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A Priest, a Rabbi, and a Minister Walk into a Bar: A Meta-Analysis of Humor Effects on Persuasion

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Despite its long history in communication, scholars continue to debate whether humor enhances or undermines persuasive attempts. To better understand the contingencies of humor effects, we conducted a meta-analysis of 89 studies across the various fields in which humor has been researched over time. Overall, humor has a weak and significant effect on persuasion (r = *.13). Further, results indicate that humor has a moderate-level influence on knowledge* (r = *.23) and only a weak impact on attitudes* (r = *.12) and behavioral intent* (r = *.09). The analysis supports the dual-processing nature of humorous messages, with related-humor being more effective for highly-involved individuals. Finally, while the analysis did not support the humor sleeper-effect prediction, the results revealed an inverted U-shaped effect of humor intensity on persuasion.*

Keywords: Meta-Analysis, Humor, Persuasion, Media Effects, Satire.

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> "Heaven has given human beings three things to balance the odds of life: Hope, sleep and laughter" (Immanuel Kant[1])

While hope and sleep often seem to be in short supply, humor remains a constant, if not increasing, part of modern life. Humor is often used to charm, disarm, and persuade. Indeed, a content analysis of advertisements found that 30% contained a humorous appeal (Beard, 2005; Catanescu & Tom, 2001; Weinberger, Spotts, Campbell, & Parsons, 1995), and as much as 70% of the persuasive messages airing during popular events like the Super Bowl rely on some form of humor (Gulas, McKeage, & Weinberger, 2010). Humor also plays an increasingly significant role in politics, with 26% of the public and over 50% of younger adults reporting having learned something about politics from satirical programs such as *Saturday Night*

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Live and *The Daily Show* (Baumgartner & Morris, 2012). In the health arena, humor has emerged as a coping mechanism for almost all segments of the population, from young children (Dionigi, Sangiorgi, & Flangini, 2014) to older adults (Wanzer, Sparks, & Frymier, 2009). As Francis, Monahan, and Berger (1999, p. 155) remarked, "if something is ridiculous, how can it be threatening?"

Despite its prevalence, it is unclear how much, if any, of the variance in persuasion is accounted for by humor. Based on the view of persuasion as "a symbolic activity whose purpose is to affect the internalization or voluntary acceptance of new cognitive states or patterns of overt behavior through the exchange of messages" (Smith, 1983, p.7), some studies report that humor can enhance persuasion (Eisend, 2009), while other studies conclude that humor undermines persuasive attempts (English, Sweetser, & Ancu, 2011). Such discrepancies in the literature have led to the popular belief that humor is a "double-edged sword" (Meyer, 2000) and, consequently, "any generalizations about the effect of humor are fraught with pitfalls" (Weinberger & Gulas, 1992, p. 35).

Contradictory results between studies tend to refocus the attention on potential moderators and advance the discussion toward a more nuanced approach to the study of social phenomena. Yet, humor research has also been notorious for producing inconsistencies between different theoretical mechanisms that attempt to explain its effects. For instance, one of the theoretical explanations of the force of humor is associated with its ability to draw attention to messages (Madden & Weinberger, 1984; Weinberger & Gulas, 1992). Relief theory advances a different mechanism, arguing that humor appeals create a counter-arousal state that helps to release tensions, increase liking, and enhance source attraction (Meyer, 2000; Shurcliff, 1968). Another framework, referred to as the mood maintenance approach, is one proposed by Kuiper, McKenzie, and Belanger (1995), where a good mood induced by humor leads to positive emotions and reduction in counterarguments (Osterhouse & Brock, 1970; Strick, Holland, van Baaren, & van Knippenberg, 2009). This theory also explains the strong link between humor and wellbeing, as well as its direct contribution to a host of other domains and activities. Gruner (2000), however, famously argued that the most valuable function of humor rests in its capacity to enhance source credibility. Unlike theories that emphasize humor as a trigger for cognitive elaboration, this approach maintains that humor is effective because it encourages individuals to associate high credibility with a humorous source, even if it is completely unwarranted. Conversely, the ability of humor to influence people has been also associated with a sleeper effect (Lammers, Leibowitz, Seymour, & Hennessey, 1983), where humor is linked with low levels of source credibility that gradually increase as the audience disassociates the source from the message.

It would seem impossible to reconcile the theoretical frameworks cited above, since some of them associate humor with heightened attention and cognitive elaboration, whereas others associate humor with distractions and heuristic reasoning. Likewise, in many instances, source credibility appears to be an advantage of

humorous messages, while according to other accounts, it is precisely what impedes the influence of messages that use humor. Gruner (1985) has coined the term "a modicum of apt" to refer to this delicate balance that differentiates favorable and unfavorable reactions to humor.

A major factor contributing to the cloud of uncertainty surrounding humorous appeals is that researchers in different fields have investigated the link between humor and persuasion in relative isolation, without the benefit of an overarching framework. Not surprisingly, therefore, while humor effects have proved to be a fruitful field of inquiry in various disciplines, including communication, psychology, political science, public health, education, and marketing, there is no general agreement about the role played by humor in persuasion. In order to determine the potential of humor as a persuasive tool and identify the conditions under which humor does or does not impact knowledge, attitudes, and behavior, we conducted a meta-analysis that focused on the effect of humor on these persuasion-related outcomes. We also examined a series of relevant moderators that may disentangle previous inconsistencies, described in more detail below.

The current meta-analysis

The current study systematically compares humor- to nonhumor-based messages and their persuasive effects across the major domains of persuasion in which this relationship has been studied, including marketing, health, education, and political communication. Previous systematic reviews attempted to provide insights into identifying the contingencies that characterize humor's strengths and limitations (Duncan, 1979; Markiewicz, 1974; Speck, 1987; Sternthal & Craig, 1973; Weinberger & Gulas, 1992; Ziv, 1988). While most of these reviews showed a consistent positive impact of humor on attention and attitudinal outcomes (but see Markiewicz, 1974), they were highly inconclusive with respect to effects on knowledge, intent, and behavior. Beyond the mixed results, past reviews of humor effects were largely restricted to the fields of marketing and education, with each review focusing only on a limited set of studies. For instance, Ziv (1988) summarized the results of 18 studies (with 7 null results) that examined the influence of humor on knowledge, whereas Weinberger and Gulas (1992) outlined the results of only 18 inquiries (with 10 null results) into the link between humor and persuasion. More importantly, given that systematic reviews do not report on total effect sizes or their significance tests, these studies have limited capacity to conclude whether humor has meaningful effects on persuasion.

To some extent, these types of gaps are often addressed with a meta-analytic approach. Specifically, a meta-analysis of humor in public address, health care, and the workplace found a moderate-level effect ($r = .31$) of humor across 26 samples (McRoberts & Larson-Casselton, 2006); yet, a closer look at the results reveals the limited scope of the project. In particular, the study focused only on sarcasm, jokes, and stories, and the relevant outcome was vaguely defined as psychological valence

(positive or negative). A much broader attempt to test the effects of humor was conducted by Eisend (2009, 2011). This analysis found humor to be moderately ($r = .38$) associated with attitudinal outcomes (i.e., attitudes toward ad), as well as with purchasing intentions ($r = .19$). Moreover, the analysis examined the impact of several moderating variables on the influence exerted by humor on persuasion, recording stronger associations for student samples (versus non-student samples), fictitious ads (versus real ads), and print media (versus broadcast). Due to the fact that this meta-analysis included numerous correlational studies that had limited abilities to assess the causal relationship between humor and persuasion, it is still unclear whether humor affects persuasion, if at all. In addition, Eisend's (2009, 2011) meta-analysis has been restricted to the literature of advertising; thus, further evidence is needed to illuminate the relationship between humor and persuasion in domains such as health and politics.

Experimental designs that compare the effects of humorous and nonhumorous appeals while holding other factors constant provide the best context for understanding causal links between humorous messages and persuasive effects. However, experimental studies of humor differ considerably in what comparison and control groups are included. For example, while some studies include a nonhumor control condition (e.g., Ziv, 1988), others do not. Moreover, studies lacking a control group contain a range of comparison conditions, including fear appeals (Brooker, 1981). As a result, if such studies reveal a significant difference between the humor condition and the comparator condition, it is difficult to identify the cause: is the effect due to the comparison group (e.g., fear), the humor condition, or both? Still other experiments manipulate the style (Vance, 1987) or the volume of humor (Bryant, Brown, Silberberg, & Elliott, 1981). To avoid such confounds in the current meta-analysis, we limited our sample of studies to experimental designs that directly compared humor with nonhumor/serious messages on the same topic.

Another factor that hinders our ability to understand the effects of humor deals with inconsistencies in presumed outcomes. Specifically, prior meta-analyses and systematic reviews (McRoberts & Larson-Casselton, 2006; Weinberger & Gulas, 1992) have aggregated dissimilar outcomes, such as recall, attention, knowledge, credibility, arousal, attitudes, and behavior, without empirically accounting for any differences or explaining why the effects of humor should be similar on these disparate outcomes.

In order to avoid potential confounds and confusion such as that articulated above, the current study focused on experimental designs and estimated the overall differences between humor and nonhumor message conditions, with respect to change in knowledge, attitudes, intentions, and behavior. We decided to focus on outcomes that are traditionally associated with persuasion (Hovland, Janis, & Kelley, 1953), not only because these are the primary outcomes measured in studies of humor, but also because they are equally relevant for politics, education, marketing, and health. For instance, alternative outcomes such as attention and recognition seem to appear more in education and marketing literature, but they are seldom applied in

the context of health or politics. Conversely, it is much more common to find measures of efficacy beliefs in studies that assess the impact of humor on politically- or health-related outcomes, compared to studies in marketing or education.

Some might argue that these outcomes are still overly broad and that only behavioral outcomes—the gold standard of persuasion—should be included. But, from a persuasion perspective, differences in knowledge or attitudes can precede a change in behavior (McGuire, 1968). Consequently, if we restricted our analysis to behavioral outcomes, we might have limited our ability to record an effect, not because it was absent, but rather because it had yet to manifest itself in observable behavior. Given this introduction, the first research question is:

> RQ1: Are there significant differences in the effects of humor on persuasion-related outcomes (i.e., knowledge, attitudes, intentions, and behavior), compared to equivalent nonhumor messages?

Following Chattopadhyay and Basu's (1990) call to shift the question from if humor is effective to when humor is effective, our second goal was to investigate theoretical factors that might moderate the relationship between humor and persuasion. These factors are primarily based on theoretical propositions and empirical evidence of previous analyses, and they can be broadly categorized as theoretical moderators and exploratory moderators.

Theoretical moderators

Humor appeals are often studied within the framework of dual processing models (Cline & Kellaris, 2007). One of the pivotal components of such models is the extent to which the humor is central to the persuasive message. For instance, utilizing a silly spokesperson (e.g., a talking dog) or situation (e.g., forgetting to wear pants in public) to attract attention cannot be equal to a punchline that resonates with the main argument of a message. Thus, the degree to which the humor relates to the persuasive message's conclusion is a strong predictor of success (Weinberger & Gulas, 1992). In fact, the dimension of relatedness has been widely put forth to explain the positive and negative outcomes of persuasion through humor. For example, Moyer-Gusé, Mahood, and Brookes (2011) demonstrated that related humor reduced counterarguing in the context of sexual behavior, whereas unrelated-humor tended to distract and confuse, creating a situation where individuals vividly remember the joke but not the message. Based on this, we proposed the following hypothesis:

> H1: The effects of humor on persuasion will be moderated by humor relatedness, such that stronger effects will be recorded when humorous appeals are related to the persuasive message.

Another important variable that may provide further insight into humor's effects is issue involvement. The level of audience involvement—the perceived

relevancy and importance of the issue (Petty & Cacioppo, 1986)—was among the first variables suggested to influence responses to humor (Powell, 1975). Traditionally, humorous appeals are perceived to be more effective when message involvement is low (Chung & Zhao, 2011). For instance, Limbu, Huhmann, and Peterson (2012) found that low involvement among consumers predicted more positive responses to prescription drug ads with humorous appeals. Similarly, Baek and Wojcieszak (2009) concluded that exposure to late-night comedy such as *Saturday Night Live* mainly affects inattentive citizens. Drawing from dual processing models, this line of research suggests that issue involvement governs individuals' information processing, with lowly-involved individuals being more likely to engage in less motivated processing and, instead, turn to positive surface cues, such as humor (Gruner, 2000; Yoon & Tinkham, 2013).

With that said, the interplay between issue involvement and humor is, perhaps, more complex than initially suggested. Specifically, Zhang and Zinkhan (2006) differentiate between humor as a message argument and humor as a peripheral cue. According to this view, when humorous messages are processed systematically, usually under high involvement, the relatedness of the humor appeal to the message is essential for persuasion. Therefore, for highly involved individuals, less relevant humor will engender counterarguing that is detrimental to persuasion. Conversely, under conditions of low involvement, humor relatedness becomes less important, as individuals rely on heuristic cues such as perceived credibility (Gruner, 2000) and good mood (Kuiper et al., 1995). Accordingly, the following hypotheses are proposed:

> H2: The effects of humor on persuasion will be moderated by issue involvement, such that stronger effects will be recorded for lowly-involved individuals.
> H3: The effects of humor on persuasion will be moderated by issue involvement and humor relatedness, such that humor will be more effective for lowly-involved individuals when it is unrelated to the message and more effective for highly-involved individuals when it is related to the message.

One of the most fascinating dimensions for the study of humor appeals is related to time. At first, humor was conceptualized as a counter-arousal state that helps to release tensions, increase liking, and enhance source attraction (Shurcliff, 1968). Therefore, the effects of humor were perceived to be short-lasting. In contrast, studies that employed longitudinal designs observed an interesting phenomenon, whereby, after a certain period of time, initially ineffective humor appeals tend to overpower nonhumorous messages (Nabi, Moyer-Gusé, & Byrne, 2007). In concurrence with trace consolidation theory (Lammers et al., 1983), humor effects on persuasion are likely to be witnessed in the long-term rather than the short-term. One potential explanation for the delayed effect is that the memorable nature of humor tends to instigate more elaboration as time passes, gradually increasing the influence (Yoon, 2010). Hence, the humor-sleeper effect, whereby a humorous

appeal wins out over a serious appeal, is a particularly noteworthy phenomenon (Lee & Mason, 1999). Thus, we propose that:

> H4: The effects of humor on persuasion will be moderated by the delay of the outcome measurement, such that humorous appeals will be more effective for moderate and long delays than short measurement delays.

Similar to other affect-based appeals (e.g., fear), the humor-persuasion relationship is hypothesized to be curvilinear. While there is no agreed-upon mechanism to account for the curvilinear pattern (Brooker, 1981), Sternthal and Craig (1973) have argued that very low levels of humor will not disarm the individual, whereas highly humorous messages may distract. In concert with this claim, studies have found that moderate levels of humor are most conductive for persuasion, whereas high levels of humor tend to result in more positive moods but less persuasion (De Pelsmacker & Geuens, 1999). Following this line of research, humorous appeals should be more effective at moderate levels. To examine this issue, the final hypothesis is:

> H5: There will be a curvilinear relationship (inverted-U) between humor intensity and persuasion, such that humor will be most effective at moderate levels, compared to low or high levels of intensity.

Exploratory moderators

Studies of humorous messages can vary along a number of dimensions, including sample type, gender of message source, channel, style, and the inclusion of specific calls for action. While these moderators represent pertinent questions for the link between humor and persuasion, the extant literature does not point to specific hypotheses. Hence, these variables are better conceptualized as exploratory moderators.

A significant proportion of studies in social science research, including humor research, draw conclusions based mainly on convenience samples of college students, leaving the generalizability of the results in question. Sample type may play an important role, because audience variables such as age and education have been shown to moderate the persuasive effects of humor (Sternthal & Craig, 1973). For instance, Madden and Weinberger's (1984) review suggests that humor works best for young and educated publics. Hence, the premise that college student samples may yield stronger effects for humor than non-student samples will be examined in the current meta-analysis.

Although humor appeals are widely employed across a variety of contexts, how humor is coded, delivered, and interpreted may differ by discipline and topic. For instance, studies in marketing and education tend to yield stronger effects for humorous messages than studies in political communication (Weinberger & Gulas, 1992). Surprisingly, there are very few studies that directly compare effects for

different message topics (e.g., screening cancer vs. buying cameras). With that said, Weinberger and Campbell's (1991) analysis of 1600 radio ads found significant variation in humor usage across different products. Thus, it stands to reason that particular topics may be better suited for humorous appeals. Another relevant message feature is the gender of the message source (Banas, Dunbar, Rodriguez, & Liu, 2011). Bryant, Comisky, Crane, and Zillmann (1980) found that gender of the message source moderates the effects of humor through source credibility. Although only a few studies examined the effect of source gender, interactions between source gender and message appeal are likely to occur, potentially intensifying or attenuating persuasion effects.

The specific mode or channel of communication through which the humorous message is delivered (i.e., face-to-face, audio, print, visual, and audiovisual) is likely to have impact. Print stimuli appear to be less amenable to humor, because—as argued by humor researchers—texts have a more restricted arsenal of affective cues (Eisend, 2009), whereas audiovisual and face-to-face modes of communication are associated with a richer experience. Thus, the channel of communication is presumably one of the principal moderators of humor's persuasive ability.

Ironically, most studies that focus on humorous appeals treat humor as a theoretical "black box." That is, humor is often operationally defined as the opposite of a serious message or whatever scores higher on a perceived humor scale. In addition, studies often treat diverse categories of humor such as slapstick, parody, and satire as virtually synonymous. However, the recent raft of research on political satire has forced scholars to revisit their conceptualization of humor and provide more clarity to this multifarious concept (Holbert, 2005). Although very few studies have directly compared different styles of humor (Weinberger & Gulas, 1992), the few that did found significant differences between humor types (Holbert, Hmielowski, Jain, Lather, & Morey, 2011; Speck, 1987). In order to advance a clearer conceptualization of humor, Buijzen and Valkenburg (2004) provide a seven-category taxonomy, including slapstick, clownish humor, surprise, misunderstanding, irony, satire, and parody, which encompass more than 40 techniques drawn from previous research. Recently, Riecken and Hensel (2012) classified humor styles based on their expected cognitive investment, maintaining that high-cognitive humor (e.g., satire, irony) fosters different psychological processes than low-cognitive humor (e.g., slapstick, surprise).

Another important message feature that can moderate the effect of humor appeals is whether the message includes a formal call to action. While some messages directly encourage specific actions, other studies utilize messages aimed at providing more general information. For example, Nabi (2016) used a humorous character together with a formal call to action ("examine yourself monthly") to encourage breast cancer self-examination. Similarly, Yoon (2015a) used a tree-swinging Tarzan to depict deforestation while also offering concrete guidelines (help conserve trees by conserving paper; don't buy disposable paper cups or paper plates). To this end, calls to action can help distinguish studies that deal with

perceived influence from studies that deal with actual influence (Dillard, Weber, & Vail, 2007). Thus, this meta-analysis also seeks to understand:

> RQ2: How, if at all, do variables (i.e., sample type, gender of message source, channel, style, and calls for action) moderate the effect of humor on persuasion?

Method

Selection of studies

Literature search

Studies used in the meta-analysis were obtained in three ways. First, electronic databases were systematically searched for empirical reports that focused on humor appeals (i.e., Google Scholar, All Academic, JSTOR, Medline, ProQuest, PubMed, PsychLIT/Psych Abstracts, Communication and Mass Media Complete, Educational Resources Information Center). The specific terms (and their derivations) that were used to perform the search included humor, funny, parody, comic, satire, joke. These were often combined with effect, persuasion, comprehension, knowledge, behavior, and attitudes. Second, we examined the reference list for each publication to find potential studies that were not identified by our search terms. After this effort, 22 leading media effects scholars were contacted to approve the list and identify omissions. This search took place from February to December 2016. In all, 640 potentially eligible articles were identified, which were further screened for inclusion criteria (see Appendix A, in the Supplementary Material, for a flow chart that summarizes the procedures used to collect studies for the current meta-analysis).

Inclusion criteria

In their seminal essay on humor and persuasion, Sternthal and Craig (1973) proposed three definitions of humor that emphasize different analytical foci. First, humor can be defined in terms of its stimulus properties. Thus, the existence of humor is determined on the basis of whether irony, slapstick, satire, puns, misunderstanding, parody, or clownish humor were used. Yet, the taxonomical approach to definitions of humor fails to recognize what qualities lead to each of the abovementioned categories being perceived as humorous. A second approach entails the examination of physiological responses to an identifiable stimulus. Accordingly, arousal, smiles, and laughter can indicate the presence or absence of humor. Unfortunately, these physiological manifestations are relatively hard to interpret or link to humor. For instance, it is easy to misattribute laughter as a response to humor, whereas in fact, it often indicates the release of nervous energy. The final approach to the definition of humor uses the audience's self-report data to test whether a stimulus was interpreted as humorous. According to this approach, humor becomes synonymous with perceived humor. We adopted Lee and Ferguson's (2002) definition for humorous messages as appeals that attempt to induce positive affect and/or attract attention through

amusement. This definition underscores the goal of humor rather than its outcome, providing a much more inclusive criterion that does not require evidence that the appeal achieved its outcome or was interpreted as funny. Pragmatically speaking, given that many studies do not employ manipulation checks (only 47 studies, 52.8%, measured perceived humor) for humorous messages (e.g., Was a satirical show perceived as more humorous than an equivalent news report?), we did not require independent evidence that the messages were perceived as humorous. More importantly, our analysis did not record any significant differences between effect sizes of studies that employed manipulation checks and studies that did not measure the perceived humor of the message.[2]

Studies had to meet certain criteria to be included in the analysis. The ideal comparison condition of a humor message is a nonhumorous message that is exactly the same, excluding the humor. In practice, however, this equivalence can rarely be achieved (Nabi, 2016). As argued by Markiewicz (1974), when adding humor, other message characteristics, such as length, quality, and argument strength, are bound to vary. Thus, a more realistic inclusion criteria will require relevant studies to provide a direct comparison between a humor message and a humorless message on the same topic, rather than two identical messages that differ only with respect to the inclusion of humor. That is, the contrast of interest was between a humorous message and a parallel nonhumorous (i.e., serious) message. Excluded by this criterion were studies that lacked any comparison condition for the humorous message (such as within-subject designs), studies that compared a humorous message to a no-message control condition or an irrelevant-message control condition, and studies that compared humorous messages to messages designed to evoke other affective states (e.g., fear). The point of this criterion was to identify studies that permitted isolation of the effects of adding humor to a message. Studies that compared humor with fear without a control condition (e.g., Lee & Shin, 2011), as well as studies that compared the effects of different levels of humor without a nonhumorous condition (e.g., Benson & Perry, 2006), were excluded.

Second, studies had to assess persuasive outcomes—specifically, knowledge, attitudes, intentions, or behavior. Excluded by this criterion were studies of other outcomes, such as aggression (e.g., Berkowitz, 1970), well-being (e.g., Porterfield, 1987), and anxiety (e.g., Yovetich, Dale, & Hudak, 1990). Third, sufficient information had to be available, either in the original report or from correspondence with authors, to permit computation of relevant effect sizes. After the screening process, 79 research reports that documented results of 89 separate studies were included in the meta-analysis (~10% unpublished), with a total sample size of 14,587 (see Appendix F: Overview of Studies Included in Meta-Analysis).

Coding of outcomes

All effect sizes pertaining to knowledge, attitudes, intentions, and behaviors were calculated per sample.[3] When a single study reported on two different dependent variables within the same category (e.g., attitudes toward ad and attitudes toward

brand), the effects were averaged. After all measures were coded, effect sizes of Hedge's *g* were calculated. Later, for the sake of consistency with other meta-analyses from the field of emotions/affects, Hedge's *g* was transformed into a correlation estimate (*r*). Most samples ($k = 62$) included only one type of outcome (knowledge, attitudes, intentions, or behaviors), although some samples included two ($k = 22$) or three ($k = 5$).

To create a unified persuasion index (i.e., a measurement that combines knowledge, attitudes, intent, and behavior) without excluding relevant effect sizes (in cases where studies reported on more than one outcome), we treated each study as a separate meta-analysis (O'Keefe, 2013; Tannenbaum et al., 2015). In other words, when studies reported on more than one outcome, all relevant effects of humor within each study were averaged with a random-effects model. After analyzing the total effect of humor on persuasion across 89 samples and testing for variance of effect sizes, we proceeded to analyze the four outcomes separately. This decision was guided by two considerations. First, the evidence in hand about the equivalence of different outcome variables for assessing relative persuasiveness (O'Keefe, 2013) concerned only measures of attitude, intention, and behavior. It is an open question as to whether knowledge outcomes will exhibit the same pattern. Second, it is at least conceivable that, among message variations, humor variations might be distinctive in producing different effect sizes for attitude, intent, and behavior. Some theoretical accounts associate humor with increased cognitive elaboration, whereas others suggest that humor's effectiveness stems from its capacity to distract and induce a positive mood. Though outcomes like cognitive elaboration and positive mood do not map directly onto the four outcomes examined in the current analysis, it opens the possibility of humor to exhibit distinct effects of knowledge, attitudes, intent, and behavior.

Coding of moderators

Sample

Studies were coded by the type of population studied. The two values included studies of college student samples ($k = 72$) and studies of non-student samples ($k = 17$).

Topic

The general context of the study was coded into five categories: (a) political topics ($k = 21$), such as gun control and social security; (b) health topics ($k = 27$), such as cervical cancer and mouth hygiene; (c) marketing topics ($k = 24$), such as soft drinks and hair products; (d) education topics ($k = 12$), such as safety instructions; and (e) N/A ($k = 5$) a category that included two or more topics across the domains of politics, health, marketing, or education.

Issue-involvement

In concurrence with its common definition (Apsler & Sears, 1968), high involvement occurred when the topic of the message had direct consequences for the participants' lives (e.g., humorous instructions of safety procedures during a flight or a

message advocating against drinking and driving addressed to students). In cases where the level of involvement could not be assessed, involvement was coded as non-applicable (N/A). The final sample included 48 studies that were coded as low-involvement and 38 studies that were coded as high-involvement.

Humor relatedness

In cases where reports included the full version or a sample of their stimuli, we coded for the relatedness of humor in the message, either as high or low ($k = 34$; $k = 45$, respectively). Reports that did not provide this information were coded as N/A ($k = 10$).

Call to action

The sample included 15 studies that used humorous stimuli with an explicit call to action, compared to 74 studies that did not include such information.

Gender of source

The gender of the individual delivering the humorous message was coded as male ($k = 31$), both genders ($k = 12$), or unspecified ($k = 45$). When gender was unspecified or gender was neutral (e.g., a talking toothbrush), reports were coded as N/A. Regretfully, the sample included only one study that exclusively used females as a source for a humorous message.

Channel of stimulus

The relevant channels for humor appeals included: (a) audio ($k = 14$), such as tapes and radio broadcasts; (b) audiovisual ($k = 33$), such as films; (c) print ($k = 14$), such as books; (d) face-to-face ($k = 5$), such as confederates that delivered the humorous stimulus in person; and (e) visual ($k = 23$), such as cartoons and magazine caricatures.

Humor style

We used Buijzen and Valkenburg's (2004) typology of humor styles to categorize stimuli from the reports into clownish humor ($k = 6$), irony ($k = 8$), parody ($k = 20$), satire ($k = 16$), slapstick ($k = 1$), and surprise ($k = 22$).

Humor intensity

Overall, 47 studies employed a manipulation check to ensure that humorous messages were perceived as funnier than an equivalent nonhumorous message. Given the fact that scales of perceived humor differed with respect to their response options, the intensity of humor was computed as the difference between the experimental conditions ($M = 0.31$, $SD = 0.19$), divided by the range of the scale (a difference of 5 points on a 10-point scale is equivalent to a difference of 50 points on a 100-point scale).

Measurement delay

The delay of the outcome was trichotomized into the following categories: short delay ($k = 74$), moderate delay ($k = 5$), and long delay ($k = 10$). Specifically, studies

that measured the outcome on the same day as the exposure to the message were coded as short delay, studies that postponed the measurement for one to seven days were considered moderate delay, and long delay was associated with studies that exceeded the one-week mark.

Inter-coder reliability and analysis

Of our final sample, 25% ($k = 23$) was coded by two independent coders, using *Krippendorff's alpha*. The remaining studies (75%) were coded by the first author. Intercoder reliability was above .79 for all variables, indicating a satisfactory reliability.[4] Correlation coefficients (r) were calculated using Comprehensive Meta-Analysis (v.3; Borenstein, Hedges, Higgins, & Rothstein, 2005). The study reports on uncorrected effect sizes based on random-effects assumptions (Hedges & Vevea, 1998). Before proceeding with the moderation analysis, heterogeneity tests using the Q statistics were conducted for each relevant outcome (i.e., knowledge, attitudes, intentions, and behavior; Higgins & Thompson, 2002). Hypotheses that concerned continuous variables (H5) or interactions between different moderators (H3) were tested with a meta-regression.

Results

RQ1: Main effects of humor on persuasion-related outcomes

The results summarize the effects of humor on persuasion across 89 studies with an average sample size of 163.91 participants ($SD = 131.82$; $Med = 138$; see Appendices B–E in the Supplementary Material for forest plots with the effects of humor by persuasion-related outcome). Overall, compared to nonhumorous messages, humor had a weak, albeit significant, effect on persuasion ($r = .13$, 95% CI [.09, .18], $p = .001$, $k = 89$), with significant heterogeneity in effect sizes (Q [88] = 752.33, $I^2 = 88.30\%$, $p < .001$). When analyzing persuasion across different outcomes, humor tended to exert a higher impact on knowledge ($r = .23$, 95% CI [.12, .33], $p = .001$, $k = 29$), followed by attitudes[5] ($r = .12$, 95% CI [.06, .18], $p = .001$, $k = 58$), behavioral intentions ($r = .09$, 95% CI [.02, .15], $p = .017$, $k = 29$), and behavior ($r = .04$, 95% CI [−.10, .18], $p = .547$, $k = 5$). There was significant heterogeneity in effect sizes for knowledge (Q [25] = 309.21, $I^2 = 91.92\%$, $p < .001$), attitudes (Q [57] = 558.15, $I^2 = 89.79\%$, $p < .001$), and behavioral intent (Q [28] = 181.31, $I^2 = 84.56\%$, $p < .001$). The only homogenous estimation of effect sizes was associated with behavior (Q [4] = 5.79, $I^2 = 48.22\%$, $p = .122$).

H1-H5: The effects of theoretical moderators

For a complete outline of conditioned effects by moderating variable, see Tables 1 to 3. In concurrence with H1, the analysis found that humor relatedness was a significant moderator across all relevant outcomes, including knowledge (Q [1] = 19.68, $p = .001$), attitudes (Q [1] = 11.63, $p = .001$), and intentions (Q [1] = 6.25, $p = .01$). Hence, studies where humor was central to the message tended to exert more impact on knowledge, attitudes, and behavioral intent, compared to messages that used humor

Table 1 The Effects of Humor on Knowledge by Different Moderating Variables

Variable	*r*	*k*	*n*	*Q*	*p*	*95% CI*
Main effect	.23	29	4766			[.12, .33]
Sample				1.40	.24	
Students	.25	24	3568			[.13, .37]
Non-students	.11	5	1198			[−.10, .31]
Issue involvement				5.10*	.02	
High	.35	14	1842			[.16, .52]
Low	.10	15	2924			[.01, .20]
Topic				47.96***	.001	
Education	.36	11	1398			[.17, .52]
Marketing	.22	10	1552			[.23, .40]
Health	.05	2	719			[-03, .13]
Politics	−.05	5	1009			[−.23, .12]
Relatedness				19.68***	.001	
Related	.42	14	1701			[.27, .55]
Unrelated	.01	12	2417			[−.09, .11]
Gender				2.48	.12	
Both	.38	5	407			[.19, .54]
Males	.14	10	2011			[−.10, .37]
Action				1.82	.18	
Yes	.10	3	748			[−.05, .25]
No	.24	26	4018			[.11, .35]
Channel				11.93*	.02	
Face-to-face	.45	2	185			[.23, .64]
Visual	.34	4	607			[.07, .57]
Audiovisual	.29	11	1857			[.06, .49]
Audio	.10	7	870			[−.02, .22]
Print	−.05	5	1247			[−.14, .23]
Style				45.76***	.001	
Parody	.44	9	847			[.30, .57]
Surprise	.08	9	1664			[−.02, .17]
Irony	−.10	1	495			[−.19, −.02]
Satire	−.03	4	791			[−.26, .20]
Clownish	.62	2	191			[.25, .83]
Time delay				0.01	.98	
Long delay	.23	8	1159			[−.01, .44]
No delay	.23	21	3607			[.10, .35]

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

only peripherally. H2 predicted that humorous messages would be more effective for lowly-involved individuals, compared to highly-involved individuals. This prediction was not supported for behavioral intent (Q [1] = 0.25, $p = .62$) and attitudes (Q [1] = 0.11, $p = .74$). Interestingly, issue involvement was a significant moderator

Table 2 The Effects of Humor on Attitudes by Different Moderating Variables

Variable	*r*	*k*	*n*	*Q*	*p*	*95% CI*
Main effect	.12	58	10398			[.06, .18]
Sample				1.15	.28	
Students	.13	50	8761			[.06, .20]
Non-students	.06	8	1637			[-05, .17]
Issue involvement				0.11	.74	
High	.11	20	2835			[−.02, .23]
Low	.13	35	6629			[.06, .20]
Topic				16.06***	.001	
Education	.29	1	52			[.03, .51]
Marketing	.24	19	3639			[.16,.32]
Health	.03	17	3703			[−.09, .15]
Politics	.04	17	2574			[−.05, .12]
Relatedness				11.63***	.001	
Related	.25	20	3289			[.16, .33]
Unrelated	.04	29	4977			[−.05, .12]
Gender				0.05	.83	
Both	.16	6	967			[.01, .31]
Males	.18	21	3129			[.06, .30]
Action				0.78	.38	
Yes	.05	8	1443			[−.11, .21]
No	.13	50	8955			[.07, .19]
Channel				2.14	.71	
Face-to-face	.12	3	1046			[.02, .22]
Visual	.19	15	3041			[.05, .31]
Audiovisual	.09	21	3711			[.02, .17]
Audio	.14	9	980			[−.03, .31]
Print	.04	10	1620			[−.15, .23]
Style				6.85	.14	
Parody	.22	12	1848			[.10, .34]
Surprise	.06	11	2493			[−.10, .21]
Irony	.19	6	692			[−.04, .39]
Satire	.03	12	1950			[−.06, .12]
Clownish	.08	5	862			[−.22, .37]
Time Delay				1.99	.37	
Long delay	.01	2	834			[−.15, .16]
Moderate delay	.16	3	242			[−.07, .38]
No delay	.12	53	9322			[.06, .19]

for the effects of humor on knowledge (Q [1] = 5.10, p = .02); however, contrary to our expectation, stronger effects were recorded for highly-involved individuals. In line with H3, this result may suggest an interaction between issue involvement and humor relatedness. To examine the interaction, we conducted a meta-regression

Table 3 The Effects of Humor on Intentions by Different Moderating Variables

Variable	*r*	*k*	*n*	*Q*	*p*	*95% CI*
Main effect	.09	29	4731			[.02, .15]
Sample				1.49	.22	
Students	.10	23	3986			[.02, .18]
Non-students	.03	6	745			[−.04, .10]
Issue involvement				0.25	.62	
High	.07	16	2746			[−.05, .19]
Low	.10	13	1985			[.04, .17]
Topic				9.81**	.002	
Marketing	.20	11	1908			[.12, .28]
Health	.01	18	2823			[−.09, .10]
Relatedness				6.25**	.01	
Related	.17	8	1458			[.10, .24]
Unrelated	.01	17	2584			[−.09, .12]
Gender				0.18	.67	
Both	.08	6	878			[−.01, .16]
Males	.11	10	1445			[−.01, .22]
Action				1.98	.16	
Yes	.02	9	1465			[−.08, .12]
No	.12	20	3266			[.03, .20]
Channel				5.78	.12	
Visual	.06	13	2429			[−.03, .14]
Audiovisual	.18	12	1682			[.08, .27]
Audio	.04	2	256			[−.08, .16]
Print	−.20	2	364			[−64, −.33]
Style				4.50	.21	
Parody	.14	8	1247			[.04, .24]
Surprise	−.01	9	1421			[−.16, .15]
Irony	.17	3	598			[.05, .29]
Clownish	−.01	4	740			[−.25, .22]
Time delay						
No delay	.09	29	4731			[.02, .15]

with issue involvement, humor relatedness, and their interaction term as predictors of effect sizes of humor on persuasion. Given missing data associated with the coding of involvement and relatedness, we decided to use the general persuasion index (with single effect size per sample) as the outcome of interest. According to the meta-regression (Q [3] = 41.07, $p < .001$; $R^2 = .43$, $k = 77$), there was a significant interaction between issue involvement and humor relatedness ($b = .19$, $SE = .09$, $p = .046$). To further probe the interaction, Figure 1 presents the predicted mean effects for the samples in the meta-analysis. As predicted by H3, stronger effects were recorded for messages with related humor when they were processed by

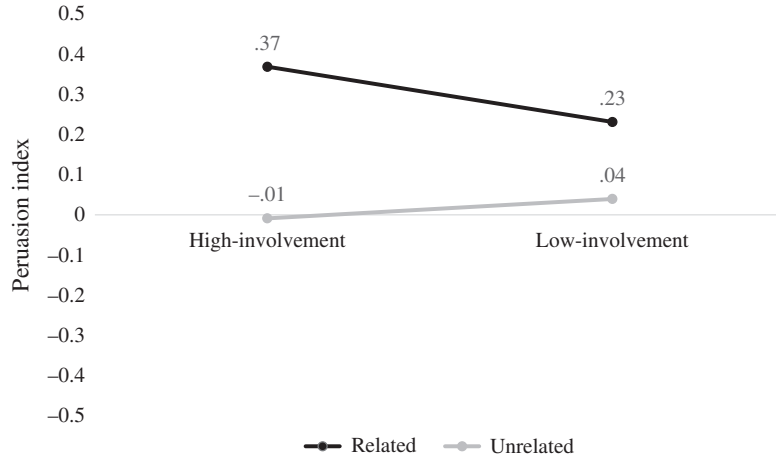

Figure 1 The interaction effect on persuasion by humor relatedness and issue-involvement.

highly-involved individuals, compared to lowly-involved individuals. Much smaller differences were recorded between highly- and lowly-involved individuals in the case of messages with unrelated humor.

In line with the humor sleeper-effect hypothesis (H4), we expected humorous appeals to be more effective at moderate and long delays compared to short measurement delays. The data, however, did not support this prediction for knowledge (Q [1] = 0.01, $p = .98$) or for attitudes (Q [2] = 1.99, $p = .37$). Regretfully, all the studies that measured the effects of humor on behavioral intent only measured it at immediate posttest, preventing us from testing H4. The final hypothesis (H5) predicted a curvilinear effect of humor intensity on persuasion. As with H3, acknowledging missing data associated with studies that did not employ manipulation checks of perceived humor, the meta-regression relied on the general persuasion index (with single effect size per sample) as the outcome of interest. In particular, the hypothesis was examined by including the linear ($b = .82$, $SE = .39$, $p = .05$) and quadratic terms ($b = -.90$, $SE = .43$, $p = .04$) of perceived humor as continuous predictors of persuasion. Based on the meta-regression (Q [2] = 8.41, $p = .04$, $R^2 = .12$, $k = 47$), the effect of humor intensity on persuasion was curvilinear. Figure 2 demonstrates a plotted regression line. In agreement with H5, the plotted effects followed an inverted-U shape whereby moderate levels of humor resulted in stronger effects, whereas weak and strong humorous appeals were more likely to exert a small, or even negative, impact on persuasion.

RQ2: Exploratory moderators

In contradiction with our expectation, the results revealed that college student samples and nonstudent samples did not differ significantly in the effect sizes of humor on knowledge, attitudes, and intentions.[6] The general topic of the humorous stimulus had a significant impact on knowledge (Q [3] = 47.96, $p = .001$), attitudes

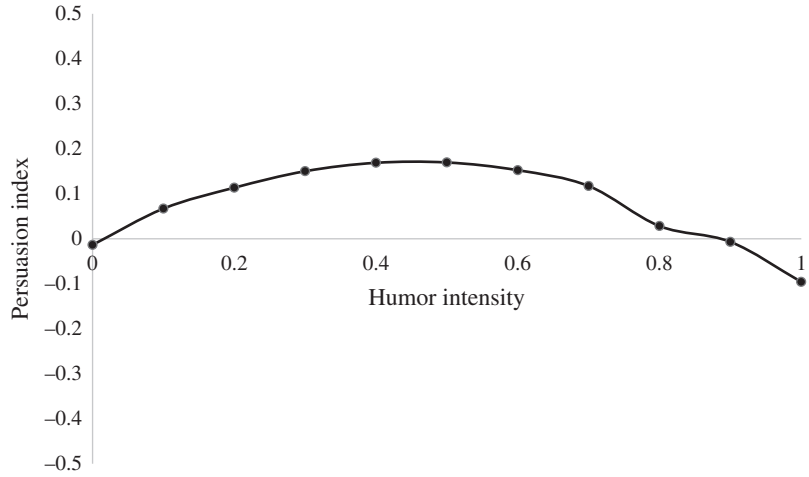

Figure 2 The plotted regression of humor intensity on persuasion.

(Q [3] = 16.06, p = .001), and intentions (Q [1] = 9.81, p = .002), such that studies in education tended to yield the strongest effects, followed by marketing, health, and politics. In terms of gender of the message source, messages that included both males and females were not more effective than messages that included only males for all persuasion-related outcomes.

The moderation analysis showed a significant effect for message channel on knowledge (Q [4] = 11.93, p = .02). Both face-to-face and audiovisual messages were effective for knowledge gain. In addition, the style of humor played a significant role as a moderator for knowledge (Q [4] = 45.76, p = .001), but not for attitudes (Q [4] = 6.85, p = .14) or intentions (Q [3] = 4.50, p = .21). In particular, parody was an effective vehicle for knowledge gain. Interestingly, irony appeared to have a negative impact on knowledge and a positive effect on behavioral intent. Finally, there were no significant differences between the effectiveness of humorous messages that included a call to action and messages that did not.

Publication Bias

The best way to address the "file drawer problem" – underrepresentation of null-results in the published literature – is to provide a combination of different indices. One of the most common statistical tests to detect a publication bias is Egger's test (Egger, Smith, Schneider, & Minder, 1997). The null hypothesis for Egger's test is that the precision of effect size estimations (the inverse of its standard error) is not a significant predictor of its standardized effect size. In this case, the null hypothesis was not rejected for attitudes (t[56] = 1.40, p = .17), behavioral intent (t[27] = 0.49, p = .63), or behavior (t[3] = 0.89, p = .44), indicating that the test did not detect a significant publication bias. Yet, Egger's test recorded a potential publication bias in the case of knowledge-related outcomes (t[24] = 2.19, p = .04). To further probe

this potential bias, we utilized the Trim and Fill procedure (Duval & Tweedie, 2000a, 2000b). According to this analysis, the "true" estimated averaged effect of humor on knowledge was even stronger ($r = .25$, CI [.14, .35]).

Discussion

Theoretical and practical implications

After almost a century of empirical research that failed to reveal simple and consistent main effects of humor on persuasion, the focus shifted toward analyzing the boundary conditions that either cause humor to have the desired impact or to result in a counterproductive outcome. The current meta-analysis underscores this movement, revealing that only by including relevant moderators can we present a clearer picture of the mechanisms that shape the influence of humor on persuasion. Comparing humor and nonhumor conditions, the analysis demonstrated positive, moderate-level effects of humor on knowledge; positive, albeit weak, effects on attitudes and behavioral intent; and nonsignificant effects on behavior. The magnitude of the effects was highly contingent on theoretical and exploratory moderators incorporated in experimental designs. Thus, overall, stronger effects were recorded for studies in education and marketing that incorporated parody within the stimulus and designed a humorous component that was related to the persuasive message.

Inquiries into the link between humor and persuasion in health and political communication tended to yield weaker effects. Though the current analysis does not permit drawing firm conclusions about the reasons behind the relative advantage of marketing and education, on a tentative level there are several potential explanations. Politically- and health-related decisions are typically cultivated across the course of one's life, based on experiences such as growing up in a working-class Democratic household or losing a parent to cancer, which, presumably, make them less amenable to immediate change, compared to educational or marketing decisions such as what deodorant to purchase. Broadly speaking, these differences can be also attributed to methodological considerations. Simply put, while health and political communication are often concerned with processes and conditioned effects, education and marketing put much more emphasis on direct outcomes. In this case, theoretical clarity and methodological sophistication can come at the expense of stronger bottom-line effects. Lastly, the reliance of humor effects in the context of education on knowledge-related outcomes (which tend to be stronger) may also skew the main effects.

Compared to previous meta-analyses of humor in marketing and education, the current results reveal modest effects. These discrepancies can perhaps be attributed to our inclusion criteria, which incorporated studies from subfields (i.e., health and political communication) where humor has been notoriously associated with inconsistencies and minimal effects. In fact, when focusing only on marketing- and education-related outcomes, the average effects of humor on persuasion were very close to those retrieved in previous meta-analyses ($r = .19$ versus $r = .19$–$.37$ in Eisend, 2009, and $r = .30$ versus $r = .31$ in McRoberts & Larson-Casselton, 2006). In addition, discrepancies

pertaining to the magnitude of effect sizes could be associated with the fact that previous meta-analyses combined experimental designs with correlational studies. Pragmatically speaking, these two research designs provide two distinctly different assessments for the effect of humor on persuasion (O'Keefe, 2017). While correlational studies estimate the relationship between a humorous message and a persuasion-related outcome, experimental designs describe the difference between the size of the effect of the humorous and the nonhumorous messages. As such, the combination of correlational and experimental studies might bias the results.

The majority of studies that analyzed the contingencies of humor effects argue that humorous appeals are best suited for educated, younger audiences (Eisend, 2011; Weinberger & Gulas, 1992). Counter to this argument, the current analysis did not record significant differences between student and non-student samples. To some extent, these results echo previous meta-analyses in other domains of persuasion. For instance, in the context of political advertising (Lau, Sigelman, Heldman, & Babbitt, 1999) and presidential debates (Benoit, Hansen, & Verser, 2003), studies failed to produce unique effect sizes for student samples.

Analyzing the link between involvement and persuasion, previous meta-analyses rejected the oversimplified approach to issue involvement, arguing for different types of involvement, including value relevance, outcome relevance, and impression relevance (Glasman & Albarracín, 2006; Johnson & Eagly, 1989). Similarly, the current meta-analysis points to the possibility that issue involvement does not have a direct impact on persuasion through humor and that interactions with other factors, such as relatedness, may better account for variance in humor effects. Namely, highly-involved individuals tend to be persuaded more from humor when it is related to the persuasive message, while attempts to persuade highly-involved individuals with unrelated humor are less likely to succeed. Further, while related humor works better for lowly-involved individuals as well, persuasive messages that use unrelated humor are not penalized to the same extent as using unrelated humor to persuade highly-involved individuals. In addition, the results underscore the significance of humor intensity. Specifically, the effects of humor on persuasion are governed by an inverted U-shaped pattern that peaks at moderate levels of perceived humor and then gradually decreases when the humorous message becomes "too funny." Though there is a need to further understand the graphical relationship between humor and persuasion, one potential explanation can be traced back to the conceptualization of humor as an arousal state (Shurcliff, 1968). As with other arousal-inducing stimuli (Yerkes & Dodson, 1908), it appears that small amounts of humor may not be enough to draw attention, while too much humor may overwhelm the processing of information. Hence, in order to leverage the strengths of humor, message designers need to calibrate their appeals toward moderate levels of humor intensity.

Another important factor that was largely overlooked in prior research is the style of humor. While parody exerts a positive effect, the outcomes of studies examining the effect of satire and irony can best be described as mixed. Mirroring the results of

some of the earliest studies of satire (Vidmar & Rokeach, 1974), as well as more recent attempts to unravel the force of irony (LaMarre, Landreville, & Beam, 2009), ambiguous humor often impedes persuasion, as it leaves much more room for selective perception and individual interpretation. This point highlights a bigger question pertaining to satire. Namely, it is unclear whether satire can provide a meaningful comparison to other genres, as it is often achieved by mixing various types of humor in a single satirical piece. This insight calls for further examinations associated with the consequences of combining different types of humor.

Limitations and future directions

Although the authors have made a considerable effort to reduce potential threats to the validity of the results, certain limitations should be noted. Most importantly, the study abided by rigorous criteria, excluding approximately 85% of the considered research reports. While adopting rigorous criteria made the meta-analysis consistent and theoretically meaningful, it does not suggest that studies that did not fit the inclusion criteria cannot provide valuable insights on humor. Relatedly, an exclusive focus on experimental designs may overshadow the importance of situating the findings in a more naturalistic context (Tannenbaum et al., 2015). Moreover, the decision to focus only on experimental designs might impact the distribution, and perhaps the direction, of the moderating variables. For instance, including survey-based research in the analysis would have resulted in a much higher proportion of studies using representative samples, potentially affecting the link between humor and persuasion. Further, the current meta-analysis focuses on humor appeals rather than perceived humor. Since our inclusion criteria did not differentiate between studies that utilized manipulation checks and studies that have not, all effects must be interpreted as depicting exposure to humor appeals rather than subjective interpretations of humor.

Likewise, other emotional/affective appeals, such as anger, guilt, sadness, disgust, happiness, and fear, can also qualify as nonhumorous comparison conditions. Yet, while the inclusion of such diverse emotional/affective states can inform us regarding their relative impact compared to humor, they will not provide direct insights on the overall effect of humor on persuasion. For example, the results of Brooker's (1981) experiment suggested that humor outperformed fear but did not outperform the nonhumorous ad. If we were to include this comparison of humor and fear in the current meta-analysis, the conclusion might be that humor is effective, directly contradicting the results of the original experiment.

While the current study focused on persuasion-related outcomes, questions regarding the processing of humorous content remain open. Considering the reliance of several theoretical frameworks of humor on dual-processing models, it might be interesting to examine the boundary conditions that increase the likelihood that a humorous message will be processed systematically or heuristically. Thus, though the traditional literature on persuasion often treated humor as a heuristic cue, the relatively large effects recorded for knowledge outcomes in this study

suggest that humor can operate through both routes. An additional promising area for future studies on humor is associated with social media. Given the centrality of humor to discourse on social media, it is imperative to examine the effects of humorous messages when they are packaged into new media formats such as Twitter, Facebook, Instagram, etc. As previously argued (Nabi, 2016), this category of humorous messages is likely to leverage social media affordances such as interactivity and the endorsement of messages by friends.

A review of the reference list of studies included in the analysis demonstrates that humor is truly a multidisciplinary phenomenon. In recent years, however, the field of communication has taken the lead in attempting to systematically organize the scattered research relating to humor into a unified, overarching theoretical framework (Becker, 2014; Meyer, 2000). We hope that this meta-analysis adds to these efforts by providing an empirical framework to assess the potential of humor as a persuasive tool and identify the conditions under which humor does or does not impact knowledge, attitudes, and behavior.

Supplementary Material

Supplementary material is available at *Human Communication Research* online.

Notes

1 Kant was commenting on Voltaire's claim that heaven gave mankind hope and sleep to relieve the many troubles of life (Class, 2012).

2 For knowledge (Q [1] = 0.56, p = .456); attitudes (Q [1] = 0.02, p = .897); intent (Q [1] = 0.17, p = .682); and behavior (Q [1] = 0.51, p = .477).

3 The original intention was to code for additional outcomes and mediators, such as mood (i.e., positive/negative), cognitive elaboration, reactance, counterarguing, and valence. Yet, as the literature search indicated, there were very few studies within the relevant topic areas that included variables such as mood and elaboration, and even fewer studies that reported on the direct effects of humor on such mediators. Specifically, mood was included as a variable in only two studies (i.e., Geuens & De Pelsmacker, 2002; Weber, Martin, Members of COMM 401, & Corrigan, 2006), elaboration appeared as a variable in five studies (i.e., Chan, 2011; Nabi, 2016; Nabi et al., 2007; Skalski, Tamborini, Glazer, & Smith, 2009; Zhang & Zinkhan, 2006), reactance was directly measured in one study (i.e., Skalski et al., 2009), counterarguing was assessed in seven studies (i.e., Duncan & Nelson, 1985; Holbert et al., 2011; Lammers et al., 1983; Moyer-Gusé et al., 2011; Nabi et al. 2007; J.L. Powell, 1977; L. Powell, 1977; Zhang & Zinkhan, 2006), and valence appeared in three studies (i.e., Jin & Villegas, 2007; Lee & Mason, 1999; J.L. Powell, 1977; L. Powell, 1977).

4 Sample, α = .98; issue involvement, α = .83; topic, α = .82; relatedness, α = .88; gender, α = .90; call to action, α = .80; channel, α = .94; style, α = .80; delay, α = .91.

5 Studies in marketing often differentiate between attitudes toward an ad versus a brand. Although humor tended to exert stronger effects on attitudes toward an ad (r = .28, 95% CI [.18, .39], p = .001, k = 15), compared to attitudes toward a brand (r = .19, 95%

CI [.09, .29], $p = .001$, $k = 12$), these differences were not statistically significant (Q [1] = 1.62, $p = .20$).

6 Studies were also coded based on the geographical region of their sample, including Northern American samples ($k = 79$), European samples ($k = 5$), Middle Eastern samples ($k = 2$), Asian samples ($k = 1$), and Oceanic samples ($k = 1$). According to the results, there were no significant differences in effect sizes based on the geographical region of the study for attitudes (Q [2] = 3.24, $p = .20$) or intentions (Q [1] = 0.04, $p = .83$); however, studies from the Middle East ($r = .45$, 95% CI [.23, .64]) and Oceania ($r = .43$, 95% CI [.11, .67]) resulted in stronger effects on knowledge compared to studies from North America ($r = .21$, 95% CI [.08, .33]) and Europe ($r = .01$, 95% CI [−.13, .13]).

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*Indicates a study included in the meta-analysis.

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