that the lack of parallelism between positive and negative is confounded with some other dimension beyond valence, it is possible that objective ambivalence would capture the conflict between those dimensions in addition to the conflict between valences. For this reason, it may be useful in future work to use positive and negative measures that are as parallel as possible.

Beyond affect–cognition matching. Future research could extend the current matching effects to other attitude properties that can match or mismatch to messages. Past research has found that topics can vary in whether they are normatively viewed as moral (Luttrell et al., 2019; Philipp-Muller et al., 2020). Moreover, messages can be focused on morality (Luttrell et al., 2019; Maio & Olson, 2000). As such, these variants of the message could also elicit a matching effect on objective–subjective ambivalence correspondence, like the ones observed in this research.

Conclusion

Extant literature has revealed that the objective–subjective ambivalence relation is often quite weak, spurring research to identify times when it is stronger. The present research adds that affective–cognitive matching between an attitude orientation and a message can also strengthen the objective–subjective ambivalence relation. Moreover, this is more likely to occur when a person's attitude is discrepant from the message. More broadly, the current work provides insight into how different types of messages may influence attitude strength.

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Supplemental Material

Supplemental material is available online with this article.

Notes

1. We began this research by using objective ambivalence items that mismatched the orientation of the topic because past research found that matching the affective–cognitive orientation of the objective ambivalence measure to a normatively affective–cognitive topic could result in greater correspondence to subjective ambivalence (See & Luttrell, 2021). We were concerned that a match between objective ambivalence and topic would leave little variance to observe the effects of a match between message and topic, so we began with a mismatching measure. We then moved to a combined measure as well as a matched measure of objective ambivalence in later studies to ensure that the effects would persist across various objective ambivalence measures. Indeed, the effect of matching message and topic occurs regardless of which measure is used.
2. To ensure that the Objective Ambivalence × Matched-Mismatched Message Factor interaction was as hypothesized in the affective and cognitive topic conditions, we also examined the Objective Ambivalence × Affective–Cognitive Message Factor × Affective–Cognitive Topic interaction. Consistent with our hypothesis, the three-way interaction was significant. Details are in the Online Supplement.
3. As Study 5 was conducted online than in-person, we added attention checks to ensure data quality. To be consistent across studies, we did not exclude anyone from the analyses reported in the text. Excluding eight participants who failed the attention check did not change the results. See breakdown in the Online Supplement.
4. Using Study 3's data, we examined mediation via perceived fluency for conflicting reactions. Although the moderated mediation index was not significant, $B = 0.009$, 95% CI: [−0.057, 0.077], the decomposed patterns via positive and negative attitudes were as expected. See online supplement for breakdown.

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