The importance of message framing in rule compliance by visitors during wildlife tourism

Simplicious J. Gessa¹,² | Jessica M. Rothman²,³,⁴

¹Department of Journalism and Communication, Makerere University, Kampala, Uganda
²Uganda Wildlife Authority, Kampala, Uganda
³Department of Anthropology, Hunter College of the City University of New York, New York, New York, USA
⁴New York Consortium in Evolutionary Primatology, New York, New York, USA

Correspondence
Simplicious J. Gessa, Department of Journalism and Communication, Makerere University, PO Box 409, Kampala, Uganda.
Email: gessajohn@gmail.com

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Abstract
A conundrum of wildlife tourism is balancing wildlife conservation and tourist satisfaction. Mountain gorillas (Gorilla beringei) are a flagship species for biodiversity and there is worldwide interest in gorilla trekking safaris. This tourism provides substantial revenue to the government and local communities for gorilla protection, but puts them in danger of zoonotic diseases. To minimize disease transmission, health guidelines are in place for visitors whereby they are asked to remain 7 m from the endangered apes and stay in a cohesive group. Unfortunately, tourists often do not follow these rules and consequently their behavior puts gorillas at risk. The pre-trekking messages presented to tourists in Bwindi Impenetrable National Park, Uganda were changed to determine if the way messages are stated affects visitor adherence to rules. Tourists (n = 389) either received strategic messages that were positively or negatively framed in relation to expectations to follow specific rules to adhere to health guidelines, and tourist behavior was measured, such as the nearest distance they were to gorillas, and their cohesiveness. Using generalized linear mixed models, it was found that framing messages affected tourist behavior. Tourists who received a negatively framed message had a higher adherence to rules than those who received a positive or control message. They were 75% further from the gorillas (7.26 vs. 4.52 m), more cohesive (0.40 vs. 0.81 m to each other), and approached the gorillas less (0.34 vs. 1.32 times) than the control message. These findings demonstrate that communicating in different ways promotes changes in behavior by tourists, which reduces the chances of epizootic respiratory infections being passed to vulnerable animals. Strategic message framing should be widely considered as a cost-effective mechanism to promote behavior change during ecotourism.

KEYWORDS
communication, conservation psychology, ecotourism, framing effect, messaging, mountain gorillas
1 | INTRODUCTION

Influencing human behaviors is an important goal of conservation biology, including human interactions with wildlife (Jacobson et al., 2019; Nilsson, Fielding, & Dean, 2020). Nature-based tourism is an important economic contributor to conservation in many countries (Bookbinder, Dinerstein, Rijal, Cauley, & Rajouria, 1998; Balmford & Whitten, 2003; but see: Kruger, 2005; Stronza, 2007; Wardle, Buckley, Shakeela, & Castley, 2021). Perhaps one of the most successful examples of ecotourism is the case of the endangered mountain gorillas (Gorilla beringei). There is worldwide interest in viewing and photographing these gorillas through exclusive trekking safaris in their rainforest habitats in Uganda and Rwanda. This tourism is beneficial in many ways to the gorillas. Over the past decade tourism ranked as a large contributor to the gross domestic product in both countries (>2.5% in both countries; Uganda Wildlife Authority, 2017; Odunga, Manyara, & Yobesia, 2020), and gorilla tourism alone contributes a substantial portion of Uganda Wildlife Authority (UWA)'s annual budget for its 10 national parks. As well, a portion of the fees go towards local communities through a revenue-sharing programme and communities benefit from other revenue/employment generated by lodges, restaurants, souvenirs, and other tourism activities (Ahebwa, van der Duim, & Sandbrook, 2012). Consequently, gorilla ecotourism is particularly impactful for the national economy and the willingness of the government to conserve gorillas (Adiyia, Vanneste, & Van Rompaey, 2012).

As much as tourism is regarded a sustainable measure to promote gorilla conservation (Sandbrook & Adams, 2012), there are concerns about epizootic disease transmission from humans to gorillas during ecotourism visits. Indeed, there have already been numerous incidences of pathogen transmission from humans to apes (Dunay, Apakupakul, Leard, Palmer, & Deem, 2018). The disease risk from humans to endangered apes such as gorillas is substantial; epizootic respiratory diseases of unknown origin accounted for 13% of all mountain gorilla infant deaths over 46 years (Hassell et al., 2017), and a recent outbreak of human respiratory disease in chimpanzee communities was responsible for several chimpanzee deaths (Scully et al., 2018). An even more pressing current worry is the COVID-19 pandemic because gorillas are likely susceptible (Gillespie & Leendertz, 2020).

To minimize the risk of tourists spreading diseases to these endangered animals, park managers require tourists to stay at least 7 m from the gorillas, not approach the gorillas, and stay in a cohesive group (Uganda Wildlife Authority, 2020). Unfortunately, tourists often do not follow these rules even after being briefed by the park guides (Sandbrook & Semple, 2006; Weber, Kalema-Zikusoka, & Stevens, 2020), and videos that contain human interaction with gorillas are common on social media (Otsuka & Yamakoshi, 2020). Because of the serious threat of emerging epizootic diseases such as COVID-19, it is now even more critical that the distance between humans and gorillas be maintained (Gillespie & Leendertz, 2020).

Conservation messages can be strategically framed in different ways to better promote a particular attitude or behavior (Kusananoff, Fidler, Gordon, Garrard, & Bekessy, 2020; Tversky & Kahneman, 1981). For example, negative messages could illustrate the dire consequences or loss that will take place when the message is not followed, such as the demise of wildlife. Alternatively, messages could also be posed positively whereby the benefits or gain of following the message, such as wildlife protection, are highlighted. These different approaches in framing conservation messages could have an effect on the receiver, and thus elicit differential actions. For example, positively framed messages led to more pro-environmental behaviors in hotels (Kim & Kim, 2014). Similarly, positive message framing of online videos was more successful than negative messaging in eliciting donations and time to environmental organizations (Jacobson et al., 2019). However, negative messages were more effective in promoting recycling behavior in USA households (Lord, 1994). Off-trail hiking frequency in U.S. national parks was affected by the type of messages posted on signs, whereby the injunctive-proscriptive messages were most effective (Winter, 2006).

Although the effects of framing of conservation messages on human behavior has not yet been examined specifically in the context of ape ecotourism, previous research has suggested that conservation-related information is best received when visitors feel empowered by their own actions. Information from the tour guide/interpreter during whale watching was best received when the guide presented the visitor with a sense of responsibility for whale conservation (Peake, Innes, & Dyer, 2009). Similarly, in the Galapagos National Park, ecotourism interpretive experiences encouraged conservation-minded attitudes with well-delivered educational materials (Powell & Ham, 2008). Consequently, the emotion and shame that comes with a negatively framed message might be more successful in eliciting behaviors to protect wildlife than a positively framed message (Kolandai-Matchett & Armoudian, 2020). Normative and emotional framing often prompts pro-environmental behaviors (Farrow, Grolleau, & Ibanez, 2017), as well as high-risk fear appeals, and shame appeals (Kolandai-Matchett & Armoudian, 2020). The willingness of tourists to pay large sums of money to view gorillas ($600 for 1 hr; Uganda Wildlife Authority, 2017) could be considered a testament to their affection for gorillas. The conservation-minded attitudes of tourists should be reflected in their behavior if information is provided in a
way that cultivates their concern and empowers them to act accordingly (Powell & Ham, 2008).

The objective of this study was to determine if tourists changed their behavior when communication by park guides was framed differently in relation to gorilla rules during tourist treks in Bwindi Impenetrable National Park, Uganda. Our hypothesis was that tourists who received more pre-trek information about the rationale for rules would be more likely to follow these rules during gorilla visits. We also hypothesized that these strategically framed messages would elicit behavior change compared to a control message. We specifically predicted that tourists would be further from the gorillas, more cohesive, and less frequently approach the gorillas when they received a negatively framed message compared to a positively framed message or a control message.

2 | METHODS

2.1 | Study site

Bwindi Impenetrable National Park, Uganda is a rugged mountainous rainforest located in southwestern Uganda. The 331-km² area was gazetted as a national park in 1991 and has served as an iconic area for ecotourism as well as integrated conservation and development projects (Tumusiime, Bitariho, & Sandbrook, 2018). The Bwindi gorillas are one of two populations of mountain gorillas and they are currently endangered, with the world’s population numbering just over 1,000 individuals in the wild, with none in captivity (Granjon et al., 2020).

2.2 | Tourist observations

During June-August 2015, we observed 389 tourists that visited 3 of 14 habituated gorilla groups. Two gorilla groups (Mubare and Rushegura) were in the Buhoma sector, while one group (Bitukura) was in the Ruhija sector of the park. The guides spent about 20 min briefing the tourists about various aspects of their visit including what they should expect during the trek. Positive, negative, and control messages pertaining to rules were relayed to tourists by UWA park guides before the tourists embarked on their trek to view gorillas. The UWA restricted the observation sample sizes of tourists and the number of gorilla groups studied to minimize the impact on these endangered gorillas.

2.3 | Messages

The positive, negative, or control messages that relayed appropriate behavior during gorilla viewing were integrated into the briefing by park guides. These briefings included the messages below as well as a request to the guests to cover their faces and turn away from the gorillas when coughing or sneezing, and refrain from smoking, eating and drinking. Tourists were told that visits are limited to 1 hr, that they must bury their own human waste, and they should not use flash photography. The control message (below) is the message that was communicated before this study took place.

Eight tourists trekked to each of three gorilla groups daily. During the study, each of these tourist groups listened to a different pre-trekking strategically framed message: one that was positive, negative or the control. We randomly rotated the daily message to minimize any potential effects of differences due to gorilla group, park guide, and terrain. The negative and positive messages both used elements of strategic framing and contained more information to enhance the messages compared to the control (Kusmanoff et al., 2020).

2.3.1 | Control message

Maintain a distance of at least seven meters from the gorillas. Stay in a cohesive group. Tourists need to follow the rules of gorilla trekking to protect the gorillas.

2.3.2 | Positive message

Maintain a distance of at least seven meters from the gorillas. Stay in a cohesive group. It is wonderful to report that because tourists have followed rules, gorillas have not recently acquired human diseases. Disease transmission has reduced tremendously because of the safe actions of tourists. It is only through the help of tourists that we have been able to keep our gorillas safe.

2.3.3 | Negative message

Maintain a distance of at least seven meters from the gorillas. Stay in a cohesive group. It is devastating to report that because tourists have not followed rules, gorillas have acquired human diseases. It is because of tourists that some of these gorillas have died of human disease. It is only through the help of tourists that we have been able to keep our gorillas safe.

2.4 | Behavioral observations

During each 1-hr gorilla trek, eight tourists viewed one of three gorilla groups that were composed of 6–22
individual gorillas. While the tourists were viewing the gorillas, the authors and/or three trained field assistants used instantaneous scan sampling to record the distance to the gorilla, and the nearest distance of each tourist to each other as a measure of tourist cohesion. In this type of sampling, the state of every individual tourist is measured at timed intervals, ideally at the same time (Altmann, 1974). Here, those timed intervals began at the start of the visit and thereafter every 15 min throughout the 1 hr visit. We recorded the tourist’s gender as male or female based on our assessment of their gender presentation. In addition, we recorded topography, openness of the forest canopy and weather. During 10 treks that were not used in the analysis, we verified that the five observers were collecting data the same way. The observers did not know which groups had received the different messages (or treatments) while collecting the data.

2.5 | Analysis

We analyzed the data using SPSS Version 22. We assessed the effects of message type (positive, negative, or control) on tourist behavior. In addition to message type, we also examined the following predictor variables: topography (whether gorilla viewing was on a slope or ridge), canopy of the forest (whether it was open or closed), weather (sunny, cloudy, rainy), and the gender of the tourist (male or female). Since we were interested in determining if rules were followed, the following response variables were examined in separate models: the mean distance from tourists to gorillas (using instantaneous scan sampling every 15 min during the observations), the nearest distance to gorillas during the trek, cohesion of tourists (measured as the distance between tourist nearest neighbors), and the number of approaches that tourists made to gorillas during trekking.

To examine the effects of message type on different parameters (average distance, nearest distance, cohesion, approaches to gorillas and the extent of maintenance of 7 m rule), we used generalized mixed models. Continuous data (mean distance between humans and gorillas, nearest distance between humans and gorillas, nearest neighbor distance between humans) were modeled using a normal distribution with an identity link function. Count data (approaches to gorillas) were modeled using a Poisson distribution with a logit link function. Subjects were each tourist that trekked gorillas, and the 15-min time points within the 1 hr viewing were considered repeated measures.

We considered message type, weather, gender, slope or valley, open or closed forest to be fixed factors. Since eight tourists view the same gorilla group together on the same day, we considered the day of trekking a random factor. Means are reported ±SDs and effect sizes are reported as Cohen’s d (Cummings, Fidler, Kalinowski, & Lai, 2012).

3 | RESULTS

3.1 | Distance between tourists and gorillas

Message type was the strongest predictor of the closest distance of tourists to gorillas during their trek ($F = 76.535, df_1 = 2, df_2 = 1,535, p < .001$), supporting the hypothesis that strategic message framing affects tourist behavior. Tourists who received a framed message were further from the gorillas than tourists that received the control message. In addition, tourists who received the negative message were furthest from the gorillas (negative: $7.26 \pm 1.305$, Cohen’s $d = 1.83$, 95% CI [7.03, 7.48]); positive: $6.35 \pm 1.240$, Cohen’s $d = 1.25$, 95% CI [6.13, 6.56]; control: $4.52 \pm 1.661$. Only the negative message was associated with a mean distance of >7 m in accordance with the rule (Figure 1).

Message type was also the strongest predictor of the mean distance between tourists and gorillas, supporting the hypothesis that strategic message framing affects tourist behavior. The mean distance between gorillas and tourists was $5.7 \pm 1.66$ when tourists were read the control message, while tourists who received the negative and positive messages were a mean distance of $8.2 \pm 1.25$ (Cohen’s $d = 1.70$, 95% CI [7.98, 8.41]) and $7.3 \pm 1.31$ (Cohen’s $d = 1.07$, 95% CI [7.07, 7.53]), respectively (Figure 2).

![Figure 1](image-url) Mean closest distance between tourists and endangered mountain gorillas after tourists received differently framed messages (yellow line indicates the regulation of 7 m)
Other predictors of the mean distance between tourists and gorillas were weather ($F = 62.040$, $df_1 = 2$, $df_2 = 1,535$, $p < .001$), and topography (slope/valley; $F = 9.689$, $df_{1-1} = 2$, $df_2 = 1,535$, $p < .001$). These differences were similar even if gorillas were in trees or on the ground, or whether the gorillas were in an open area during trekking ($p > .05$). Tourists who received the positive message were closer to the gorillas on cloudy and sunny days compared to rainy days ($F = 31.826$, $df_1 = 4$, $df_2 = 1,535$, $p < .001$). As well, when tourists were viewing gorillas from a slope, tourists were closer to gorillas than when they were in a valley ($F = 9.689$, $df_1 = 1$, $df_2 = 1,535$, $p = .002$), and this difference was independent of message type.

### 3.2 Approaches by tourists to gorillas

The message frame affected the number of approaches by tourists to gorillas while viewing. Overall, there were differences among all three message frames ($F = 43.674$, $df_1 = 3$, $df_2 = 1,533$, $p < .01$). There were fewer approaches made by tourists toward gorillas when the positive ($0.269 \pm 0.098$, Cohen’s $d = 7.54$, 95% CI $[0.252, 0.286]$) and negative ($0.344 \pm 0.236$, Cohen’s $d = 4.74$, 95% CI $[0.20, 0.27]$) message frames were read than the control message ($1.321 \pm 0.171$). Notably, fewer tourists approached the gorillas overall when they were read a framed message compared to the control message.

### 3.3 Tourist cohesion

Message frame ($F = 37.679$, $df_1 = 2$, $df_2 = 1,535$, $p < .001$) and the location of gorillas (if it was in a tree or on the ground; $F = 14.843$, $df_{1-1} = 2$, $df_2 = 1,535$, $p < .001$), affected the nearest distance between tourists. Tourists who received the negative message stayed in more cohesive clusters ($0.40 \pm 0.231$, Cohen’s $d = 0.86$, 95% CI $[0.36, 0.44]$) than those who received the positive and control messages ($0.81 \pm 0.034$) and ($0.72 \pm 0.471$) respectively. Tourists were closer to each other when the gorillas were in trees ($0.882 \pm 0.084$, Cohen’s $d = 1.57$, 95% CI $[0.87, 0.90]$) compared to when gorillas were on the ground ($1.011 \pm 0.080$) when they were read the control message ($F = 19.168$, $df_1 = 2$, $df_2 = 1,535$, $p < .001$). Other messages showed no effect on tourist cohesion in relation to the position of the gorillas.

Other predictors also affected the nearest neighbor distance of tourists. The tourists who viewed gorillas in slopes and valleys who received negative messages were more cohesive ($0.449 \pm 0.059$, $0.492 \pm 0.048$, Cohen’s $d = 9.75$, 95% CI $[0.44, 0.46]$) in contrast to those who were read positive ($0.992 \pm 0.094$, $1.201 \pm 0.083$) and control messages ($1.393 \pm 0.139$, $1.153 \pm 0.088$; $F = 17.145$, $df_1 = 2$, $df_2 = 1,535$, $p < .001$). While weather condition (sunny, rainy, cloudy) did not have a significant impact on the cohesion of tourists overall, during rainy days, the tourists who received a positive message were more cohesive than on days with other weather conditions ($F = 9.689$, $df_1 = 1$, $df_2 = 1,535$, $p = .002$).

### 3.4 Gender

There were no differences due to gender in relation to any of the parameters, including the mean distance from tourists to gorillas during trekking ($F = 1.622$, $df_1 = 1$, $df_2 = 1,535$, $p > .203$), the nearest distance to gorillas ($F = 0.641$, $df_1 = 1$, $df_2 = 1,535$, $p = .423$), the number of approaches by tourists to gorillas ($F = 1.976$, $df_1 = 1$, $df_2 = 1,535$, $p = .160$), and in the cohesion of tourists ($F = 1.976$, $df_1 = 1$, $df_2 = 1,535$, $p = .160$).

### 4 DISCUSSION

Message framing is not regularly applied to conservation biology as much as in other areas (Kidd et al., 2019; Kusmanoff et al., 2020), such as the health fields where both positive and negative framing elicit behavioral changes to improve public health (Rothman, Desmarais, & Lenne, 2020; Rothman & Salovey, 1997). Our results demonstrate that strategic message framing during wildlife tourism elicits changes in human behavior. Tourists were further from gorillas, approached gorillas less often and stayed in more cohesive clusters during visits because of strategic communication. This finding demonstrates that
strategic message framing is a simple way to improve compliance to the rules that aim to reduce epizootic respiratory disease transmission. Strategic message framing is therefore an important cost-effective mechanism for gorilla conservation and should be used more widely to promote rule adherence during ecotourism (Jacobson et al., 2019; Kusmanoff et al., 2020).

For tourists embarking on a trek to see endangered gorillas, the negatively framed message was more successful at changing human behavior than the positive message, and it was only this message that elicited the suggested social distancing of 7 m that reduces the risk of disease transmission between gorillas and tourists. The negative message could have been particularly impactful because it generated fear that an individual might be responsible for the demise of these endangered animals. In a study aimed to promote health behaviors, pamphlets describing the dire effects of not performing breast self-examination were more persuasive than those pamphlets describing its benefits (Meyerowitz & Chaiken, 1987). By invoking the possibility of breast cancer, study participants could have been more fearful that non-compliance would be gravely consequential (Meyerowitz & Chaiken, 1987). Similarly, most tourists want the opportunity to view mountain gorillas in their natural habitats without harming them (Weber et al., 2020). As Kusmanoff et al. (2020) suggest, reducing psychological distance could be important in this case because the negative message perhaps better illustrated the realistic consequences of close encounters with gorillas. In addition, both the positive and negative messages increase the vividness of the message compared to the control message, and could thus evoke a more powerful emotional reaction by the tourists (Karpinska-Krakowiak, Skowron, & Ivanov, 2020; Kusmanoff et al., 2020). The two strategically framed messages were similarly effective in preventing approaches from tourists to gorillas compared to the control message, suggesting these strategically framed messages could have elicited concern. In addition, the framed messages were phrased descriptively with information with the reason for the rules. A study in Iceland focused on signage presented to tourists at a seal-watching site demonstrated a similar outcome; tourists were more compliant when they read instructions with a rationale compared to messages with the instruction alone (Marschall, Granquist, & Burns, 2017).

Included in our messages was a normative component whereby we referenced other tourists and their behaviors in our message. Thus, in addition to the positive and negative frames, this normative frame could have also affected tourist behavior. Similarly, off-trail hiking frequency in U.S. national parks was affected by the type of messages posted on signs, whereby simply stated injunctive-proscriptive messages were most effective (Winter, 2006). As well, messages in this study were read to a group of tourists at once whereby the actions of one tourist in the group would be deemed good for all, and gorilla conservation generally, thus tourists could have felt shame in front of their peers if they did not follow the rules (Karpinska-Krakowiak et al., 2020). There were no differences between men and women in rule compliance despite that previous studies noted that women have higher levels of environmental concern in some cases (Gifford & Comeau, 2011), but not in others (Jacobson et al., 2019). Although tourists were responsible for their own behaviors, they viewed the gorillas in small groups and social conformity could have played a role in changing behavior (Frey & Meier, 2004; Torelli, 2006).

Tourists on slopes resulted in nearer distances to the gorillas regardless of message type, though tourists that received strategically framed messages (both positive and negative) still maintained a further distance than the control message. Bwindi National Park is characterized by steep-sided slopes with narrow valleys and extremely rugged terrain. Slopes in Bwindi are particularly challenging to climb as they lie at angles of up to 70 degrees or more (Olupot, Barigyira, & McNeilage, 2009). It is possible that this angle obscured viewing. It is also likely that tourists perceived the gorillas as further away on steep than flat terrain and incorrectly estimated their distance as further than reality (Stefanucci, Proffitt, Banton, & Epstein, 2005).

Conservation managers are faced with the task of ensuring wildlife is as safe as possible while providing a rewarding experience for tourists. Our research provides a demonstration that strategic framing is important and can influence conservation relevant behavior. Specifically our research demonstrates that strategic approaches to message framing (e.g., Kusmanoff et al., 2020) can be effective. It also demonstrated that in this case strategically framed messages, both positively and negatively framed, were effective in promoting conservation behaviors; and that a negatively framed message was more effective in this instance than a positively framed message.

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CONFLICT OF INTEREST
The authors declare no conflict of interests.

AUTHOR CONTRIBUTIONS
Simplicious J. Gessa: conceived and designed the study, collected the data, analyzed the data, and wrote the manuscript. Jessica M. Rothman: conceived and designed the study, and reviewed and edited the manuscript.

DATA AVAILABILITY STATEMENT
Data are available upon reasonable request from the corresponding author, SJG, upon reasonable request.

ETHICS STATEMENT
This research complied with all laws and regulations of Uganda. The research was approved by UWA, which is the government agency that processes approvals for research in national parks. In addition, an Institutional Review Board (IRB) at Makerere University, Uganda determined that since no identifiable human data were being collected, the study did not require IRB approval.

ORCID
Simplicious J. Gessa https://orcid.org/0000-0003-1338-0447

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