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Abstract

Humor is a ubiquitous experience that facilitates coping, social coordination, and well-being. We examine how humorous responses to a tragedy change over time by measuring reactions to jokes about Hurricane Sandy. Inconsistent with the belief that the passage of time monotonically increases humor, but consistent with the benign violation theory of humor, a longitudinal study reveals that humorous responses to Sandy's destruction rose, peaked, and eventually fell over the course of 100 days. Time creates a comedic sweet spot that occurs when the psychological distance from a tragedy is large enough to buffer people from threat (creating a benign violation) but not so large that the event becomes a purely benign, nonthreatening situation. The finding can help psychologists understand how people cope and provide clues to what makes things funny and when they will be funny.

Keywords

humor, psychological distance, time, emotion, coping

Humor is an important psychological response that facilitates coping, social coordination, and the pursuit of happiness. When tragedies strike, humor may be an effective coping tool, but it is not always easy or appropriate to joke in the face of tragedy. Widespread intuition and recent evidence suggest that viewing something from afar facilitates humorous responses to tragic experiences. But does distance uniformly make tragedies funnier?

The benign violation theory explains why psychological distance helps humor up to a point but suggests that too much distance hurts humor (McGraw & Warren, 2010; McGraw, Warren, Williams, & Leonard, 2012). Distance reduces threat, helping transform tragedy (a violation) into comedy (a benign violation), but too much distance can make comedy seem tame and uninteresting (a benign situation). In a longitudinal study, we find that the passage of time initially increases humor in response to jokes about Hurricane Sandy. The passage of additional time, however, decreases the humor perceived in those same jokes.

Benefits of Understanding Humor

Humor is a psychological response characterized by amusement and the tendency to laugh (Martin, 2007; McGraw & Warren, 2010; Veatch, 1998). Humor is ubiquitous, occurring regularly in response to social interactions (e.g., inside jokes, awkward situations) and entertainment (e.g., standup comedy, Internet surfing). Humor has received significant attention as a topic of philosophical and scientific inquiry. However, unlike

other emotional experiences whose antecedents are generally agreed on (e.g., embarrassment, grief), the necessary and sufficient conditions that precede humor are still hotly debated (Martin, 2007).

We examine humor prompted by tragedy. It is critical to examine the factors that increase and decrease humor born from aversive experiences, given the important role humor plays in coping and social coordination. The human capacity for taking a source of pain and transforming it into a source of pleasure is a critical feature of the psychological immune system (Gross, 2008; Lazarus & Folkman, 1984). Humor helps people cope with minor grievances as well as more serious tragedy and loss (Keltner & Bonanno, 1997; Lefcourt & Martin, 1986; McDougall, 1922; Samson & Gross, 2012; Smyth, 1986). Further, humor facilitates social interactions, increasing likability, mating success, and perceptions of intelligence (Greengross & Miller, 2011; Martin, 2007). Hence, understanding what enhances humor in the face of adversity is important, as both coping skills and social acceptance improve psychological well-being (Baumeister & Leary, 1995; Bonanno, 2004; Cohen & Wills, 1985). Conversely, failing to

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be funny can be costly, prompting disapproval and potential social isolation (Smeltzer & Leap, 1988). Thus, it is also important to understand the factors that *decrease* humor.

Tragedy, Distance, and Benign Violations

Psychological distance is the subjective set of experiences associated with objective distance (Ross & Wilson, 2002; Van Boven, Kane, McGraw, & Dale, 2010). We propose that psychological distance can play a critical role in shaping humorous responses to tragedy. There are four commonly accepted forms of distance: temporal (now vs. then), spatial (here vs. there), social (self vs. other), and hypothetical (real vs. imagined; Liberman & Trope, 2008). Psychological distance alters people's cognitive representation of information (cf. construal-level theory; Trope & Liberman, 2010) and emotional responses to appetitive and aversive stimuli (Mobbs et al., 2007; Williams & Bargh, 2008).

Research and intuition suggest that each form of psychological distance increases humorous responses to highly aversive situations (McGraw et al., 2012). For example, disgusting things are more amusing when they are ostensibly fake, seem far away in space or time, or afflict someone else (Hemenover & Schimmack, 2007; McGraw et al., 2012). However, contrary to intuition, psychological distance tends to decrease humorous responses to mildly aversive situations. Whereas people report that getting hit by a car would be more humorous if it occurred *5 years ago* than if it happened yesterday, they also report that stubbing a toe would be more humorous if it occurred *yesterday* than if it happened 5 years ago (McGraw et al., 2012).

Most humor theories have difficulty accounting for evidence that distance sometimes helps and sometimes hurts humor (Gruner, 1999; Morreall, 2009). To motivate our investigation, we draw on the benign violation theory of humor, which makes unique predictions regarding why psychological distance would help transform tragedy into comedy. The theory proposes that humor arises when something that threatens a person's well-being, identity, or normative belief structure (i.e., a violation) simultaneously seems okay, safe, or acceptable (i.e., benign; McGraw et al., 2012; McGraw & Warren, 2010; Veatch, 1998). Physical attacks, such as tickling, play fighting, and slapstick, are humorous when they are not harmful. Similarly, puns and other wordplay misuse language but are humorous because they make sense given an alternative linguistic or logical norm.

The benign violation theory highlights the two ways a situation can fail to be humorous. A situation may be purely violating (e.g., being tickled by a creepy stranger) or purely benign (e.g., tickling oneself); neither produces humor. Humor requires threat but not too much or too little. Thus, the theory explains why factors that decrease feelings of threat can enhance the humor associated with highly aversive events (e.g., crashing cars) yet can also reduce the humor associated with mildly aversive events (e.g., stubbing toes). Psychological distance is one such factor, as distance has been shown to reduce feelings of threat (Mobbs et al., 2007; Williams &

Bargh, 2008). For example, a negative event is less threatening when it happens to someone else (social), in another place (spatial), at a distant point in time (temporal), or when imaginary (hypothetical; Andrade & Cohen, 2007; Blanchard et al., 2004; Huddy, Feldman, & Weber, 2007; Pfefferbaum et al., 2000; Wohl & McGrath, 2007). Because of its threat reduction properties, distance increases the humor associated with tragic events by making it easier to perceive the situation as okay. However, when events are mildly aversive, distance decreases humor by reducing the threat to the point that the situation becomes purely benign.

Predictions

Previous research demonstrates that psychological distance can either help or hurt humor, depending on the severity of the violation (McGraw et al., 2012). However, the cross-sectional nature of that research provides only a limited understanding of how threat reduction influences humor. For example, such snapshots cannot illustrate how a single event can be transformed from a tragedy into a source of humor. We move beyond that work by examining the dynamic nature of humorous responses to a tragedy as they unfold over time. Because of the threat-reducing properties of psychological distance, we propose that a tragic event (a violation) will be transformed by the passage of time into something that is humorous (a benign violation) but eventually into something that is not sufficiently threatening to be humorous (a benign situation). Therefore, we posit the existence of a sweet spot for humor—a time period in which tragedy is neither too close nor too far away to be humorous.

Method

Participants

A total of 1,064 online panelists ($M_{age} = 31.1$; 407 female) recruited from the Amazon Mechanical Turk network participated in the study. Although most tragedies are unanticipated, hurricanes permit a full exploration of the humor derived from tragedy because they are tracked and publicized before they inflict harm. We recruited independent samples of approximately 100 unique participants at each of 10 different time points: one day before Hurricane Sandy hit the Northeastern United States (October 29), the day the hurricane made landfall (October 30), and again days and weeks following the natural disaster (November 2, November 7, November 14, November 21, November 28, December 5, January 2, and February 6).

Procedure and Materials

In an online survey, participants responded to three tweets (i.e., short messages) posted on the website twitter.com, by an account titled @AHurricaneSandy about the approaching storm (e.g., "JUS BLEW DA ROOF OFF A OLIVE GARDEN FREE BREADSTICKS 4 EVERYONE"; Figure 1). Participants evaluated the extent to which they found each tweet to



Figure 1. The three tweets posted from the twitter.com account @AHurricaneSandy on October 28, 2012, and October 29, 2012 used as stimuli.

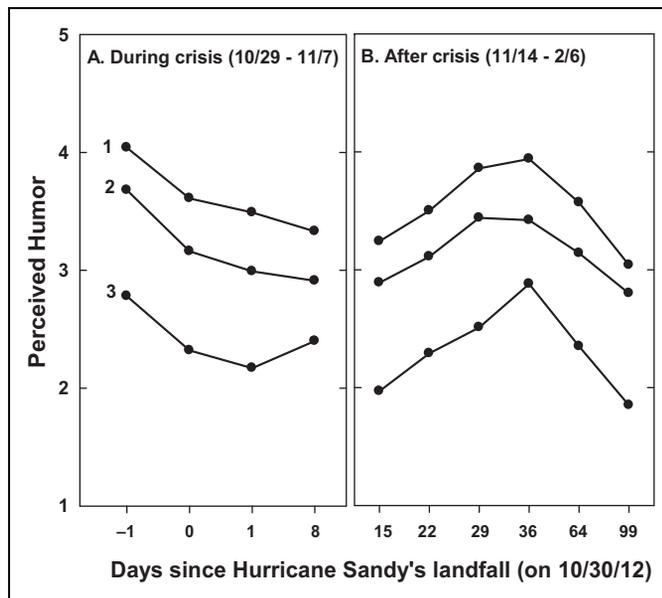


Figure 2. The humor perceived in three tweets about Hurricane Sandy. Panel A represents the time frame during which the crisis is realized. Hurricane Sandy made landfall in the Northeastern United States on October 30, 2012. Panel B represents the time frame after the crisis. The numbers (1–3) correspond to the tweets presented in Figure 1.

Note. The x-axis is not linearly related to the dates of data collection.

be funny, humorous, upsetting, offensive, boring, irrelevant, and confusing on 7-point scales ranging from 1 (*not at all*) to 7 (*extremely*). Responses to the funny and humorous items were collapsed into a humor index for each tweet ($\alpha > .98$ across the three stimuli), which served as our primary dependent measure. Responses to the upsetting and offensive items were collapsed into an offensiveness index for each tweet

($\alpha > .85$ across the three stimuli) and served as a measure of threat perception. Responses to the boring and irrelevant items were collapsed into an irrelevance index for each tweet ($\alpha > .67$ across the three stimuli).

Last, participants provided demographic information (age, gender) as well as information regarding their current geographical location (country and state). The geographic information permitted us to create a measure of geographical distance (miles) from New York, NY by using an online geographical distance calculator (<http://www.distancefromto.net/>).

Results

Humor

We used a mixed model analysis of covariance (ANCOVA) to examine whether the time point at which participants encountered the tweets affected the humor perceived in each of the three stimuli. In this analysis, timing was the between-participant variable, stimulus (tweet1 vs. tweet2 vs. tweet3) was the within-participant variable, and geographical distance was a covariate. (The pattern and significance of the reported findings were unaffected by the inclusion of geographical distance as a covariate.) We found a main effect of stimulus, such that the tweets varied in the humor they provoked, $F(2, 1,986) = 85.5, p < .001$ and a nonsignificant effect of geographical distance, $F(1, 993) = 2.01, p = .16$. Most importantly, humor significantly varied across time, $F(9, 993) = 3.22, p = .001$. This timing effect was consistent across all three tweets, as the Timing \times Stimulus interaction was not significant, $F(18, 1,986) = .55, p = .94$.¹

On the basis of this analysis, we established three post hoc contrasts, using the Bonferroni family wise error correction method to set our α at $.05/3 = .017$.

The data can be broken into two time frames (Figure 2). The first time frame (October 29, 2012, to November 7, 2012; Panel A) represents the time in which Sandy approaches (October 29), the storm makes landfall (October 30), and people learn of the hundreds of deaths, hundreds of thousands of homes without service, and billions of dollars in damage (Blake, Kimberlain, Berg, Canglialosi, & Beven, 2013). One day before landfall, the tragic nature of the storm was unknown and thus hypothetical; at this point, the tweets were humorous ($M_{-1 \text{ day}} = 3.5$). However, over the course of the next 9 days, as the psychological reality of the tragedy set in, humor declined ($M_{+8 \text{ days}} = 2.9$), $F_{\text{Contrast}}(1, 994) = 6.63, p = .01$.

In the second time frame (November 14, 2012, to February 6, 2013; Panel B), we examined the predicted nonlinear influence of psychological distance. After people realized the gravity of the destruction, the data revealed that it was “too soon” to find humor in tweets about the storm. Humor was at a low point on November 14, 2012 ($M_{+15 \text{ days}} = 2.7$). As time passed, it became “okay” to find humor in the tragedy, increasing the humor perceived in the tweets to a peak point on December 5, 2012 ($M_{+36 \text{ days}} = 3.4$), $F_{\text{Contrast}}(1, 994) = 9.36, p = .002$. Critically, humorous responses to the tweets dropped again to

another low point 99 days after the storm hit ($M_{+99 \text{ days}} = 2.6$), $F_{\text{Contrast}}(1, 994) = 13.5, p < .001$ (Figure 2, Panel B).

Offensiveness

We used the respondents' judgments of offensiveness to assess the change in threat perception over time. Using the same mixed-model ANCOVA approach, we found a main effect of stimulus such that the tweets varied in their perceived offensiveness, $F(2, 1,986) = 147.3, p < .001$, and a marginal effect of geographical distance, $F(1, 993) = 3.13, p = .08$. Offensiveness significantly varied across time, $F(9, 993) = 3.43, p < .001$. Again, this timing effect was consistent across all three tweets, as the Timing \times Stimulus interaction was not significant, $F(18, 1,986) = .75, p = .76$.

Using the same post hoc contrast analysis that we performed on the humor measure (and a corrected α value of .017), we found a different pattern for offensiveness ratings. Consistent with benign violation theory, offensiveness significantly rose over the course of our first time frame (October 29, 2012, to November 7, 2012); this effect corroborates our view that as the reality of the crisis posed by Hurricane Sandy set in, jokes about the storm became more offensive ($M_{10/29} = 2.3; M_{+8 \text{ days}} = 2.9$), $F_{\text{Contrast}}(1, 994) = 8.49, p = .004$. The next contrast examines the beginning of the second time frame at which point people began to find it "okay" to joke about the storm. Here the offensiveness ratings significantly declined ($M_{+15 \text{ days}} = 3.4; M_{+36 \text{ days}} = 2.7$), $F_{\text{Contrast}}(1, 994) = 8.46, p = .004$. However, at the tail end of our data, offensiveness ratings largely stabilized, slightly but nonsignificantly rising ($M_{+36 \text{ days}} = 2.7; M_{+99 \text{ days}} = 3.1$), $F_{\text{Contrast}}(1, 994) = 3.20, p = .07$, not significant (NS).

Mediation by Offensiveness

Recall that the offensiveness index serves as a measure of threat perception. The benign violation theory predicts that the relationships between time, offensiveness, and humor should vary as time passes. Initially, when it is too soon to find humor in tragedy, an absence of humor should be associated with high levels of threat. Later, as humorous reactions to tragedy rise, the increase in humor should be associated with a decrease in threat (as the event is transformed from a pure violation into a benign violation). However, when it eventually becomes too late to find humor in tragedy, an absence of humor should be unrelated to perceived threat (as the event is perceived to be a purely benign, nonthreatening situation).

A series of mediation analyses support these predictions. Using bootstrapping procedures recommended by Preacher and Hayes (2004), we examined the extent to which offensiveness mediated the effect of timing on humor during each of the post hoc time frames established in the contrast analyses mentioned earlier. In the first time frame (October 29, 2012, to November 7, 2012), as Sandy moved from a hypothetical to a realized tragedy, there was a significant positive effect of time on offensiveness, $\beta = .21, t(406) = 3.08, p = .002$ (*a* path), a

significant negative effect of offensiveness on humor, $\beta = -.30, t(405) = -5.69, p < .001$ (*b* path), and critically a significant negative indirect effect of timing on humor via offensiveness, $\beta = -.06, 95\%$ confidence interval (CI): $[-.11, -.02]$ (*a* \times *b* path). Consistent with the theory, the analysis suggests that as the reality of Sandy unfolded over time, humor decreased via an increase in threat perception.

In the second time frame (November 14, 2012, to December 5, 2012), as humorous responses to Sandy rose and peaked, a different pattern emerged. Here we found a significant *negative* effect of time on offensiveness, $\beta = -.22, t(407) = -3.16, p = .002$ (*a* path), and a significant negative effect of offensiveness on humor, $\beta = -.32, t(406) = -6.20, p < .001$ (*b* path). In this case, there was a significant positive indirect effect of timing on humor via offensiveness, $\beta = .07, 95\%$ CI: $[.03, .13]$ (*a* \times *b* path). Again, consistent with the benign violation theory, this analysis suggests that as temporal distance from Sandy increased, humor increased because of a reduction in threat perception.

In the final time frame (December 5, 2012, to February 6, 2013), as humorous responses to Sandy decreased, we did not find evidence that the decline in humor over time was due to changes in perceived offensiveness. Timing did not significantly influence offensiveness ratings, $\beta = .19, t(304) = 1.70, p = .09$, nor was the indirect effect of timing on humor via offensiveness significant, $\beta = -.05, 95\%$ CI $[-.13, .004]$, including zero. Thus, this final decline in humor was not due to increased threat perception. Taken together, the mediation analyses shed further light on the complex relationship between psychological distance, threat perception, and humor.

Irrelevance and Confusion

We measured irrelevance to examine the possibility that changes in humor would be driven by decreased interest in the stimuli. Using the same ANCOVA model described earlier, we did not find a significant effect of timing on irrelevance scores, $F(9, 993) = 1.24, p = .27$. We measured confusion to examine the possibility that changes in humor would be driven by changes in stimuli comprehension over time. We analyzed the confusion item for each of the three tweets, finding that confusion scores do vary significantly over time, $F(9, 987) = 3.24, p = .001$. However, this variation appears to be haphazard. Using the post hoc contrasts established earlier (and the corresponding corrected α level of .017), none were significant, $F_{\text{Contrasts}} < 3.51, ps > .06$, NS.

Discussion

Human history is rife with tragedy and triumph over tragedy. We illustrate the importance of psychological distance for triumphing over tragedy—first through humor and later through apathy. Despite the strong intuition that the passage of time enhances humor in the face of tragedy, little empirical evidence

exists to support this claim. We narrow the knowledge gap using responses to a real tragedy and measuring how humor changes in real time. We find that temporal distance creates a comedic sweet spot. A tragic event is difficult to joke about at first, but the passage of time initially increases humor as the event becomes less threatening. Eventually, however, distance decreases humor by making the event seem completely benign.

Relationship to Existing Literature

Dating back to Socrates, theories based on incongruity, release, and superiority have dominated discussions of what makes things humorous (Martin, 2007; Morreall, 2009). Most versions of incongruity theory, which contends that humor occurs when people perceive a mismatch between reality and their beliefs or expectations (Nerhardt, 1976; Suls, 1972), and release theory, which contends that humor occurs when repressed desires are released (Freud, 1928; Spencer, 1875), cannot readily accommodate the evidence that distance influences humor. Such alternative accounts cannot specify why distance would facilitate the perception of incongruity or why distance would accentuate feelings of release. Superiority theory, which contends that humor requires aggression, hostility, harm, or insult, makes clear predictions about psychological distance (Gruner, 1999). Social distance helps people feel superior to others and temporal distance helps people feel superior to the misfortunes of a former self. However, superiority theory is also limited in its ability to account for the curvilinear pattern we observe. The present results more consistently support a benign violation account of humor.

Our findings also provide compelling evidence that psychological distance shapes outcomes via mechanisms beyond shifting one's focus between abstract and concrete construal. Construal-level theory (CLT) specifies that as distance increases, people increasingly focus on abstract, central, and high-level aspects of an experience (Trope & Liberman, 2010). When people think abstractly, they are better able to hold incompatible ideas in mind (Hong & Lee, 2010; Malkoc, Zauberman, & Ulu, 2005). In this way, abstract thinking may very well increase humor by making it easier to see a situation as simultaneously wrong and okay (e.g., a benign violation; McGraw & Warren, 2010). However, even if abstract thinking initially enhances humor, it is difficult to explain why further abstraction would decrease humor.

Instead, our findings dovetail with emerging evidence that the cognitive consequences of psychological distance (e.g., abstract construal, specified by CLT) are largely distinct from its emotional consequences (e.g., threat attenuation). Recent research reveals that distance influences downstream evaluations primarily via changing affective intensity, whereas construal level influences such evaluations via shifting the weight placed on primary versus secondary decision inputs (e.g., desirability vs. feasibility concerns; Williams, Stein, & Galguera, in press). Although the distance created by the passage of time almost certainly altered how people mentally represented Hurricane Sandy, for our analysis it is more critical

that distance altered how people felt about the tragedy. Distance reduces threat; a moderate amount of threat reduction enhances humor, but the complete attenuation of threat eliminates the perception of a violation, a necessary ingredient for humor.

Implications and Future Directions

Our inquiry revealed a curvilinear relationship between time and humor. A benign violation account suggests that other forms of distance, characteristics of the event, and characteristics of the perceiver also influence humorous responses. The inquiry also suggests a deeper look at the relationship between humor and coping. We discuss each of these in turn.

Although we focus on temporal distance, the curvilinear pattern revealed by our inquiry should occur for other forms of distance. Indeed, guided by the benign violation theory, we suspected that geographical distance would meaningfully shape people's humor responses to Hurricane Sandy such that those closer to New York would find less humor in response to the tweets compared to those farther away. Our ability to detect an effect may have been hampered by the relative dearth of respondents living directly in the storm's path in the earliest stages of data collection (who in many cases would have been too distracted to engage in an online survey). Consistent with this view, when we limit our examination to the later time frame (November 14, 2012, to February 6, 2013), the expected effect of geographical distance on humor began to emerge, $F(1, 598) = 3.67, p = .056$.

Nonetheless, it remains important to examine how other forms of distance affect humor. For instance, there should be a class of aversive experiences that are optimally humorous for people who are neither too socially close nor too socially distant. Accordingly, in a pilot test we found that a modest violation (a person's fly was down while chatting to a coworker) produced little humor when considered from up close (when the imagined person was the participant; too violating) or from too far away (when the person was a stranger; too benign). Instead, the situation was most humorous from a moderate distance (when the person was a friend; benign violation). Future work can build upon these initial investigations, examining the spectrum of factors that influence the process by which it becomes acceptable to find humor in tragedy.

Further, we suspect that the time course of humor depends on the characteristics of the event itself. The greater the initial degree of violation, the longer it takes to become humorous and the longer it takes to become fully benign. More tragic events, such as a devastating hurricane, should take longer to become sources of humor than less tragic events, such as a drenching downpour. In an initial test, we found that people thought a severe tragedy (responses include "murder" and "a piano falling on one's head") would take longer to become "okay" to joke about and take longer to become "too late" to joke about, compared to more mild mishaps (e.g., "breaking a leg" and "late for work").

Beyond psychological distance and violation severity, characteristics of the individual may also underlie curvilinear humor patterns, as these factors can also increase or decrease the threat of a violation. One such factor is the observer's commitment to a violated norm or principle (McGraw & Warren, 2010). For example, a church's immoral behavior is funnier to nonchurchgoers (the violation is less threatening; McGraw & Warren, 2010). Future research can bear out our prediction that violation severity will interact with a person's commitment to a violated principle in the same way that psychological distance does. Violations that are too threatening for strongly committed people (pure violations) may seem humorous to people who are moderately committed (benign violations) yet boring to those most weakly committed (purely benign situations). For example, a modestly sexist joke may be too offensive for a staunch feminist (La Fave, Haddad, & Maesen, 1976), but too tame for a steadfast misogynist.

Finally, the field would benefit from more work that investigates the role that humor plays in coping with tragedy and loss (Martin, 2002). Our work shows how humorous responses change over time as people cope with a tragic event, but it does not investigate whether joking about an event facilitates coping or whether coping facilitates joking about an event. One possibility is that transforming tragedies into benign violations may be an important step in coping, by attenuating the destructive impact of aversive events. Indeed, several authors suggest that humor provides an effective means of coping with loss (Keltner & Bonanno, 1997; Smyth, 1987). Another possibility is that humor is more typically the outcome, rather than the cause, of coping. In order to consider a tragic event benign (and, thus humorous), people may need to have successfully coped with the event beforehand. In either or both cases, the field would benefit from a deeper understanding of the relationship between humor and coping. Such understanding can inform the development of early interventions for trauma.

Conclusion

Humor is valued in social interactions, attracting admiration when successful and contempt when unsuccessful (Greengross & Miller, 2011; Martin, 2007; Smeltzer & Leap, 1988). The key to avoiding a "too soon" comedy fail or a "too late" comedy dud is matching the right degree of violation with the right amount of distance. With this in mind, we propose a modification to the popular saying, "humor is tragedy plus time." Transforming tragedy into comedy requires time, not too little yet not too much.

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Note

1. We conducted a supplemental analysis in which we used the raw number of days between Hurricane Sandy's U.S. landfall and the date of data collection as a continuous predictor of humor. This regression model also reveals a significant effect of time on humor, $\beta = -.004$, $t(1,002) = -2.18$, $p = .03$.

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