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An Empirical Procedure to Evaluate Misinformation Rejection and Deception in Mediated Communication Contexts

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Although misleading health information is not a new phenomenon, no standards exist to assess consumers' ability to detect and subsequently reject misinformation. Part of this deficit reflects theoretical and measurement challenges. After drawing novel connections among legal, regulatory, and philosophical perspectives on false, misleading or deceptive advertising and cognitive-process models of persuasive communication, we define deception and misinformation rejection. Recognizing that individuals can hold beliefs that align with a persuasive message without those beliefs having been influenced by it, we derive empirical criteria to test for evidence of these constructs that center on yielding or not yielding to misinformation in mediated contexts. We present data from an experimental study to illustrate the proposed test procedure and provide evidence for two theoretically derived patterns indicative of misinformation rejection. The resulting definitions and empirical procedure set the stage for additional theorizing and empirical studies on misinformation in the marketplace.

Keywords: Misinformation, Deception, Direct-to-Consumer Advertising, Marketing Promotion, Persuasion, Message Effects

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Despite recent research on the proliferation and potential correction of inaccurate and misleading health information (e.g., Aikin et al., 2015; Sangalang, Ophir, & Cappella, 2019), we currently have insufficient empirical evidence concerning consumers' ability to detect and subsequently reject misinformation in contexts such as advertising for prescription drugs (Boudewyns et al., 2018). Part of this deficit reflects theoretical and measurement challenges about how to assess rejection of false and/or misleading information in mediated communication. We use the term *mediated communication* here as a loose stand-in for modes of communication

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characterized by limited reciprocal exchange, where messages are largely crafted or prepared in advance, and delivery does not primarily occur through face-to-face interaction. Although we focus on audience responses to misleading or deceptive prescription drug promotion in this article, our test of *misinformation rejection* can also be applied in other communication contexts, including the promotion of other products and services.

To clarify the concept of misinformation rejection, we initially consider the criteria for designating: (a) prescription drug advertising as false, lacking in fair balance, or otherwise misleading according to the Federal Food, Drug, and Cosmetic Act (FD&C Act), and (b) marketing communication more broadly as deceptive and unfair according to the Federal Trade Commission Act (FTC Act). We then relate these definitions to *deception* and related concepts as they have been defined in various scholarly disciplines. In doing so, we identify areas of agreement and disagreement among these sources, consider counterexamples to conditions outlined in prior definitions, and arrive at consolidated definitions of misleadingness and deception. We then offer a definition of misinformation rejection in mediated contexts that differentiates yielding from mere acceptance and acknowledges that beliefs that align with a message are not necessarily influenced by that message. With this in mind, we outline empirical criteria for judging whether deception resulting from message exposure has occurred or has been averted. Lastly, we present the results from a randomized experiment to illustrate this test procedure.

What is deception?

Legal and regulatory perspectives on deceptive, false, or misleading advertising

In the United States, both the Food and Drug Administration (FDA) and the FTC have authority to enforce federal false advertising laws on behalf of consumers through provisions of the FD&C Act and FTC Act, respectively. Both laws prohibit statements or misrepresentations in promotional materials that cause or are likely to cause consumers to have false beliefs that impact their decision making with regard to a product or service, either by being expressly false or by contributing to a reasonable interpretation that is false. In some respects, these laws have overlapping definitions of what constitutes deceptive, false, or misleading advertising; however, the specific interests differ that each law protects.

A prescription drug can be misbranded ([Federal Food, Drug, and Cosmetic Act, 2018, § 352\(n\)](#)) and in violation of the FD&C Act, among other reasons, if an advertisement for it fails to satisfy the *true statement requirement* for information relating to side effects, contraindications, and effectiveness ([Prescription-Drug Advertisements, 2016, § 202.1\(e\)](#)). Such failures in prescription drug advertising can manifest by means of overt statements or representations that are factually inaccurate and through dubious implied claims or suggestions, partial truths, and omissions of material fact ([Federal Food, Drug, and Cosmetic Act, 2018, § 321\(n\)](#));

[Prescription-Drug Advertisements, 2016](#), § 202.1(e)(5)). Notably, the terms *deception* or *deceptive* in the context of prescription drug advertising do not appear in the FD&C Act or associated regulations. Instead, relevant concepts are encapsulated in the phrase “false, lacking in fair balance, or otherwise misleading.” Importantly, many prescription drug advertisements that fail to meet the true statement requirement are misleading by virtue of what they imply rather than being explicitly false ([Faerber & Kreling, 2013](#); [Hastak & Mazis, 2011](#)).

Applicable to advertising in a broader context, the FTC Act established and empowers the FTC to prevent the use of “unfair or deceptive acts or practices affecting commerce” within the United States ([Federal Trade Commission Act, 2006](#), § 45(a)(1–2)). Noting ambiguity in the way deceptive acts or practices and false advertisements are defined in the FTC Act, the FTC published a policy statement in 1983 to clarify how the concept is applied in fulfillment of its enforcement mandate, identifying three core elements of deception: (a) there must be a representation, omission, or practice that is likely to mislead consumers (which is distinct from actually causing them to reach false beliefs), (b) interpretations of the act or practice in question must be viewed from the perspective of a targeted consumer audience acting reasonably under the circumstances, and (c) the act or practice must be a material one, in that it is likely to affect consumer conduct or decision making with regard to a product or service ([FTC, 1983](#)). The FTC policy statement further explains that materiality is intertwined with the concept of injury. Material misrepresentations are likely to lead consumers to make different choices than they would were they acting on accurate and truthful information; as such, this influence constitutes an injury (see also [Southwell et al., 2019](#), for a related discussion of the influence of false or inaccurate information on health-related behaviors and the resulting harmful consequences for public health).

The way deception-related concepts are dealt with in federal false-advertising statutes, regulations, and case law emphasizes several important characteristics for understanding the meaning of this term. An advertisement can deceive without making any explicitly false statements or assertions, and deception is not an exclusively verbal phenomenon. Also, a distinction can be made between being deceived and being mistaken, even if both ultimately lead to the acquisition of false beliefs or the loss of true beliefs (see [Artiga & Paternotte, 2018](#)). Except where an advertisement is *prima facie* false, a reasonable-person standard imposes constraints on the kinds of interpretations that would be considered misleading, distinguishing misleading statements from misunderstandings or impressions that are simply made in error. Further, an act, practice, or expression can have more than one reasonable interpretation and where one of these interpretations is likely to mislead consumers, then the seller is responsible for that interpretation ([FTC, 1983](#)).

Philosophical perspectives on deception

In the broader context of human communication there is general consensus that the notion of deception involves conveying information in a way that results in someone believing something that is false. In line with this minimal view, [Chisholm and Feehan \(1977\)](#) offered eight definitions of deception to fit specific situations differentiated by the types of misinformation and belief change involved; for example, by means of omission or commission, acquiring a new false belief, continuing to hold a false belief, introducing doubt in a true belief, or preventing the acquisition of a true belief. These definitions can be simplified into the following three conditions: (a) p is false, (b) a person S represents that p is true to someone else R , and (c) by representing that p is true, S contributes causally toward R 's belief in p . Conceived broadly, p is a piece of information (or misinformation), an idea, or a proposition that is either true or false; S is a communicator or source of misinformation; and R is an audience or receiver of misinformation.

Although some variation of the first two of Chisholm and Feehan's conditions is endorsed in almost all definitions of deception in the literature we reviewed (cf. [Bok, 1978](#); [Masip, Garrido, & Herrero, 2004](#); [Vrij, 2000](#) who do not include the falsity condition in their definitions), this minimal account is incomplete. The main areas of disagreement among scholars can be grouped into three categories: the role of intentionality or deliberateness on the part of S in causing R to hold a false belief; the epistemic state of S with regard to p ; and the nature or strength of the causal connection linking S 's representation to R 's belief in p .

Chisholm and Feehan draw a distinction between *deception* and *intended deception*, whereas others have argued that intentionality is itself a necessary condition of deception ([Bok, 1978](#); [Buller & Burgoon, 1996](#); [Carson, 2010](#); [DePaulo et al., 2003](#); [Levine, 2014](#); [Linsky, 1963](#); [Mahon, 2007, 2015](#); [Masip et al., 2004](#); [Vrij, 2000](#)). Perspectives concerning the scope and target of this intentionality differ among scholars who endorse such conditions. These perspectives can be broadly split on two dimensions, each with different targets. Under the first sense, which we label *informational intentionality*, the target of intention is to influence judgments concerning p ; that is, S has a deliberate purpose in representing that p is true and that purpose is to cause R to believe that p is true (or at least to doubt that p is false). One possible reason for including this condition would be to exclude instances where S falsely represents that p is true and causes R to believe it, but S was only playacting, being sarcastic, joking, or operating in a communication context where exaggeration is not supposed to be taken seriously. In other words, while S might have inadvertently misled R about p by "causing them to have a false belief" ([Carson, 2010](#), p. 49), it does not rise to the level of deception because S did not intend for R to believe that p is true.

Some definitions of deception that include an intentionality condition seem to restrict it to the narrow sense described by informational intentionality ([Buller & Burgoon, 1996](#); [DePaulo et al., 2003](#); [Levine, 2014](#); [Linsky, 1963](#)). Most other

definitions combine this dimension with a second dimension, which we label *meta-representational intentionality*, where the target of the deceptive intent is for *S* to be misleading about their epistemic state with regard to *p* (Bok, 1978; Carson, 2010; Mahon, 2007; Masip *et al.*, 2004; Vrij, 2000). That is, by representing that *p* is true, *S* aims to give the false impression that they personally believe *p* is true, when they actually believe that *p* is false (or, at least, that they do not believe that *p* is true).

However, the metarepresentational intentionality condition is too restrictive to be a necessary element of deception and we illustrate this point with a counterexample. Suppose that Smith is a local retailer who recently started selling CBD oil because of media buzz around it but is uncertain whether it has any health effects. Smith has a longtime customer, Roberts, who was diagnosed recently with cancer. Seeing an opportunity for a sale, Smith falsely represents to Roberts that CBD oil cures cancer with the following utterance: “I don’t know if CBD oil does anything at all, but many people say it cures cancer.” Smith does not intend to imply a personal belief that CBD oil cures cancer, and is metarepresentationally sincere in saying, “I don’t know if CBD oil does anything at all.” However, Smith does have informational intentionality to get Roberts to think that CBD oil is or might be a cure for cancer. If hearing this utterance strengthens Roberts’s belief that CBD oil cures cancer, intuition tells us that Smith will have deceived Roberts. But if metarepresentational intentionality were a necessary condition of deception, this example would not fit.

Definitions with an intentionality condition also tend to include a condition concerning *S*’s epistemic state with regard to the truth of *p*. For example, Bok (1978), Masip *et al.* (2004), and Vrij (2000) altogether replace the falsity condition in their definitions of deception with a condition concerning whether or not *S* believes that *p* is true. Other scholars who include a version of this condition in their definitions treat it as an additional necessary component along with the falsity condition (Buller & Burgoon, 1996; Carson, 2010; Kalbfleisch & Docan-Morgan, 2019; Mahon, 2007). There are two versions of the *epistemic-state condition*. The narrow version requires that *S* believe that *p* is false (Carson, 2010; Kalbfleisch & Docan-Morgan, 2019; Mahon, 2007; Masip *et al.*, 2004). The broad version requires only that *S* does not believe that *p* is true (e.g., because *S* has not given any thought to the veracity of *p*; Bok, 1978; Carson, 2010; Vrij, 2000).

Ordinary language provides a reason to choose the broad version of this condition over the narrow version (cf. Carson, 2010). In human communication contexts, individuals tend to hold a defeasible presumption of honesty because, descriptively, most people communicate honestly with one another most of the time (Grice, 1975; Levine, 2014; Sperber *et al.*, 2010). When *S* represents that *p* is true, it follows from the presumption of honesty that *R* would infer that *S* believes that *p* is true. In effect, the representation that *p* is true typically carries with it a second-order representation concerning *S*’s epistemic state toward *p*. Our interpretation of the epistemic-state condition is that it attempts to articulate that deception involves (or ought to involve) a violation of this presumption. The narrow and broad versions

of the condition are both intended to negate the presumptive attitudinal proposition that *S* believes that *p* is true. However, there are two nonequivalent meanings to this negation: (a) *S* believes that *p* is false, and (b) *S* is indifferent with regard to the veracity of *p* (i.e., *S* does not believe that *p* is true nor that *p* is false). Only the broad version of the epistemic-state condition—*S* does not believe that *p* is true—is consistent with both of these meanings. Consequently, the broad version negates the presumption of honesty, encompasses the narrow version of the condition (e.g., meaning 1 is the same as the narrow version), expands on it by allowing for indifference to the truth of *p*, and should be preferred on these grounds.

A third contentious condition relates to the role of causation in deception. Several definitions treat deception as a factive-verb and include a *yielding condition*, which stipulates that deception connotes success with regard to the formation or persistence of a false belief (Bok, 1978; Carson, 2010; Fallis, 2010; Frank & Svetieva, 2013; Levine, 2014; Mahon, 2007; Simpson, 1992) or in being led into a misinformational state (Artiga & Paternotte, 2018; Chisholm & Feehan, 1977; Fallis & Lewis, 2019; Skyrms, 2010). Fallis and Lewis (2019) note an ambiguity in the false-belief version of the condition that centers on whether belief is conceived as a binary state or a subjective continuum allowing for varying degrees of belief (e.g., Goldman, 1999):

not all [deceptive] signals that convey information result in outright belief. A signal may just shift the probability of some hypothesis (. . .) For instance, even if a big bet does not fully convince your opponent at the poker table that you have a strong hand, it may create enough doubt in his mind that he folds. (p. 2281)

Conceiving of beliefs as subjective probabilities (e.g., Fishbein & Ajzen, 2010) resolves this challenge by allowing for incremental changes in belief strength. From this interpretation, which we endorse in our model, the yielding condition would be met so long as *S* strengthens or sustains *R*'s belief that *p* is true or weakens *R*'s belief that *p* is false.

Consolidated definition of deception

To mislead and deceive are nested concepts from both philosophical and legal perspectives, as are the qualities of having been misled (i.e., misleadingness) or deceived (i.e., deception). To clarify the boundaries of these related concepts, we unpack our definition into two components:

mislead: *S* misleads *R* with respect to a piece of information *p*, if and only if (. . .)

- A₁. *p* is false (*falsity*); and
- A₂. *S* represents that *p* is true (*representation*); and
- A₃. *R* believes that *p* is true because *S* represents that *p* is true (*yielding*).

deceive: *S* deceives *R* with respect to a piece of information *p*, if and only if (. . .)

- A₁₋₃. *S* misleads *R* with respect to *p*; and

- A₄. S does not believe that *p* is true (*epistemic state*); and
- A₅. By representing that *p* is true, S intends to cause *R* to believe that *p* is true or, at least, to doubt that *p* is false (*informational intentionality*).

As a point of clarification, we use the unconventional label, A_{1-3} , for the first condition in the definition of *deceive* to emphasize its equivalence and substitutability with the three conditions that constitute the definition of *mislead*. This is consistent with the notion that deception is a special case of misleadingness that assumes intentionality. Likewise, we continued the numbering of the remaining conditions in the definition of *deceive* to draw further attention to the relation between these two concepts.

The first two conditions in these definitions, A_1 and A_2 , roughly align with two points of consensus in nearly all theories of deception we reviewed; namely, that to mislead or deceive involves communicating something false. The term *represents* in conditions A_2 , A_3 , and A_5 is meant to be inclusive of the broad range of actions, devices, signals, stimuli, or states by which people might convey information. We also intend to exclude erroneous impressions or misunderstandings on the part of message recipients from what a communicator represents (Artiga & Paternotte, 2018; Carson, 2010). If *S* represents that *p* is true with a signal, stimulus, or message *M*, then our understanding is that, by definition, *R* is justified in interpreting *M* to mean “*p* is true.” However, the mere act of interpreting some stimulus to mean “*p* is true” is insufficient on its own to say that the stimulus represents that *p*. In other words, we presume something akin to the reasonable-person standard as part of the meaning of *represents*.

We also conceive condition A_2 broadly enough to include cases where *S* misrepresents the truth-value of *p* by omission. From this perspective, *S* in effect represents that *p* is true by neglecting to represent that *p* is false, despite a contextual obligation to do so. The caveat that this interpretation only applies when there is a contextual obligation to accurately represent that *p* is false is included to constrain these cases to situations where the omitted information is situationally relevant and expected to be disclosed according to some standard, such as a legal or moral obligation. By remaining silent about *p* under such circumstances, *S* intervenes to sustain an incorrect belief that *p* is true or to tacitly endorse a presumption to that effect. Had *S* not been silent, *R* might have called into question their judgments on the matter.

The definitions offered here also cover cases of misleadingness and deception where the truth-value of the information in question is inverted, such that *p* is true but the message represents that *p* is false or is otherwise misleadingly silent about the truth of *p*. This inversion becomes clear if we assume an identity relation between *p* and some false proposition *not-q* (i.e., $p = \text{not-}q$).

Lastly, we can further connect our definition to the related concepts of *misinformation* and *disinformation*, which are roughly the false information communicated in misleading or deceptive messages, respectively (Southwell, Thorson, & Sheble, 2018). Similar to the difference between *misleadingness* and *deception*, communicator intent is

a distinguishing factor between misinformation and disinformation. Consequently, we can derive definitions of misinformation and disinformation with slightly altered version of conditions A1–A5: A signal, stimulus or message *M* is *misinformation* with regard to *p* if and only if *p* is false and *M* represents that *p* is true; *disinformation* is misinformation with the additional conditions that the source of *M* does not believe that *p* is true and the intent behind communicating *M* is to cause the recipient to believe that *p* is true or, at least, to doubt that *p* is false.

What is misinformation rejection?

In terms of assessing an audience's ability to reject misleading or deceptive prescription drug promotion, the definitions offered above are helpful for establishing the criteria that must be met in an empirical test of misinformation rejection. The ultimate outcome of deception or misleadingness is false belief *resulting from a misrepresentation of some fact*. Conversely, the ultimate outcome of misinformation rejection is a lack or reduction of false belief *despite that misrepresentation*. However, reduction in false belief alone is insufficient. In other words, an absence of evidence for deception alone cannot be construed as evidence for misinformation rejection. It is also important to rule out other explanations for *R*'s disbelief; for example, that *R* misunderstood what *S* represents regarding *p*, that *R* is unaware that *S* represents anything at all about *p*, or that *R* disbelieves *p* regardless of anything *S* did.

Cognitive-process models of persuasive communication (e.g., Albarracín, 2002; Fishbein & Ajzen, 1981; McGuire, 1968; Wyer, 1974) give us the tools to clarify how the outcome of deception and misleadingness—yielding to misinformation—can be translated into the outcome of misinformation rejection. Here, yielding broadly refers to message-congruent change in a belief resulting from message reception. Yielding is differentiated from mere acceptance, which is the extent to which someone holds message-congruent beliefs regardless of whether the message is received or not (Fishbein & Ajzen, 1981; Wyer, 1974). The distinction between yielding and acceptance acknowledges that people can hold beliefs that align with a persuasive message without those beliefs having been influenced by the message. Within this context, the stage for misinformation rejection (or disinformation rejection) is set when *R* thinks that a signal, stimulus, or message falsely claims that *p*, but *R* does not yield to *p*:

misinformation (*disinformation*) rejection: *R* rejects misinformation (disinformation) with respect to *p*, if and only if (. . .)

- B₁. *R* is exposed to *M*, where *M* is misinformation (or disinformation) with regard to *p* (*misinformation exposure*); and
- B₂. *R* believes that *M* represents that *p* is true (*attribution*); and
- B₃. *R* believes that *p* is false despite *M*'s representation that *p* is true (*unyielding*).

Procedure to test for deception and misinformation rejection

In the remainder of this article, we offer a way to operationalize deception and misinformation rejection (or disinformation rejection). For simplicity, hereafter we use the former term as a stand-in for both concepts since we've established above that disinformation is a subset of misinformation that is differentiated by communicator intent. We then illustrate this approach using data from an experimental study where a pharmaceutical website for a weight loss medication was manipulated to produce three versions: a version with no misleading claims (control), a version with a factually accurate but implicitly misleading claim (implicit misinformation), and a version with an explicitly false claim (explicit misinformation). Of note, the issue of deceptive intent that features prominently in philosophical debates over the meaning of deception is largely sidestepped in the context of marketing promotion. Intention can be presumed given the forethought, planning, and message testing involved in the production of advertisements and other marketing promotions (Boush, Friestad, Wright, 2009), setting them apart from the kinds of extemporaneous or interpersonal discourse emphasized in most philosophical discussions of deception. Consequently, the conceptual distinctions between misleadingness/deception and misinformation/disinformation are less important to the operationalization of these constructs when used in this context.

Translating our definitions of deception and misinformation rejection into a between-subjects experimental design, the falsity and representation conditions (A_1 or B_1 and A_2 or B_2 , respectively) would become basic assumptions that must hold in our manipulations; namely, that the stimuli in the experimental group(s) contain misrepresentations and constitute misinformation with regard to p . The attribution, yielding, and unyielding conditions (A_3 , B_2 and B_3) point to two outcome variables that can be measured directly: claim attribution and claim acceptance. Conceptually, claim attribution is indistinguishable from what Jacoby and Hoyer (1987) refer to as *communication beliefs*, which “pose the question ‘Does the receiver believe that the communication expresses proposition X?’,” where proposition X is a “representation that can be objectively demonstrated to be either true or false” (p. 56, emphasis in original). We prefer the term *claim attribution* because it unambiguously emphasizes our concern with the act of “ascribing a character or quality as belonging” to something (“Attribution,” 2020)—in this case the perception that a target claim is part of a signal, stimulus, or message—and unlike related concepts like *comprehension*, *attention*, or *recognition* it carries no connotation that the attributed claim is actually a feature of the message. If claim attribution of a target false claim is greater (or of a target true claim is lower) in a misinformation arm of the study relative to the control, that would be evidence of misrepresentation and such a test could serve as a manipulation check (O’Keefe, 2003):

H1 [misinformation manipulation check]: The proportion of people who attribute a target false (true) claim to misinformation concerning a logically related false proposition will be greater (lower) than the proportion of people who attribute the same target claim to a control stimulus.

Differences in target-claim acceptance between the misinformation and control conditions—where acceptance of false information is greater, or acceptance of true information is lower in a misinformation arm of the study—reflect evidence of misleadingness and/or deception:

H2 [deception]: Acceptance of a target false (true) claim will be greater (lower) following exposure to misinformation concerning a logically related false proposition than acceptance of the same target claim following exposure to a control stimulus.

Misinformation rejection becomes evident when claim attribution moderates the effect of misinformation on claim acceptance. There are two patterns indicative of misinformation rejection, both of which can occur simultaneously; consequently, evidence of one or both of these patterns can be interpreted as evidence of misinformation rejection.

In Pattern 1, some proportion of participants in the control group mistakenly attribute the false claim to the message (i.e., false recognition; see [Southwell and Langteau, 2008](#)) and accept that it is true. For example, they may have misunderstood what the message is saying and become convinced by a claim that was not there; or they may have already believed the claim to begin with and as a result misattributed it to the message (i.e., a kind of confirmation bias). In a randomized experiment, we would expect all study arms to have roughly equal proportions of people predisposed to misattribute and believe false claims in this manner. Therefore, a pattern of results where average false-claim acceptance among participants who attribute the claim to misinformation is lower than it is following exposure to a control message can be interpreted as evidence of misinformation rejection (see [Equation 1](#)):

$$\mu_{\text{misinformation,attributers}} - \mu_{\text{control,attributers}} < 0 \quad (1)$$

Under this scenario, the persuasive impact will have been reduced for individuals that correctly recognized that a claim was made, compared with individuals who mistakenly thought the control message made a false claim and were convinced by it:

Research Question 1A [misinformation rejection, pattern 1]: Will acceptance of a target false (true) claim be lower (greater) following exposure to misinformation concerning a logically related false proposition compared with a control stimulus among people who attribute a target false claim to the message?

In Pattern 2, false-claim acceptance in response to misinformation is dependent on claim attribution, such that the amount of yielding to misinformation among individuals who attribute the claim to the message is diminished relative to individuals who are non-attributers (see Equation 2):

$$-(\mu_{\text{misinformation,attributers}} - \mu_{\text{control,attributers}}) < 0 \quad (2)$$

Under this scenario, misinformation rejection occurs when yielding—the message-aligned *change* in false-claim acceptance from the control to misinformation arms of the study—is lower among individuals who attribute the false claim to the message they were exposed to than it is among individuals who do not attribute the claim to their message. Here, we understand that change can take positive, neutral, or negative values depending on whether claim acceptance is greater, the same, or lower following exposure to misinformation, respectively, compared with the control message. Unlike Pattern 1, Pattern 2 allows for cases among attributers where exposure to misinformation may cause a net increase in false claim acceptance relative to those exposed to a control message so long as this increase is less than the change in claim acceptance among non-attributers exposed to the same misinformation. The pattern is evidence of misinformation rejection because yielding to misinformation is reduced when attributing the false claim to the message.

Research Question 1B [misinformation rejection, pattern 2]: Will the level of change in acceptance of a target false (true) claim following exposure to misinformation concerning a logically related false proposition be lower (greater) among individuals who attribute a target false claim to the message than among individuals who do not?

An illustrative example

Currently, the communication literature does not offer a clearly defined and pragmatic marker for indicating when efforts to correct, clarify or counteract misinformation have been successful. By exploring the potential patterns identified in our research questions with a specific example, we illustrate the procedural aspects and practical value of misinformation rejection as a key outcome that could be operationalized in future policy-relevant work. The misinformation manipulation check and deception hypotheses serve a practical function in the illustrative example: testing assumptions that are the foundation for our definition of misinformation rejection and providing context to demonstrate the theoretical position that misinformation rejection is something more than just not being deceived. One important contribution of our definitional approach is that it serves as an explicit bridge between communication theory and future applied evaluation efforts intended to indicate the effects of misinformation in direct-to-consumer advertising. The operational definition of misinformation rejection that we propose

offers a more compelling tool for measuring the effects of correction or clarification efforts than does an approach in which no obvious evidence for deception is taken to stand for misinformation rejection effects.

Method

Participants

We contracted with Dynata (formerly ResearchNow), an online panel provider, to recruit a convenience sample of adults with obesity ($N = 396$) from existing consumer research panels. Eligible participants were English-speaking adults who lived in the United States and reported having a body mass index (BMI) greater than or equal to 30, which qualified them as obese (BMI was calculated using self-reported height and weight). We excluded respondents who worked in the healthcare, marketing, advertising, or pharmaceutical industries or for the Department of Health and Human Services (HHS). We oversampled consumers with a high school education or less. We used automated timestamps to monitor participants exposure to the websites and their navigation through the study. Participants ($n = 20$) who completed the study in less than one-third the median time (less than 4 minutes and 30 seconds) or more than three times the target duration (60 minutes) were flagged as inattentive responders and not included in the final dataset or participant count. We also excluded participants who reported being unable to see the website, for example due to technical trouble ($n = 29$).

The panel provider recruited participants by either sending them an email invitation to participate in the study or router-generated notification for those who were already signed into the panel provider's platform. After obtaining informed consent, we randomly assigned participants to one of three experimental conditions where they were asked to view a picture of a website that was ostensibly under development for a new prescription drug. Participants then answered questions about their reactions to the website. At the end of the study, participants were informed that the website was for a fictitious drug and they were compensated the equivalent of \$5.00 in the online panel provider's e-currency. Data collection was conducted from October to November 2018. All study materials and procedures were approved by the Institutional Review Boards at the FDA and RTI International.

A majority of participants were female (62.1%), the average age was 62.6 years ($SD = 10.8$) and 90.2% were non-Hispanic White alone, 4.1% were non-Hispanic Black alone, and 3.3% were Hispanic. Additionally, 22.5% had earned a high school degree or less and 58.8% had completed a four-year college degree or more. The average BMI was 37.5 ($SD = 5.9$) and most participants (71.5%) had never taken a prescription drug for weight loss. Knowledge about prescription drugs for weight loss was fairly low ($M = 2.9$, $SD = 2.6$) on a scale ranging from 0 (*knowing nothing*) to 10 (*knowing everything*).

Stimuli

Using a fictitious weight-loss drug named Calavert (see [Aikin et al., 2017](#)), we created three versions of a consumer-facing prescription drug website. The top section of all three versions of the website featured an image of a woman measuring her waistline. A footnote placed directly below the image in all three versions explained that obese or overweight adults who took Calavert along with a well-balanced, reduced-calorie diet lost more weight in a clinical trial than people who received counseling to follow the diet alone. Calavert was modeled on existing FDA-approved prescription weight-loss medications, all of which were recommended to be used in combination with healthy eating habits ([National Institute of Diabetes and Digestive and Kidney Diseases, 2016](#)). To be as unambiguous as possible that Calavert's efficacy was conditioned on a dietary requirement, the last sentence of the disclosure explicitly stated that "Taking CALAVERT alone is not enough." The same indication and safety information were included below this footnote in all three versions of the website.

Our manipulations were achieved by altering a headline positioned to the immediate left of the image. The control condition ($n = 139$) was factually accurate relative to the information provided in the footnote, with a headline reiterating that a well-balanced, reduced-calorie diet is required: "Lose weight by taking CALAVERT[®] once a day. Just stick to a well-balanced, reduced-calorie diet and CALAVERT can help you get results." In the implicit condition ($n = 117$), the website remained silent about the need for a well-balanced, reduced-calorie diet: "Lose weight by taking CALAVERT[®] once a day. CALAVERT can help you get results." Our expectation was that some participants would interpret this omission to mean that taking Calavert was the only thing they would need to do to lose weight. The headline in the explicit condition ($n = 140$) made an expressly false claim that contradicted the dietary requirements established in the footnote: "Lose weight just by taking CALAVERT[®] once a day. Stick to any diet and CALAVERT can help you get results." Before the main study, we conducted a total of 9 pilot interviews with individuals with obesity to test these claims and verify they met the criteria we had in mind when constructing these manipulations. We also solicited expert review by a Consumer Safety Officer at FDA.

Measures

The questionnaire included measures of claim attribution and acceptance for three target claims (see [Table 1](#)), which allowed us to test whether exposure to the different versions of the website led to deception or misinformation rejection in relation to these claims.

Claim attribution. The claim attribution items assessed whether participants thought the target claims were present in the website they viewed (see [Armstrong, Gurol, & Russ, 1979](#); [Foxman, Muehling, & Moore, 1988](#)). We showed participants a list of statements and instructed them that "These statements may or may not have been in the Calavert website. Please mark whether you saw or did not see each

Table 1 Target Claims

Claim	Content	Truth-value
“Works with Any Diet”	You can lose weight by taking Calavert along with any diet.	False
“Only Thing You Need”	Taking Calavert once a day is the only thing you need to do to get more results.	False
“Diet Required”	Calavert must be used with a well-balanced, reduced-calorie diet to increase weight loss.	True

of the statements.” Participants reported whether they attributed (*Yes—I saw this on the website*) or did not attribute (*No—I did not see this on the website*) each statement to the website. In addition to the three target claims, the list of statements included two foils not appearing in any of the websites one additional statement that appeared in the footnoted disclosure in all three experimental conditions. Prior to conducting the study, we verified in cognitive interviews with representatives of our research population that this operationalization aligns with our conceptual definition of claim attribution (e.g., belief that the website represents the target claim as true); however, we recognize that a more nuanced measure of claim attribution may be required in some contexts to more precisely disambiguate whether respondents merely believe that the message expresses a target claim versus expresses it as a statement of fact.

Claim acceptance. The claim acceptance items asked participants to rate how much they believed that each of the target claims was true or false (i.e., “To what extent do you believe these statements are true or false?”; see [Armstrong, Gurol, & Russ, 1979](#); [Burke, DeSarbo, Oliver, & Robertson, 1988](#); [Harris, 1977](#)). For each target claim, participants responded on a 6-point, Likert-type scale ranging from 1 (*definitely false*) to 6 (*definitely true*).

Analytic approach

We conducted chi-square tests of independence to examine the impact of type of misinformation on claim attribution (H1). Our hypothesis for this manipulation check was that a greater (lower) proportion of participants would attribute the target false (true) claims to the website following exposure to the implicit or explicit misinformation versions compared with the control. To assess deception (H2), we conducted one-way ANOVAs testing whether claim acceptance differed by type of misinformation. Here, we expect acceptance of target false (true) claims will be greater (lower) following exposure to implicit or explicit misinformation, compared with the control version of the website. In the case of a significant main effect of type of misinformation, we conducted planned contrasts to test for pairwise differences between the control and experimental groups using a Bonferroni-adjusted

Table 2 Contrast Vectors Used to Test for Misinformation Rejection by Type of Misinformation and False-Claim Attribution

Vector	Control		Implicit		Explicit	
	Non-attributer	Attributer	Non-attributer	Attributer	Non-attributer	Attributer
Ψ_1	0	-1	0	1	0	0
Ψ_2	1/2	-1/2	-1/2	1/2	0	0
Ψ_3	0	-1	0	0	0	1
Ψ_4	1/2	-1/2	0	0	-1/2	1/2

Note: Cell values are contrast weights. Ψ_1 and Ψ_3 correspond to Pattern/Equation 1 and test whether acceptance of false (true) claims are lower (greater) following exposure to implicit or explicit misinformation, respectively, among individuals who attributed the target false claim to the message. Ψ_2 and Ψ_4 correspond to Pattern/Equation 2 and test whether the impact of implicit or explicit misinformation among individuals who attribute the claim to the message is diminished relative to non-attributers.

significance threshold of $\alpha = .025$. For misinformation rejection (Research Questions 1A and 1B), we conducted two-way ANOVAs focusing on the interaction between type of misinformation and false-claim attribution on claim acceptance. In the case of a significant interaction effect, we conducted planned contrasts consistent with the two research questions examining this outcome. In the model testing for misinformation rejection with respect to the “Diet Required” true claim, we used claim attribution of the “Only Thing You Need” false target claim as the moderator. Four nonorthogonal contrasts were required to examine misinformation rejection in this study (see Table 2), so we adopted a Bonferroni-adjusted significance threshold of $\alpha < .0125$ (Rosenthal, Rosnow, & Rubin, 2000).

Results

Misinformation manipulation check: claim attribution to the website

Participants exposed to misinformation about Calavert were more likely to attribute the false target claims to the website and less likely to attribute the true target claim, providing evidence that our manipulations worked as expected (see Table 3). The proportion of participants in the control group who incorrectly reported seeing the “Works With Any Diet” (29.5%, $n = 41$) or the “Only Thing You Need” (15.1%, $n = 21$) claims are in line with false recognition rates reported in the literature, where rates of 30% or more are not uncommon (Roediger & McDermott, 2000; Scoboria *et al.*, 2017; Southwell & Langteau, 2008). Importantly, type of misinformation had a statistically significant effect on whether participants indicated that the “Works with Any Diet” false claim was mentioned in the website, $\chi^2(2, N = 395) = 43.90, p < .001, V = .33$; whether participants attributed the “Only

Table 3 Percentage of Participants Who Attributed Target Claims to the Website, by Type of Misinformation

Claim	Type of misinformation			Total
	Control	Implicit	Explicit	
“Works with Any Diet”	29.5 ^a	35.3 ^a	66.4 ^b	44.3
“Only Thing You Need”	15.1 ^a	27.6 ^b	28.6 ^b	23.5
“Diet Required”	92.1 ^a	77.8 ^b	78.6 ^b	83.1

Note: Cell values are percentages of participants who said the claim was mentioned in the website (as compared with not). Cells within rows with different superscripts are significantly different from each other based on an adjusted p -value of $< .0167$. The “Works with Any Diet” and “Only Thing You Need” claims are false and the “Diet Required” claim is true.

Thing You Need” false claim to the website, $\chi^2(2, N = 395) = 8.51, p = .014, V = .15$; and whether participants attributed the “Diet Required” true claim to the website, $\chi^2(2, N = 396) = 12.39, p = .002, V = .18$. Whereas participants who saw the website containing explicit misinformation were more likely to attribute the “Works with Any Diet” false claim to the website than participants in the control group, participants who saw either the implicit or explicit misinformation were more likely to attribute the “Only Thing You Need” false claim to the website than participants who saw the control website containing no misinformation; they were also less likely to attribute the “Diet Required” true claim to it.

Test for deception

If participants were deceived by the implicit or explicit versions of the website, this would be reflected in stronger acceptance of the false target claims or weakened acceptance of the true target claim relative to the control group (H2). Type of misinformation had a statistically significant effect on the degree to which participants believed the “Works with Any Diet” false claim, $F(2, 391) = 17.39, p < .001, \eta^2 = .08$ (see Table 4). Participants who viewed the website containing explicit misinformation were deceived, having reported stronger acceptance that the “Works with Any Diet” false claim than participants who viewed the control website ($\psi = 1.01, SE = 0.19, F[1, 391] = 28.88, p < .001, \eta^2 = .07$).

Type of misinformation did not have a significant effect on the degree to which participants believed the “Only Thing You Need” false claim, $F(2, 389) = 0.53, p = .589$, but it did have a statistically significant effect on the degree to which participants believed the “Diet Required” true claim, $F(2, 393) = 5.48, p = .004, \eta^2 = .03$. Participants who viewed the website containing implicit ($\psi = -0.36, SE = 0.13, F[1, 393] = 6.94, p = .009, \eta^2 = .02$) or explicit

Table 4 Mean Acceptance of Target Claims, by Type of Misinformation

Claim	Type of misinformation							
	Control		Implicit		Explicit		Total	
Claim	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
“Works with Any Diet”	2.60 ^a	0.13	2.69 ^a	0.14	3.61 ^b	0.14	2.99	0.08
“Only Thing You Need”	2.00	0.12	2.08	0.12	2.17	0.11	2.08	0.07
“Diet Required”	5.47 ^a	0.08	5.12 ^b	0.10	5.09 ^b	0.09	5.23	0.05

Note: Cell values are percentages of participants who said the claim was mentioned in the website (as compared with not). Means within rows with different superscripts are significantly different from each other based on an adjusted *p*-value of < .0167. The “Works with Any Diet” and “Only Thing You Need” claims are false and the “Diet Required” claim is true.

misinformation ($\psi = -0.39$, $SE = 0.13$, $F [1, 393] = 9.14$, $p = .003$, $\eta^2 = .02$) reported weaker acceptance of the “Diet Required” true claim than participants who viewed the control website.

Test for misinformation rejection

Based on the study’s conceptual definition of *misinformation rejection*, participants needed to first recognize the false claim (i.e., attribute it to the website) and be unpersuaded by it (i.e., not accept it as true). Research Questions 1A and 1B examine this proposition by asking whether claim acceptance differs based on whether participants attribute the claim to the website and by experimental condition. We tested the interaction effect between type of misinformation and attribution of the false claims to the website on target claim acceptance. Misinformation rejection occurs according to Pattern 1 when false-claim acceptance among attributers who are exposed to misinformation is lower than it is among attributers exposed to the control message. In Pattern 2, we are concerned with a difference in the amount of yielding to the misinformation between attributers and non-attributers. Pattern 2 occurs when an increase in false-claim acceptance between the control and misinformation arms among attributers is less than the corresponding increase among non-attributers.

We did not find evidence of a moderation effect for the “Works with Any Diet” false claim ($F [2, 387] = 2.95$, $p = .053$) or the “Diet Required” true claim ($F [2, 389] = 0.98$, $p = .375$). We did find a significant interaction effect of false-claim attribution and type of misinformation on acceptance of the “Only Thing You Need” false claim, $F [2, 385] = 6.13$, $p = .002$, $\eta^2 = .02$ (see [Figure 1](#)). Planned contrasts revealed evidence that participants rejected the implicit misinformation based on both Pattern 1 ($\psi_1 = -0.97$, $SE = 0.32$, $F [1, 385] = 11.94$, $p = .003$, $\eta^2 = .02$) and Pattern 2 ($\psi_2 = -0.50$, $SE = 0.18$,

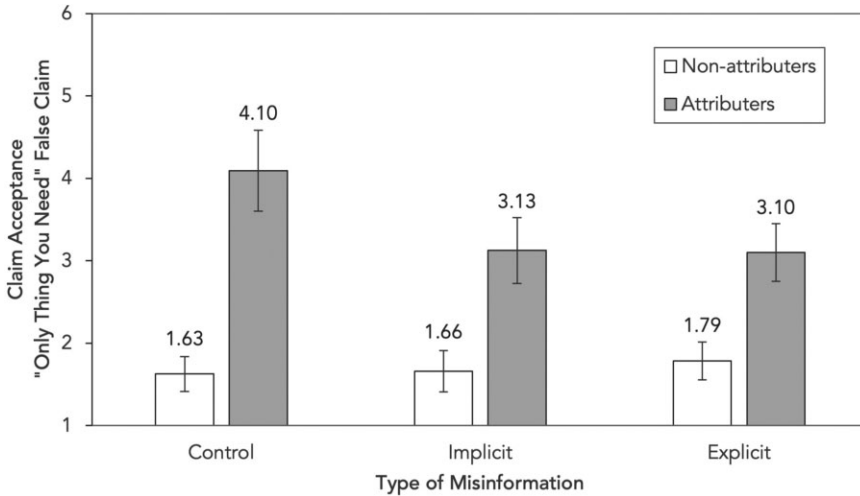


Figure 1 Plot showing the interaction effect on acceptance of the “Only Thing You Need” false target claim by type of misinformation and claim attribution of the “Only Thing You Need” claim to the website participants were assigned to view. Error bars represent 95% CIs of the means. The results are evidence of misinformation rejection among participants who viewed the implicit or explicit website.

$F [1, 385] = 7.77, p = .006, \eta^2 = .01$). Participants also rejected the explicit misinformation with respect to the “Only Thing You Need” false claim. As with misinformation rejection in the implicit condition, the planned contrasts comparing the explicit condition to the control were significant for both Pattern 1 ($\psi_3 = -1.00, SE = 0.31, F [1, 385] = 10.51, p = .001, \eta^2 = .02$) and Pattern 2 ($\psi_4 = -0.58, SE = 0.17, F [1, 385] = 11.24, p = .001, \eta^2 = .02$). In both cases, acceptance of the false claim was lower following exposure to implicit or explicit misinformation than exposure to no misinformation among participants who attributed the target false claim to the message (Research Question 1A, Pattern 1), and the persuasive impact of the implicit or explicit misinformation on false-claim acceptance among participants who attributed the claim to the message is diminished relative to non-attributers (Research Question 1B, Pattern 2).

Discussion

In this article, we examined the topics of deception and misinformation rejection from a theoretical perspective and derived empirical procedures to test for evidence of these two concepts in mediated communication contexts. Specifically, we synthesized existing legal, regulatory, and philosophical perspectives on misleadingness and deception and laid out definitions of deception and misinformation rejection. Finally, we demonstrated how deception and misinformation rejection

can be measured, applying our analytic approach in the context of an experimental study where we exposed participants to different types of misinformation in a prescription drug website.

Consolidating diverse theoretical perspectives, we argued that for deception to occur, a message source needs to represent a piece of misinformation as if it were true (despite believing that it is not true) and intentionally cause a message recipient to accept the false information or, at least, to doubt that it is false. Recognizing that deception inherently deals with belief change, we connected it to the concept of yielding, which in the field of persuasion refers to message-congruent change in a belief resulting from message exposure. In short, our definition aligns with the standard view of deception that to deceive someone is to deliberately cause them to form a false belief or to doubt a true belief (Carson, 2010; Fallis, 2010; Mahon, 2007).

The study findings contribute to the field by clarifying conditions related to the epistemic state of the sender and the object of their deceptive intent. Further, we explicated the connections between deception and several related concepts—including misleadingness, misinformation, and disinformation—and showed how these concepts can be delineated using terms taken from our definition of deception. Drawing on this synthesis, we established the parameters of a novel construct: misinformation (or disinformation) rejection. We posited that, for misinformation rejection to occur, an individual exposed to misinformation would need to attribute a false claim to that misleading or deceptive message but not yield to the position advocated by the misinformation.

We illustrated how to test for evidence of deception by examining participants' yielding to two deceptive claims and one true claim. The results showed that participants were deceived by implicit and explicit misinformation, such that participants exposed to misinformation had weaker acceptance of the true claim and a subset of them had stronger acceptance of one of the false claims. To illustrate misinformation rejection, we examined the interaction of exposure to misinformation by false-claim attribution on claim acceptance. We argued that misinformation rejection would be evident in two interaction patterns, which we operationalized with a pair of nonorthogonal contrast vectors. The results provided evidence that participants rejected one of the false claims in both the implicit and explicit misinformation conditions in a way that was consistent with both interaction patterns. Together the findings related to deception and misinformation rejection suggest that individuals may reject some pieces of misinformation while yielding to others. The findings also highlight that a single source of misinformation can impact multiple related propositions in a nuanced way and indicate that one measurement construct alone is likely inadequate to capture this phenomenon.

More research is needed to examine when misinformation is rejected, the cognitive processes through which misinformation is rejected, and also what types of misinformation may or may not be rejected. For example, it is possible that

different types of misinformation (e.g., implicit as compared with explicit, or graphics as compared with text), the topic of the misinformation (e.g., topics where individuals have more background knowledge as compared with individuals that are less familiar with the topic), or the context of misinformation (e.g., online as compared with broadcast, or personal characteristics of the audience) may influence the likelihood of rejecting or being deceived by a piece of misinformation. As it relates to cognitive processes, our conceptual model and test procedure focus on detecting deception and misinformation rejection based on changes in claim attribution and acceptance following exposure to misinformation, but we do not propose more specific mediating processes that would allow us to predict or explain the conditions under which these phenomena will or will not occur. For example, misinformation rejection might differ as a function of message involvement or operate through elevated perceived deception (Held & Germelmann, 2018) or suspicion, the latter of which would align this process with processes underlying deception detection in interpersonal deception theory (Buller & Burgoon, 1996) and truth-default theory (Levine, 2014).

The data used to illustrate the proposed test procedures were drawn from a between-subjects experimental design, and we propose and argue that the contrast vectors assessing the patterns described above represent a robust approach to assessing misinformation rejection in this context. A consequence of this study design is that evidence of deception and misinformation rejection are received in aggregate; we can infer that some participants, for example, were deceived with regard to the “Diet Required” or “Works with Any Diet” claims and that some participants rejected misinformation with regard to the “Only Thing You Need” claim, but we cannot say which participants. To some extent, this is a consequence of the essential role of belief change in the definitions of deception and misinformation rejection that require a baseline measurement or comparison group to evaluate. In principle, our model could be adapted to a pre-test–post-test or repeated measures design, where target claim acceptance would be measured before and after exposure to misinformation. Under this design, the degree of change could be calculated or estimated at the level of individual participants. If imagined as a change score, higher values would indicate greater deception and lower values would indicate less deception. Misinformation rejection would still require a comparison of attributers to non-attributers and potentially a model-based approach to evaluate it, but the no-misinformation control group could give way to a pretest or baseline measure as the point of reference for assessing changes in claim acceptance.

Conclusion

We can make an important distinction between a situation in which people believe specific health misinformation and a situation in which people learn from or reject misinformation that they encounter online or in mass media. Being able to discern the extent to which people reject newly encountered claims is crucial to future

research on patient encounters with misinformation in electronic media environments. Here we have reported a way to assess whether individuals exposed to misinformation reject it or are deceived by it that is grounded in current theoretical perspectives on deception. The findings from our concept explication and empirical illustration demonstrate that the effects of exposure to misinformation on deception can be complex. Study designs and measures used by researchers should account for such complexity. Importantly, assessing the sheer prevalence of belief in an inaccurate claim is insufficient to specifically study misinformation rejection (or acceptance), *per se*. By employing the approach outlined here, we can make progress in understanding the conditions under which deception and misinformation rejection occur in mediated contexts and the characteristics of misinformation that are most likely to deceive consumers.

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