

5-11-2020

## **The Effects of Emotionally Appealing Messages on Perceptions About Marine Plastic Pollution: Implications for Science Communication on Social Media Outlets**

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University of New Haven  
Honors Program

2019-2020 Honors Thesis

THE EFFECTS OF EMOTIONALLY APPEALING  
MESSAGES ON PERCEPTIONS ABOUT MARINE  
PLASTIC POLLUTION: IMPLICATIONS FOR  
SCIENCE COMMUNICATION ON SOCIAL MEDIA  
OUTLETS

Shelby Miller

A thesis presented in partial fulfillment of the requirements of the Undergraduate Honors  
Program at the University of New Haven.

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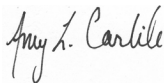
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5/11/2020

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## ABSTRACT

Marine plastic pollution (MPP) is one of the most pressing problems in the world today with many effects on ecological, economic, and social aspects of society. Global plastic production is around 322 million tons, with 10% of the world's plastic products entering the ocean every year. Environmental campaigns use humor and shock in order to influence consumer behavior in regard to plastic products. Such approaches are important to utilize on social media in order to effectively communicate the issues posed by MPP. In this study, students and staff at the University of New Haven campus were given a survey containing social media posts using humor or shock to display information about MPP. The survey asked questions about participant demographics, social media use, everyday habits before and after reviewing the social media examples. User responses were analyzed and compared to determine the most effective emotional appeal for marine plastic pollution outreach. The results in this study showed that there was no significant difference between the shocking or humorous emotional appeal in regard to the sustainable behavior of participants. Most participants stated marine plastic pollution is an issue at the forefront of today's media, so this study did not change their opinion on whether MPP was a problem. This study implies that gender, academic background and pre-exposure to MPP may play a role in changing behavior. The conclusions of this study may be used for environmental advertisements in terms of the most effective appeal for different audience backgrounds.

#### ACKNOWLEDGEMENTS:

I would like to thank everyone who helped me through this process. Thank you to Dr. Seara for your tireless editing and revision, as well as guidance with any questions I may have had. Thank you to all my other professors for giving me the education needed to provide a basis for this research. Thank you to the Honors Program and Marine Biology program for providing me with the necessary funding. Thank you to everyone who took this survey, for without you, this research would not exist. Finally, thank you to my friends and family for all the love and support they have shown me throughout my education at the University of New Haven.

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## 1. INTRODUCTION

Marine plastic pollution (MPP) is one of the most pressing environmental problems in the world today. In the scientific community, plastic is being considered as a defining mark of the Anthropocene. The Anthropocene is a proposed geological era that is defined by how humans have affected the earth (Caffery, 2019). There is ongoing debate between scientists about whether the Anthropocene is as defined as the past geological eras to replace the current epoch, the Holocene. In order for the time period to be formally adopted, global-scale changes such as land surface and atmospheric transformations must be ingrained in geologic material. (Lewis et al., 2015). One of the proposed markers for the Anthropocene is the presence of microplastics and plastic products in the geologic record (Corcoran et al., 2014). The fact that microplastics are being considered as a geological marker in the time scale shows the persistence of plastic in the environment, indicating the importance of global awareness to plastic pollution (Lewis et al., 2015). Different plastic remnants, such as microplastics, can be found in stratified layers of undisturbed bottom sediment, especially when plankton or dinoflagellate cysts are present (Corcoran et al., 2015). In recent years, plastics have been observed in glaciers, the open ocean, and even in river systems and freshwater lakes (Jambeck et al., 2018). In a study about deep sea debris, about 89% of the deep-sea debris were found to be single-use plastics. In the same study, a plastic bag was observed in the Mariana trench, one of the deepest points in the ocean, about 10,898 meters deep and around 1000 kilometers from shore (Chiba et al., 2018). This is strong evidence that plastic and its effects will remain far into the future, indicating the need for awareness and action by the scientific community, governments, and the general public. In today's

society, social media is at the forefront of environmental campaigns and could be an important and effective vector for ecological awareness. MPP can be defined as any plastic products, chemicals pertaining to plastic production, or microplastics entering into the oceanic system (Villarrubia-Gomez et al., 2018). Plastic production has sharply increased since the 1950s due to industrialization, convenience, and the need for durable materials.

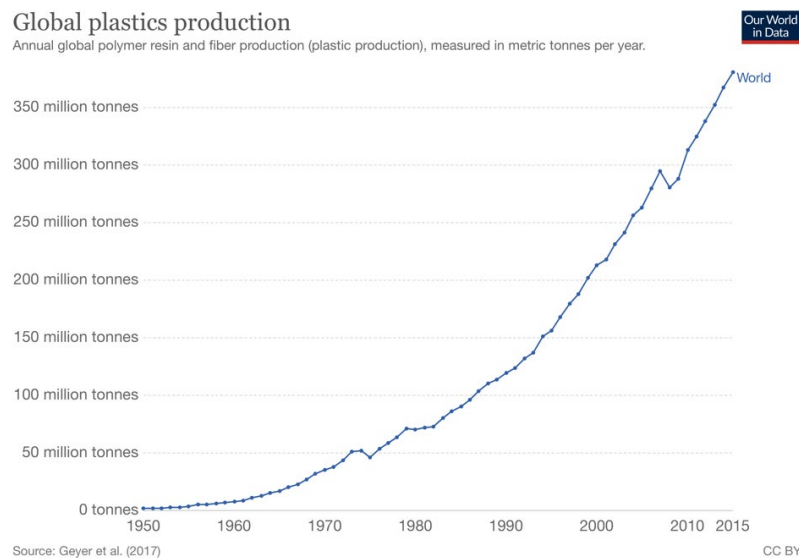


Figure 1. Global plastic production from 1950 to 2015 in million tons (Source: Geyer et al., 2017)

Studies have shown that an increase in plastic waste mismanagement can be correlated to an increase in human population growth and concentration (Jambeck et al., 2018). Today's global plastic production is around 322 million tons, with approximately 12.7 million tons of plastic waste entering the ocean (Villarrubia-Gomez et al., 2018). About half of marine debris comes from land-based sources such as human litter and landfills; the other half derives from recreational and commercial vessels (Haward,

2018). A study by Jambeck et al. (2018) in Africa stated that underdeveloped countries require special attention in terms of plastic waste due to their rapidly growing populations and lack of governmental structure. Due to the different economic, political, and environmental positions of many countries, international cooperation and global governance are important in MPP mitigation (Haward, 2018).

MPP affects nearly every part of the world, ecologically and socially, because the oceans are so dynamic. This form of pollution affects many aspects of the marine environment such as water quality, organism health, system toxicity, and food web interactions (Alimba et al., 2019). Leaching of toxic chemicals, entanglement, and ingestion of plastic debris affect marine populations and fisheries (Mendenhall, 2018). Studies have shown that around 243 marine species are impacted by entanglement in marine plastic debris, resulting in many casualties of individuals, including marine mammal species such as California sea lions (*Zalophus californianus*) and brown fur seals (*Archtocephalus pusillus*) (Jepsen et al., 2019). In a study of lanternfish (family Myctophidae) in the North Pacific, fish were observed to have higher levels of PCBs in their body in areas with higher amounts of plastic pollution (Gassel et al. 2019). In a Canadian study, microplastics were found in about 2.4% of North Atlantic Cod that were fated for human consumption (Liboiron et al., 2016). Human ingestion of microplastics from fish and shellfish species have been shown to pose a consumer health risk due to toxic chemicals in plastic (Faraday, 2019). This health risk has had adverse effects on human economy, especially in terms of the seafood industry (Farady, 2019). It has been predicted that the equity of ecosystem services, such as recreation, tourism, and heritage will decrease by 1 to 5% due to the amount of plastic in the oceans (Beaumont et al.

2019). Recreational visitors are less likely to participate in activities if there is marine litter and plastic debris in a tourist-heavy, recreational area (Hartley et al., 2013).

Tourism is a very lucrative business, especially in tropical areas. Many of these locations are inundated in plastic waste resulting in a decrease of tourism and the accompanying revenue (Eagle et al., 2016). These ocean-dependent activities are some of the most productive parts of national economies, especially in coastal areas. Since economies and social structures are interconnected, hindered ecosystem services as a result of marine plastic pollution can mean cultural and social collapse, especially in developing countries (Kilonzi et al., 2019). MPP can also affect ocean heritage, which is a feeling of comfort in knowing that the species in the ocean will be there for generations to come. A decrease in ocean heritage results in an overwhelming feeling of doom and hopelessness (Börger et al., 2014). In order to ease the adverse effects of MPP globally, the urgency of the problem needs to be communicated between scientists, politicians, and the general public in the most effective way.

Lack of environmental education and awareness is one of the most pressing issues to address for successful MPP mitigation. It has been shown that a lack of environmental knowledge is one of the main barriers for pro-sustainability behavior (Čulin et al., 2019). In order to overcome this barrier, many countries have attempted to increase environmental communication to the public. In Thailand, environmental risk communication initiated pro-environmental behaviors, such as recycling, turning off lights, and taking public transportation in educated individuals (Janmaimool, 2017). A study in Spain shows that environmental education and intrapersonal relations, such as friendships or family-ties, are important in influencing green behavior; green behavior in

this study includes green purchasing and saving energy (Varela-Candamio et al., 2018).

Social media has been supported as an effective form of communication between the scientific community and the general public (Langan et al. 2019). Social media has been shown promote in depth conversations that result in sophisticated learning, especially in terms of environmental and sustainability issues (Andersson et al., 2019). Social media outlets such as Facebook, Twitter, and Instagram reach a broad audience and are easy to navigate for the everyday user. Social media has been shown to increase users' likeliness to volunteer, donate, and engage in environmental activism (Bussing et al., 2019).

Environmental organizations such as Oceana, World Wildlife Fund (WWF), and the National Oceanic and Atmospheric Administration (NOAA) use social media as a major outlet for scientific communication and environmental education. This type of communication is important to aid strategies in moving the world population to solve global issues, such as MPP. Studies have shown that social media is an effective tool for "glocalization" or localizing a global issue in order to solve it internationally (D'Ambrosi, 2017). Environmental marketing and advertisements have been shown to play a key role in changing human behavior in regard to sustainable activities, such as recycling and making smart consumer decisions (Andersson et al., 2019; Eagle et al., 2016; Janmaimool, 2017; Varela-Candamio et al., 2018). More research on an environmental social media approach is necessary in order to effectively influence human behavior in regard to MPP.

Different strategies can be used to change or influence viewer behavior.

Emotional appeals such as humor, fear, disgust, and shock are displayed in many types of campaigns. For example, in a study about farming practices, farmers were more likely to

respond positively to humorous messages aimed at influencing a change in the type of pesticide they were using (Vande et al., 2018). In another study about anti-smoking campaigns, participants (including smokers and non-smokers) who were exposed to messages with forms of fear and disgust showed explicit attitudes against any type of smoking behavior (Halkjelsvik et al., 2015). These types of emotional appeals may be very helpful when it comes to changing behavior in regard to sustainable activities, such as recycling or making conscious consumer decisions. Studies have shown that environmental advertisements are effective when it comes to the use of guilt and shame; however, the perception of the advertisements may change depending on the background of the participants (Baek et al., 2017). Previous studies have shown that shock or disgust appeals in advertisements can result in negative, defensive, aversive, and threatened responses from the participants no matter the subject, making the advertisement less effective (Mukherjee et al., 2012). Studies have shown that humor can be more effective when compared to shock or disgust in offsetting the negative responses of the participants, especially if the subject matter has a negative message (Mukherjee et al., 2012). Comparing and contrasting these emotional appeals can be useful in regard to developing frameworks for environmental communication and education. Determining whether humor or shock is more effective to viewers could have major implications for the portrayal of MPP on social media.

This study focuses on two major emotional appeals in messages and videos: humor and shock. The objectives of this study are to evaluate which emotional appeal is the most effective to communicate the issue of MPP on social media as well as collect qualitative information to further understand implications of social media posts for

scientific communication. The results of this study can be used to influence the types of emotional appeals as well as targeted audience for effective science and environmental communication on social media outlets in the future.

## 2. MATERIALS AND METHODS

In this study, information was gathered about the use of social media and the presence or absence of sustainable habits. The research was conducted using an online survey (see Appendix 1), distributed by the researcher as well as in person focus groups. A survey through Baseline Campus Labs distributed via email on the University of New Haven campus was used to reach a broad audience. Two different survey groups, one for humor and one for shock, were created using a random number generator from lists of student organizations on campus. Different clusters of people were randomly chosen from the campus community to split participants between the two surveys and minimize bias. Approximately half the participants were given a survey with humorous social media posts (see Appendix 2) and half were given a survey with shocking or somber posts (see Appendix 3).

All participants were asked a series of questions about their demographics including, but not limited to age, sex, gender, ethnicity, major and year in college, academic background, etc. Information provided on the online survey did not contain names or other means of personal identification to ensure confidentiality. There were also questions for participants about daily social media use and exposure to posts about marine plastic pollution. Questions involving social media include but are not limited to how often the participant uses different social media outlets, if the participant has ever

seen a post about marine plastic pollution before and, if so, on which social media outlet it was posted. At the end of the survey, participants were asked a series of questions on their opinion about marine plastic pollution. The participants were shown examples of social media posts involving marine plastic pollution with the two different emotional appeals (humor and shock) to compare the effectiveness of the different types of messages. After viewing the post, participants were asked a series of questions (labeled post-questions in Appendix 1) to capture changes in perception toward marine plastic pollution.

In addition to the survey effort, a focus group of the College Republicans was conducted to obtain more in-depth information and compare the sample with regard to the potential influence of political views. The participants were split into survey groups, as was the entire sample, and asked to take the same survey. A focus group format was then used to ask participants select questions from the online survey and new questions to gather qualitative information beyond the bounds of the survey. This data was used provide more information on people's emotional response toward different types of messages to raise awareness about marine pollution and helped further interpret the results of the online survey.

### 3. RESULTS

#### 3.1. Sample Demographics

The sample size for the shock survey included 101 participants and the humor survey included 79 participants. The age range for the sample included participants from the age of 18 to 60 years old with an overall mean age of 20.81 years (STD DEV=



5.443). The mean ages for the shock and humor samples were not statistically significantly different (Table 1).

Table 1. Descriptive statistics for the age range and mean age for the shock and humor samples.

Appeal	N	Min	Max	Mean	Std. Dev.
Shock	101	18	33	20.08	2.369
Humor	79	18	60	21.78	7.691

$t = -1.902$ ;  $df = 89.626$ ;  $p > 0.05$ ; Equal variance not assumed

The majority of participants in this survey were female (73.9%), whereas males made up about 25.6%, and non-binary individuals were at about 0.6% of the overall sample size. There was no statistically significant difference in the percentage of genders between the humor and the shock samples (chi square= 1.286;  $df=2$ ;  $p > 0.05$ ) (Table 2).

Table 2. The frequency and percent of gender in the shock and humor samples.

Appeal		Frequency	Percent
Shock	Female	75	74.3
	Male	26	25.7
Humor	Female	58	73.4
	Male	20	25.3
	Non-binary	1	1.3

The majority of participants in the overall sample are undergraduate students at the university of New Haven without a completed degree (67.2%,  $N=121$ ), while some respondents have completed a Bachelor's or Associate's degree (10.6%,  $N=19$ ) or a master's or PhD degree (6.7%,  $N=12$ ). The mean number of years at the University of New Haven was 3.72 (STD DEV 1.465) with 27.8% ( $N=50$ ) of the overall sample being first year students, 21.7% ( $N=39$ ) being sophomores, 16.7% ( $N=30$ ) being juniors,

22.2% (N=40) being seniors, and 7.8% (N=14) being graduate students. The majors with the highest frequency were Criminal Justice or Forensic Science (36.1%, N=65), followed by Biology and Chemistry (11.7%, N=21), and Marine Biology and Environmental Science (7.2%, N=13). A full categorical break down of majors can be found in Appendix 6. There was a statistically significant difference in the makeup and frequency of academic majors between the shock and humor survey samples (chi square= 36.591; df=13;  $p<0.05$ ).

Table 3. Breakdown of academic major between the shock and humor samples.

Academic Major	Shock		Humor	
	N	%	N	%
Criminal Justice/ Forensic Science	34	33.7	31	39.2
Biology/Chemistry	15	14.9	6	7.6
Marine/Environmental Science	6	5.9	7	8.9
Psychology	10	9.9	7	8.9
Engineering	13	12.9	6	7.6
Facilities	0	0	5	6.3
Business	7	6.9	2	2.5
Communication	9	8.9	0	0.0
Other	7	6.9	15	19.0

Participants could select multiple ethnicities in this survey; percentages come from the number of recorded responses. The ethnicity with the highest frequency in the overall sample was “White” (66.8%, N=133), followed by “Hispanic or Latino” (11.6%, N=23) and “African American or Black” (11.1%, N=22). Figure 2 displays the ethnicity frequency in each emotional appeal sample. The highest frequency ethnicity was “White” (Shock- 70.6%, Humor- 62.2%) followed by “Hispanic or Latino” (Shock- 9.2%, Humor- 14.4%) (Figure 2). There is no statistically significant difference in ethnicity frequency between the shock or humor samples (chi square= 4.815; df=4;  $p>0.05$ ) (Appendix 4).

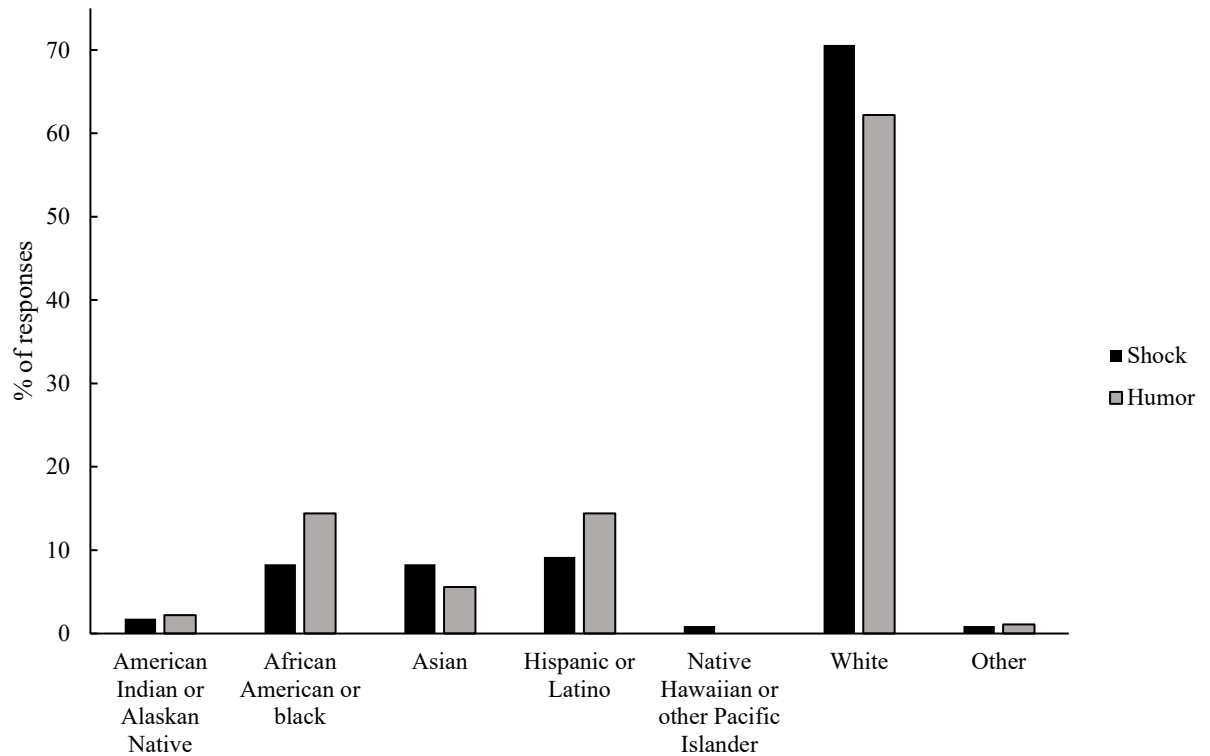


Figure 2. Percent of responses for participants' ethnicity in the humor and shock samples.

In regard to political affiliation, the majority of the overall sample identified as being part of the Democratic Party (38.3%, N=69), while 24.4% (N=44) identified as belonging to the Independent Party, 17.8% (N=32) identified as part of the Republican party, 2.2% (N=4) identified as the category "other", and 17.2% (N=31) preferred not to state their political affiliation (Figure 3). There is no statistically significant difference between the humor and shock samples in regard to political affiliation (chi square= 5.922; df=4;  $p>0.05$ ). A table with percentages per political affiliation group can be seen in Appendix 5.

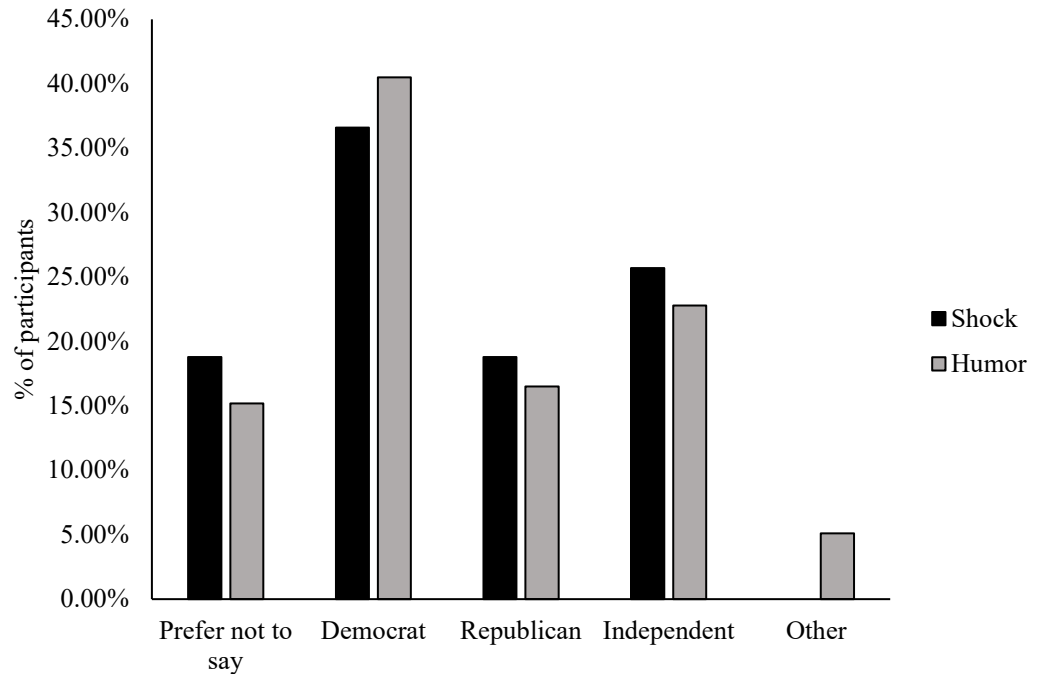


Figure 3. Percent of participants and their political affiliation in the shock and humor samples.

Most participants identified as living in a coastal area or being close to the coast (61.1%, N=110). There was no statistically significant difference between the shock (62.4%, N=63) and humor samples (59.5%, N=47) (Chi square= .155; df=1;  $p>0.05$ ).

### 3.2.Social Media Use

Most participants, in the overall sample, spend around two to four hours on social media per day (46.1%, N=83) or between 30 minutes to 2 hours per day (38.3%, N=69) (Figure 4), including different social media outlets such as Instagram, Twitter, and Facebook. There is no statistically significant difference between the shock and humor samples (chi square= 3.945; df=3;  $p>0.05$ ). A full table comparing the shock and humor samples can be found in Appendix 7.

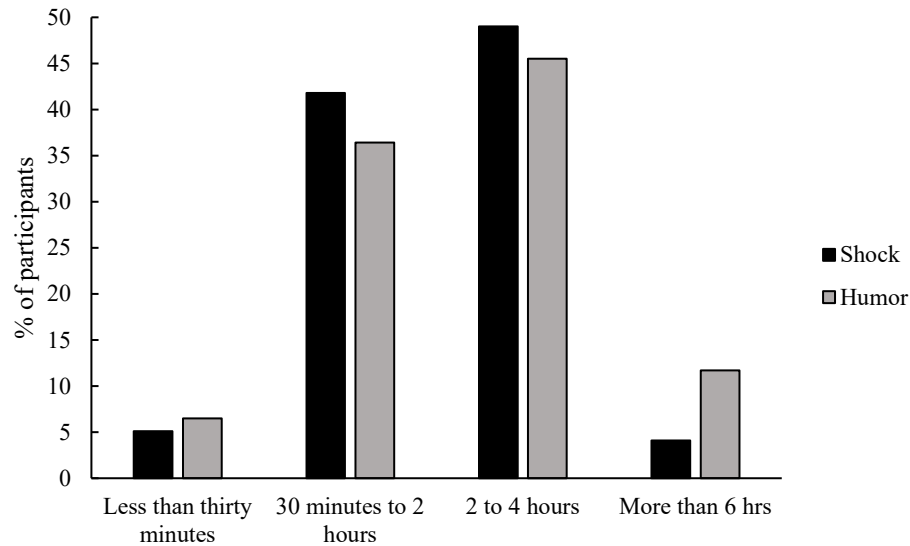


Figure 4. Average time participants spend on social media per day for shock and humor appeals.

For the amount of time spent on different social media outlets, multiple responses were recorded for each participant. The social media outlet the majority of participants utilize most frequently was Instagram (43.7% of responses, N=139), followed by twitter (17.6%, N=56) and Facebook (17.3%, N=55). The majority of participants (49.1%, N=86) do not use Twitter however, 26.9% (N=47) of participants said that they spend 30 minutes to 2 hours on Twitter in a given day. The majority of Facebook users (49.1%, N=86) use the platform for less than 30 minutes per day. The bulk of Instagram users (64%, N=112) stated they used Instagram for 30 minutes to 2 hours a day. Full tables and breakdowns for use of Twitter, Facebook, and Instagram can be found in Appendices 8 through 10 . There was a statistically significant difference between the humor and the shock samples in regard to time spent on Facebook, with the humor sample spending more time on average. There were no statistically significant differences for any of the other outlets.

Table 4. Results for chi-square tests for time spent on Facebook, Twitter, and Instagram.

Outlet	Chi-Square	df	p
Twitter	3.233	3	$p>0.05$
Facebook	8.868	3	<b><math>p&lt;0.05</math></b>
Instagram	2.263	4	$p>0.05$

There was no statistically significant difference between the frequency of use for each social media outlet between the shock and humor samples (chi square= 3.495; df=3;  $p>0.05$ ) (Figure 5).

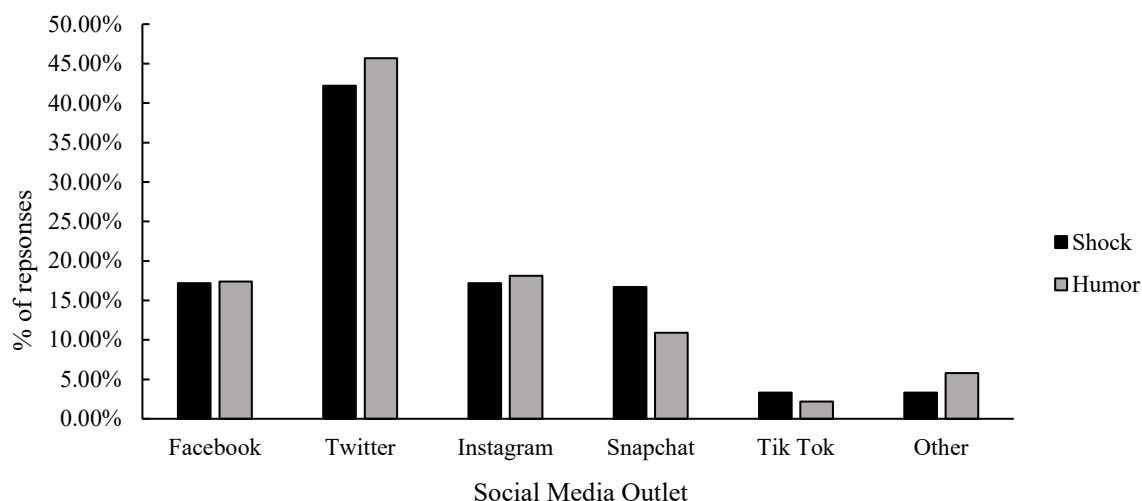


Figure 5. Percent of responses for which social media outlets participants spend the most time on for shock and humor appeals.

When asked if they have seen a post about marine plastic pollution on social media, 83.4% (N=146) of respondents stated to have seen a post, whereas 12.6% (N=22) have not seen any posts, and 4% (N=7) did not remember. Participants who stated that they have seen a post about marine plastic pollution were asked to indicate on what social media outlet they saw the post. The majority of participants viewed posts on Instagram (47.7%, N=116), followed by Facebook (26.3%, N=64), and Twitter (22.6%, N=55), and 3.3% (N=8) of participants did not remember on what outlet they viewed a post about

marine plastic pollution (Figure 6). There is no statistically significant difference in responses between the humor and shock samples (chi square= 2.976; df=7;  $p>0.05$ ) (Appendix 11).

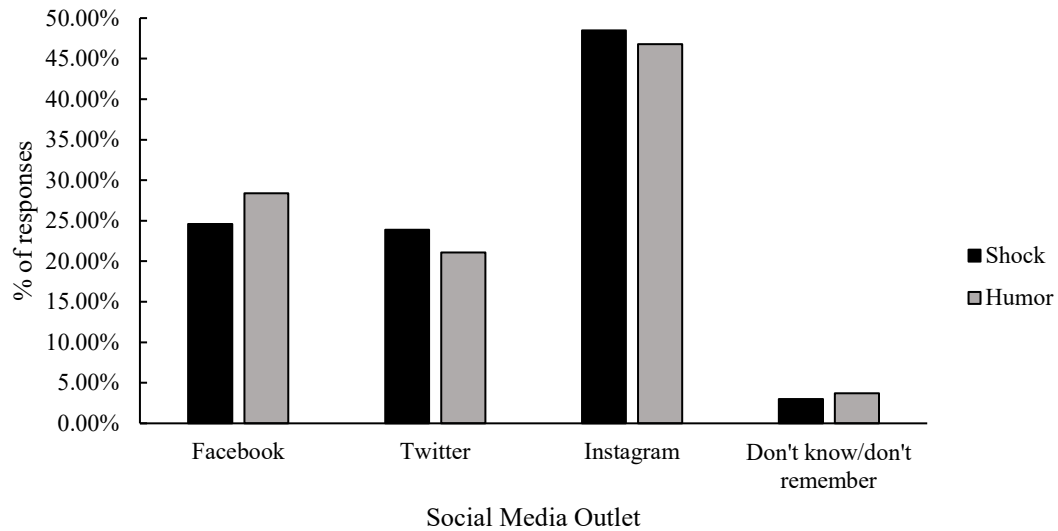


Figure 6. Percent of responses for which social media outlets participants have viewed a post about marine plastic pollution.

### 3.3. Everyday Habits and Behavior

Participants answered questions on their everyday habits and sustainable behavior. For the overall data set, 71.7% (N=129) of participants stated that they have thrown their last plastic product in the recycling bin, whereas 19.4% (N=35) said they threw it in the trash. There was no statistically significant difference between the humor and shock samples (chi square= 4.882; df= 2;  $p>0.05$  (Appendix 12).

The majority of participants (36.7%, N=64) stated that they “sometimes” used plastic straws, 35.6% (N=64) stated that they “rarely” used them, 15.6% (N=28) “frequently” used them, and 8.3% (N=15) never used plastic straws. There was no

statistically significant difference between the humor and shock samples (chi square= 4.576, df=4,  $p>0.05$ ) (Figure 7) (Appendix 13).

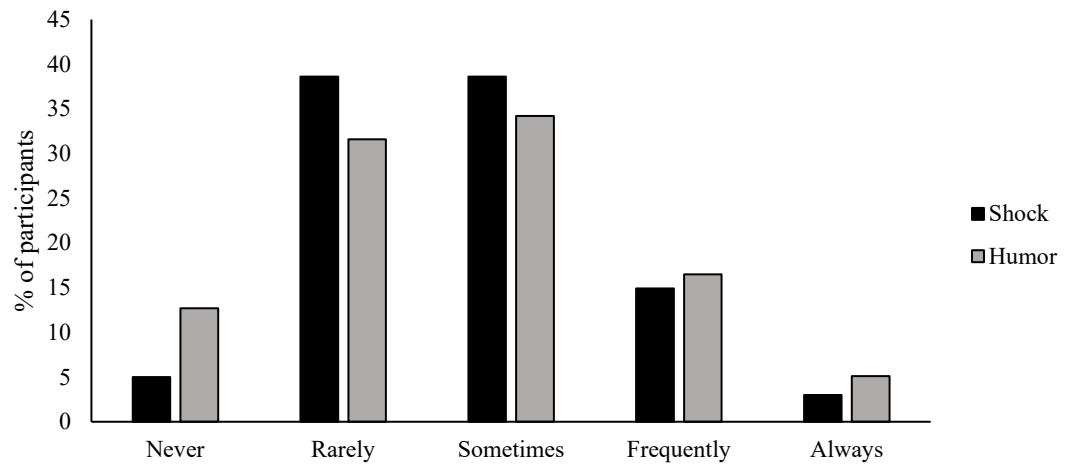


Figure 7. Participants' frequency of plastic straw use for the shock and humor data sets.

For the overall sample, 47.8% (N=86) of participants stated that they always utilize in-home recycling, 27.2% (N=49) frequently do, 14.4 % (N=26) sometimes do, 6.7% (N=12) rarely do, and 3.7% (N=7) of participants never do. There was no statistically significant difference between the humor and shock samples for this question (chi square= 8.818; df= 4;  $p>0.05$ ) (Appendix 14).

The majority of participants (43.9%, N=79) stated that they always use reusable bags instead of plastic bags, 21.1% (N=38) frequently do, 25.6 % (N=46) sometimes do, 8.9 % (N=16) rarely do, and 0.6% (N=1) never do. There was no statistically significant difference between the shock and humor samples (chi square= 5.998; df=4;  $p>0.05$ ) (Figure 8). A full breakdown between the shock and humor samples is provided in Appendix 15.



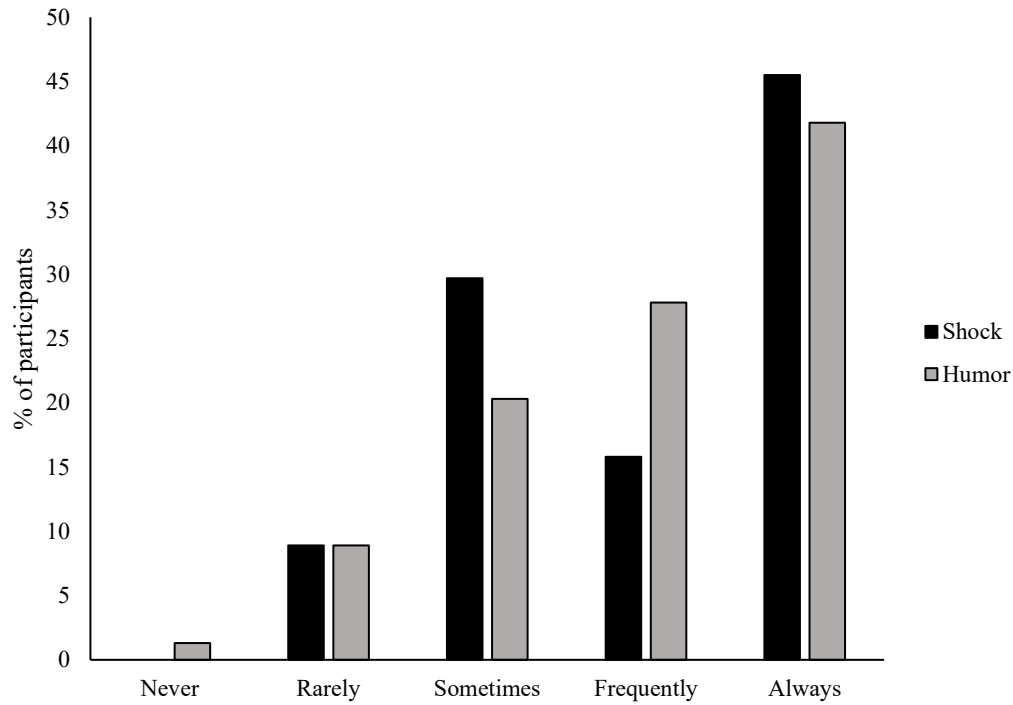


Figure 8. Participants' frequency of using reusable bags for the humor and shock samples.

Participants were presented with multiple statements that they were asked to choose their level of agreement with on a scale of 1 (strongly disagree) to 5 (strongly agree). The statements, the means for humor and shock samples, the Mann Whitney U value, and the p value can be seen in Table 5. Figures with detailed responses from each sample for the statements in Table 5 can be found in Appendices 16-26.

Table 5. Participants' level of agreement on a Likert scale (1=strongly disagree to 5=strongly agree) with statements about their everyday habits and awareness of MPP.

Question	Shock	Humor	U value	p
"I refuse plastic straws."	2.35	2.54	3689	p>0.05
"I refuse plastic bags."	3.25	3.65	3335	p>0.05
"I use re-useable water bottles."	4.41	4.40	3725	p>0.05
"I believe a zero-waste lifestyle is one of the best ways to live."	3.42	3.73	3253	<b>p&lt;0.05</b>
"I believe marine plastic pollution affects my life."	3.62	3.92	3293	<b>p&lt;0.05</b>
"I believe that marine plastic pollution should be addressed by the local government."	4.29	4.54	3396	p=0.05
"I believe that marine plastic pollution should be addressed by international government."	4.28	4.57	3237.5	<b>p&lt;0.05</b>
"I believe marine plastic pollution is not being handled correctly by the federal government."	2.44	2.31	3531	p>0.05
"Seeing posts about marine plastic pollution makes me feel helpless."	3.17	3.00	3588	p>0.05
"seeing posts about marine plastic pollution makes me feel hopeful."	3.14	3.32	3507	p>0.05
"I think marine plastic pollution is a serious problem."*	4.57	4.71	3475.5	p>0.05

\*This question was asked as part of the pre and post questions in this survey.

### 3.4. Post Questions

After viewing the posts about marine plastic pollution (located in Appendices 2 and 3) respondents answered similar questions and provided qualitative data. Overall, the majority of respondents 86.1% (N=155) thought it important to see more pictures like the ones they saw about marine plastic pollution, whereas 13.9% (N=25) of respondents did not. The majority of respondents (93.9%, N=169) wanted to see more videos like the ones they saw and 6.1% (N=11) did not. Neither of these questions were affected by which emotional appeal participants viewed; they still wanted to see more posts like the ones in this survey (Table 6 and 7).

Table 6. Percent and frequency of participants that would like to see more pictures like the ones in their survey group on social media.

Appeal		Frequency	Percent
Shock	Yes	89	88.1
	No	12	11.9
Humor	Yes	66	83.5
	No	13	16.5
Chi square= 0.776 ; df=1; p>0.05			

Table 7. Percent and frequency of participants that would like to see more videos like the ones in their survey group on social media.

Appeal		Frequency	Percent
Shock	Yes	94	93.1
	No	7	6.9
Humor	Yes	75	94.9
	No	4	5.1
Chi square= 0.269; df=1; p>0.05			

The majority of total respondents (72.2%, N=130) said their opinion did not change after seeing the humorous or shocking examples of social media posts, whereas 27.8% (N=50) did. There was no significant difference between the humorous and shocking data sets (Chi square=.100; df=1; p>0.05) (Figure 9).

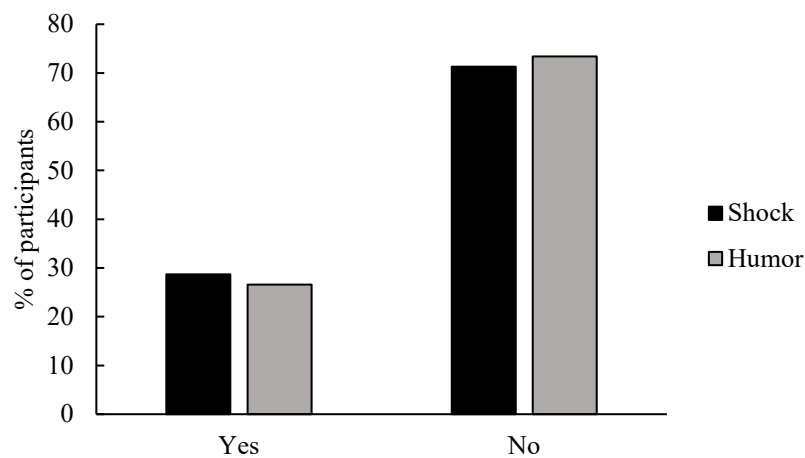


Figure 9. Percent of participants' whose opinion on marine plastic pollution changed after seeing examples of social media posts.

Participants were asked to provide qualitative information on whether or not this study changed their opinion on marine plastic pollution. The majority of overall participants (51.4%, N=75) stated that they already knew marine plastic pollution was an issue before this study, so their opinion was unchanged. Some participants (12.3%, N=18) stated that this study made them more aware of this issue and it made them empathize with the environment. Other respondents (10.3%, N=15) stated that the government and bigger companies need to make a change in order for this issue to be solved because their small contribution will not help. There was no statistically significant difference between the shock and humor data sets regarding the categories of qualitative responses (chi square=13.064; df=9;  $p>0.05$ ).

Participants were asked to provide reasoning to if their opinion was changed as a result of this study or not. Illustrative examples from both samples were chosen to represent the range of responses and can be seen in Table 8.

Table 8. Qualitative data from general survey and focus group illustrating responses providing reasoning for opinion change after the study.

Source	Appeal	Changed Opinion?	Qualitative
General Survey	Shock	Yes	“They are graphic images of the marine life being tortured from the use of plastic that should be shared on social media. Also, I never thought about how we are eating and drinking plastic. I think plastic water bottles and plastic bags should be banned entirely.”
		No	“I have always believed the issues of marine plastic pollution is a problem and will continue to be one unless governmental bodies push for more environmentally conscious decisions”
		No	“The photos and video offer no solution. Yes everyone knows (and if you do not you’re ill informed) that plastic pollution is a problem. The issue now is that not many people have solutions OR are aware of them. The public is aware there is a problem, give them viable options and solutions, not guilt. Guilt builds resentment and prompts excuses.”
	Humor	Yes	“I think this was a very beneficial way to get the message on plastic pollution out. It takes a few steps for us to get there, but I plan to live a better lifestyle this way (as shown in the video).”
		Yes	“Watching the video shows how easy it is to separate from the convenience of plastics.”
		No	“There’s nothing as myself, an individual, can do to cause change. If I stop using straws, they will still be thrown out. If I stop using plastic bags, they’ll be used somewhere else. I may not be contributing, but my contribution would be negligible. It’s on an cumulative scale that change can be seen, and this is done through government. Be it a local government basis that cooperatively works with OTHER LOCAL GOVERNMENTS that can make a true impact. This sum of power allows for much change to be seen, or the potential there within. To see a response societally, this must come culturally, which is most often not achieved by individual social action. It’s sadly not even that recognized my a grand populace that our dependency on plastic as a whole is going to kill us, but those who you talk with are not the problem. We will listen, the root of the problem (the negligible) won’t. Unless it’s a cultural change that then has societal manifestations and ramifications. And how is this gained? Not by those whom they deem practically as a detriment (like the activists), but by someone forcing them to do something or not. It comes from government, and broad scale cooperation within politics. That being said, my opinions are based in reason, so by seeing these images, it has done nothing, for nothing has been achieved. Thus; my opinions don’t change. “
Focus Group	Humor	No	“...I think that the shock value content when it comes to like the still images like you would run into scrolling on Instagram, have a lot more power over the humorous ones. But I think when it comes to videos, I think that the humorous ones have a little more power... the humorous content kind of sticks. Ya know , you think of like a break up where its just person to person, where it’s like ‘oh I’m breaking up with plastics’. That kind of message, just the way it’s delivered kind of just sticks a little more.”
	Shock	Yes	“ I just think it [Humor] sticks with people more because if I were to go and see another image of like the seals with the bags over their heads, like yeah that kills me but it doesn’t stick because our minds are built to push the negative things away anyway so I think if you hit them with the more positive, funny ad it will grab more.”

Participants were asked a set of questions after seeing the examples of social media posts; this set of questions was very similar to select questions prior to seeing the posts. The majority of the overall data set (64.4%, N=116) said it would be very likely for them to recycle their next plastic product. Followed by 28.9% (N=52) of participants who said it was likely they would recycle it, 3.9% (N=7) who said they were neutral, 1.7% (N=3) who said it was unlikely, and 0.6% (N=1) who said it was very unlikely. There was no statistically significant difference between the humor and shock samples ( $U=3748.5$ ;  $p>0.05$ ) (Appendix 27).

The majority of total participants (30%, N=54) said it was likely for them to refuse single -use plastic the next time they were offered. Followed by 27.8% (N=50) who were neutral, 26.7% (N=48) who said they were very likely to refuse the plastics, 8.3% (N=15) who said it was unlikely for them, and 6.1% (N=11) who said it was very unlikely. There was no statistically significant difference between the humor and shock samples ( $U=3536$ ;  $p>0.05$ ) (Appendix 28) (Figure 10).

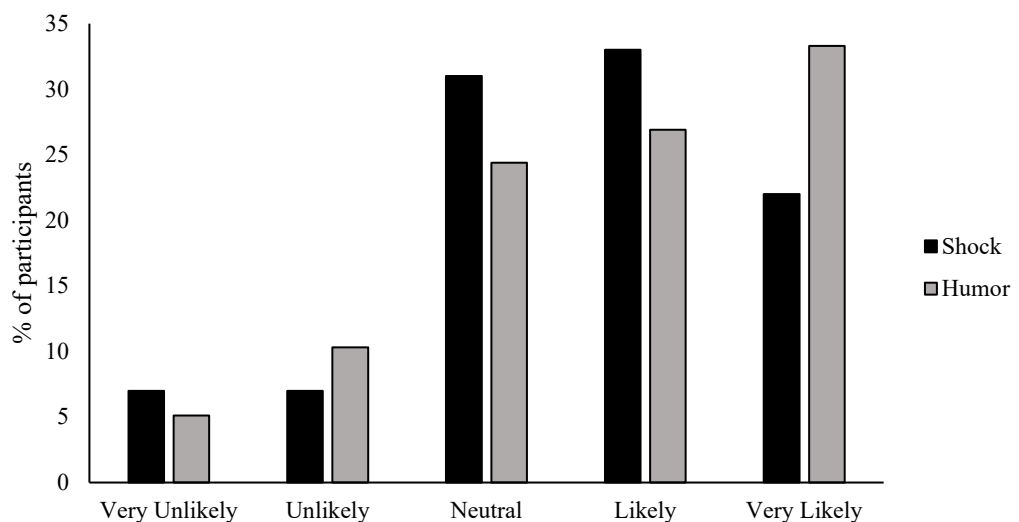


Figure 10. Participants' likeliness to refuse single use plastics for the humor and shock samples.

Overall, most participants (30%, N=54) stated that they were likely to pursue a zero-waste lifestyle after responding to this survey. Followed by 28.3% (N=51) who were neutral on this question, 16.7% (N=30) who said it was unlikely, 14.4% (N=26) who said it was very likely, 9.4% (N=17) who said it was very unlikely, and 0.6% (N=1) who said it was not applicable. There was no statistically significant difference between the two samples on whether participants were likely to pursue a zero-waste lifestyle after seeing the posts ( $U=3720$ ;  $p>0.05$ ) (Appendix 29).

The majority of respondents (35%, N=63) said it was likely that they would attend a local beach cleanup after viewing the examples of posts about marine plastic pollution. Followed by 26.7% (N=48) of participants who said they would be very likely to attend, 23.9% (N=43) who said they were neutral, 10% (N=18) who said they were unlikely to attend, and 3.3% (N=6) who said they were very unlikely to attend. There was no statistically significant difference between the shock and humor data sets in regard to this question ( $U=3789.5$ ;  $p>0.05$ ) (Appendix 30) (Figure 11).

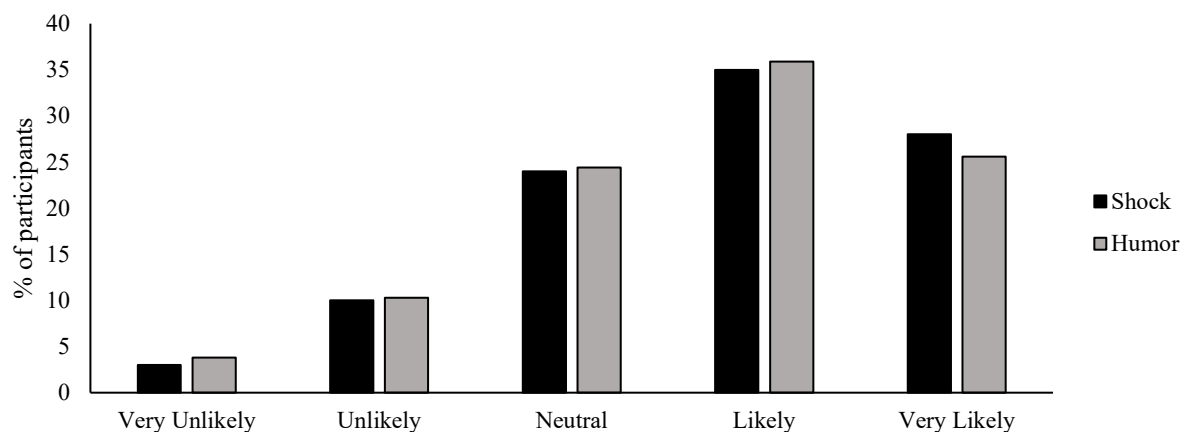


Figure 11. Likeliness of respondents to attend a local beach cleanup after viewing the examples of marine plastic pollution comparing the shock and humor samples.

After viewing the examples of marine plastic pollution, participants were asked to rate their level of agreement with the statement “I believe marine plastic pollution is a serious problem” once again. Overall, most of respondents (77.2%, N=139) strongly agreed with the statement, 16.7% (N=30) mildly agreed, 3.3% (N=6) were neutral, 1.7% (N=3) mildly disagreed, and 1.1% (N=2) strongly disagreed. For the post question, there was a statistically significant difference between the humor and shock samples for this statement ( $U=3456$ ;  $p<0.05$ ) (Table 9 and Figure 12). After a Wilcoxon Signed Ranks test with the shock and humor data sets prior to seeing the examples of marine plastic pollution and after, there was not a statistically significant difference between the shock or humor sample before or after (Table 9).

Table 9. Means and significance for the humor and shock samples for the statement “I believe marine plastic pollution is a serious problem” before and after seeing the social media examples.

Question	Shock	Humor	U value	p
Pre	4.57	4.71	3475.5	$p>0.05$
Post	4.57	4.79	3465	<b><math>p&lt;0.05</math></b>
Z-value	-.658	-1.384		
p	$p>0.05$	$p>0.05$		



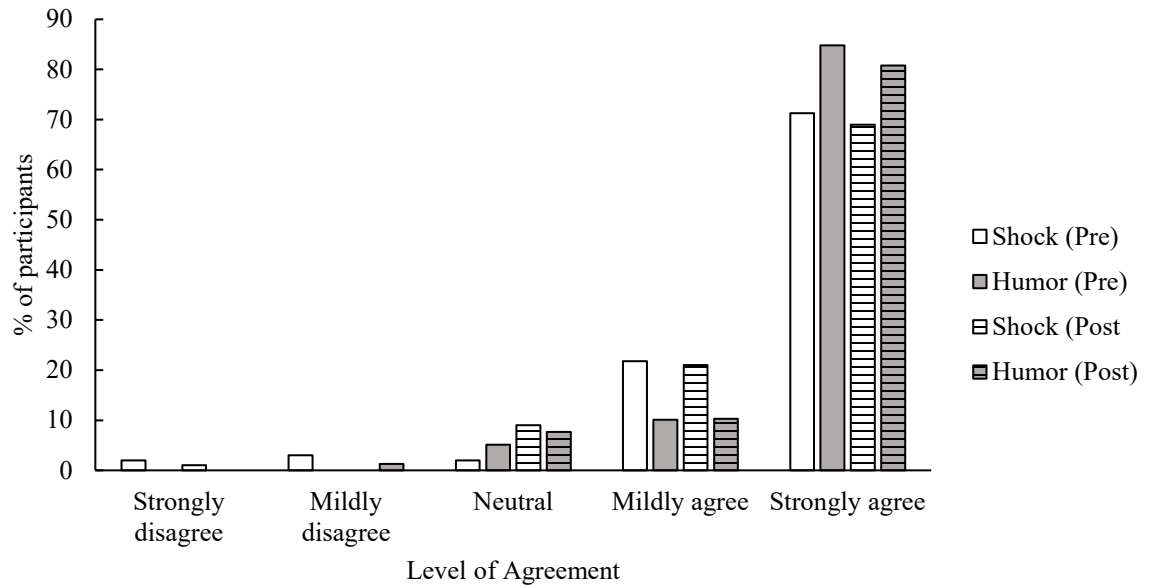


Figure 12. Level of agreement with the statement “I think marine plastic pollution is a serious problem” before and after viewing examples of marine plastic pollution.

#### 4. DISCUSSION

Environmental campaigns and messages have been shown to play a key role in changing human behavior in regard to sustainable activities, such as recycling and making smart consumer decisions (Andersson et al., 2019; Eagle et al., 2016; Janmaimool, 2017; Varela-Candamio et al., 2018). In this study, the effects of shocking and humorous environmental marketing strategies were observed with their connection to social media and sustainable behavior of the participants. The purpose of this study was to determine if one emotional message was more effective than the other in terms of influencing participants’ sustainable behavior such as recycling, attending beach cleanups, or living little to zero waste lifestyles. This information will be useful to develop effective outreach strategies in terms of MPP.

The major research objective included the determination if shock or humor messages are more effective in influencing sustainable behavior. There were many

questions relating to sustainable behavior after viewing the different emotional appeals within the social media posts. Examples of these questions include the participants' likeliness to refuse single use plastics, likeliness to attend a local beach cleanup, and the likeliness of participants to recycle their next plastic product. Humorous messages have been predicted to offset negative responses from viewers, especially if the advertisement contains a negative subject matter such as MPP (Mukherjee et al., 2012). The humorous social media posts were expected to result in an increased likeliness to act sustainably. It was expected that after seeing the shocking social media posts, participants would be highly disgusted by the image, possibly resulting in an unfavorable response to sustainable behavior (Khandaker et al., 2016). In the literature, humor has been deemed more effective than shock because it is less likely to create aversive behavior in the viewer (Mukherjee et al., 2012; Vande et al., 2018). Overall, the results of this study did not show a difference between either shock or humor having an influence on participants' behavior. These findings suggest that certain emotional appeals such as humor and shock have no difference in influencing sustainable behavior from viewers, so either would be equally as effective when included in environmental campaigns on social media.

However, the lack of difference in participant's responses between the two messages tested could also be explained by the gender makeup of both the shock and humor survey samples, which were both heavily female biased. In a similar study performed on college students at the University of South Florida, humor, shock, and emotional treatments were tested to determine the most effective format for environmental messaging. The emotional treatments were assessed in regard to attitude change, credibility, issue importance, and skepticism. The results of this study led to a

hypothesis that females are more perceptive to emotional appeal messages in regard to “attitude change and issue importance” as opposed to males (Diedring, 2008). This could explain why there was no significant difference between the two samples in this study in regard to change in behavior or “attitude change.” It is possible that since the two samples in this study were so heavily female based, that the nature of the emotional appeal did not matter in regard to likeliness of changing behavior; the behavior of females would have changed in the same manner according to both humor and shock, as opposed to males who are more perceptive to shock and violence (Swani et al., 2013).

The lack of difference between the shock and humor samples can also be explained by the pre-exposure of many participants. One of the questions that should be highlighted in this study is “Did your opinion on marine plastic pollution change after being shown the examples of social media posts? Why or why not?” The majority of respondents said their opinion did not change after viewing the social media post examples. In the qualitative section of the survey, many respondents stated that they already knew MPP was an issue before they saw the posts used in this study’s surveys. It is important to note that the majority of participants in this study were college students who may have already been exposed to the issue of MPP in their academic studies. These participants were also in an age group who use social media rather frequently further increasing the possibility of exposure to similar images like the ones used in this survey.

While, overall, not many differences were found between the shock and humor samples before viewing the social media posts, there were a few statistically significant results in regard to the statements

- (1) “I believe a zero waste lifestyle is the best way to live.”

(2) “I think marine plastic pollution affects my life.”

(3) “I think marine plastic pollution should be handled by the international government.”

These questions were not influenced by the two emotional appeals because they were asked before seeing the social media posts. The majority of the background demographics for participants of this study were not statistically significant including age, gender, ethnicity, and political affiliation; the only one found to be significant was the academic background and major of participants. This difference in responses above may reflect this difference in the academic background of each sample. The shock sample had less criminal justice majors, and more biology, chemistry, and engineering majors than the humor sample. On the other hand, the humor sample had more marine and environmental majors than the shock sample. While comparing people’s responses within the same sample was not the objective of this study, future research focusing on the background differences among college students and their responses to different emotional appeals would be helpful to further understand these relationships.

In the focus groups conducted with the College Republicans of the University of New Haven, useful qualitative information was gathered that can help to further interpret some of the results obtained in this study. Many of the participants who saw the humor images and video stated that the subject matter stuck with them in a different way than the shock posts. Some believed that social media posts with the shocking appeal would be more effective as “still images” or pictures. One participant stated the humorous videos would be easier to watch rather than shocking ones, making people feel less aggravated or targeted. Participants exposed to both types of posts stated that they think

more posts about MPP should be circulated around social media, regardless of the emotional appeal. The majority of participants in the focus group had the opinion that a mixture of both emotional appeals would be the most effective. One participant stated “I think they should be like half and half. Like start out with the funny so you’re paying attention and then come in with the more depressing side of it.” Another participant made an interesting comment in regard to the messaging in marine plastic pollution advertisements:

“I think a more important thing about these advertisements or like getting the message out there, is less about making like the one person feel bad who’s like watching and more about like showing what they can do, what solutions they can [use]. The reusable grocery bags; kind of like coming up with a solution rather than just showing the problem, I think, would be more beneficial.”

All of the findings above show why there was a lack of difference between the emotional appeals in this study. However, it is important to highlight a statistic that is directly related to the research objective and aligns with previous research that humor may be more effective than shock. The participants’ level of agreement with the statement “I believe marine plastic pollution is a serious problem” was the only question that was asked before and after viewing the social media examples about MPP. This statistic in Table 9 and Figure 12, shows there is no significant difference within the shock sample or humor sample, before and after viewing the social media examples. However, it is important to address the statistical significance between the shock and humor appeal after viewing the post. The larger difference between the shock and humor means in the post section, created the statistically significant difference, but this is not pertinent to the research question of the study. However, the means in the shock sample did not change, but the humor sample means increased, which is relevant to the

objectives of this study. The increase in the means of humor sample before and after means the humor sample had a higher level of agreement with the statement than before viewing the post, even though it was not statistically significant (Table 9). Even though it is not a statistically significant difference, there is still a higher level of agreement with the statement in the humor sample after viewing the post. This follows the literature in saying that the humorous emotional appeal may be more effective in changing perceptions than the shock appeal.

This study is beneficial to the field of marine biology, conservation, and social sciences. This research has implications that in terms of MPP, the difference between humor and shock have no effect on sustainable activities if the participants already have a background of the issue. This research shows that both emotional appeals would be effective in influencing behavior on social media, which can be used in terms of raising awareness about MPP on social media and other platforms. Participants stated that they wanted to see more videos and pictures like the ones they saw in this survey. Many participants agreed that they would want to see more pictures and videos like the ones shown in this survey. This is an area of study that requires future research to gain more understanding of the connection between academic background, gender, and pre-exposure to MPP and the responses to different emotional appeals in messages. It would be beneficial to analyze results from a sample with a larger variation of education to observe if education level or background correlates to knowledge of MPP. Those with less education may be more receptive to these kinds of advertisements whereas those with more knowledge would be less affected because they are already exposed to the information through their formal education setting. It would also be useful to observe a

more inclusive age range to see if there are correlations between age and social media use, as well as an influence in behavior from these messages.

Research such as this is important for improving science communication about MPP to the general public. MPP is one of the most pressing environmental issues today, contributing to and compounding impacts such as climate change, ocean acidification, and increasing human health risks (Mendenhall, 2018). The consequences of MPP span all the different aspects of the world including the economy, culture, government, and biodiversity (Alimba et al, 2019; Hartley et al., 2019; Kilonzi et al., 2019; Mendenhall, 2018). One of the major barriers in the way of climate change mitigation is a lack of environmental knowledge and awareness of environmental impacts in the general public (Čulin et al., 2019). Thus, a clear understanding of how to communicate these issues to the general public, including how to effectively utilize different emotional appeals to influence sustainable behavior, is of the utmost importance.

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## APPENDIX 1

## Questionnaire:

**You must be 18 years or older to complete this survey. The approximate time for completing this questionnaire is 10 to 15 minutes.**

1. I am 18 years or older.
  - a. Yes
  - b. No
2. What is your age? \_\_\_\_\_
3. What is your gender?
  - a. Female
  - b. Male
  - c. Other
  - d. I prefer not to say
4. What is your ethnicity? Check all that apply.
  - a. American Indian or Alaska Native
  - b. African American or black
  - c. Asian
  - d. Hispanic or Latino
  - e. Native Hawaiian or other Pacific Islander
  - f. White
  - g. Other \_\_\_\_\_
5. What is your political affiliation?
  - a. Democrat
  - b. Republican
  - c. Independent
  - d. Other \_\_\_\_\_
6. Do you think you spent most of your life in a coastal or non-coastal area?
  - a. Coastal
  - b. Non-coastal
7. What is your highest level of education?
  - a. Some high school, no diploma
  - b. High school graduate
  - c. Some college, no degree
  - d. Bachelor's or Associates degree
  - e. Masters or PhD
  - f. Other \_\_\_\_\_

8. Which academic year are you at the University of New Haven?
  - a. I am faculty
  - b. Freshman
  - c. Sophomore
  - d. Junior
  - e. Senior
  - f. Other
9. What is your major/academic background at the University of New Haven? If you are a faculty member, what department do you belong to?  
\_\_\_\_\_
10. Do you use social media outlets?
  - a. Yes
  - b. No
11. If you responded YES to question 9: How much time do you spend on social media in a day?
  - a. Less than 30 minutes
  - b. 30 minutes- 2 hours
  - c. 2- 4 hours
  - d. More than 6 hours
12. If you responded YES to question 9: Which social media outlet do you spend most time on? Circle all that apply.
  - a. Facebook
  - b. Instagram
  - c. Twitter
  - d. Other
13. If you responded YES to question 9: How much time approximately do you spend on Twitter in a day?
  - a. I do not use Twitter
  - b. Less than 30 minutes
  - c. 30 minutes- 2 hours
  - d. 2- 4 hours
  - e. More than 6 hours
14. If you responded YES to question 9: How much time approximately do you spend on Facebook in a day?
  - a. I do not use Facebook
  - b. Less than 30 minutes
  - c. 30 minutes- 2 hours
  - d. 2- 4 hours
  - e. More than 6 hours

15. If you responded YES to question 9: How much time approximately do you spend on Instagram in a day?
- I do not use Instagram
  - Less than 30 minutes
  - 30 minutes- 2 hours
  - 2- 4 hours
  - More than 6 hours
16. Have you ever seen a social media post about marine plastic pollution?
- Yes
  - No
  - Don't know/remember
17. If you answered YES to question 15: On which outlet? Check all that apply.
- Facebook
  - Twitter
  - Instagram
  - Don't know/remember
18. Did you throw your last plastic product in the trash or recycling bin?
- Trash
  - Recycling
  - Don't remember
19. How often would you say you use plastic straws?
- Never
  - Rarely
  - Sometimes
  - Frequently
  - Always
20. How often would you say you use reusable bags?
- Never
  - Rarely
  - Sometimes
  - Always
21. How often would you say you recycle at home?
- Never
  - Rarely
  - Sometimes
  - Frequently
  - Always

Rate your level of agreement with the following statements.

22. I refuse plastic bags at the grocery store.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

23. I refuse plastic straws at restaurants and drive-thrus.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

24. I use re-usable water bottles.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

25. I think a zero-waste lifestyle is one of the best ways to live.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

26. I live a zero-waste lifestyle.

- a. Yes
- b. No

27. I think marine plastic pollution personally affects my life.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

28. I think marine plastic pollution should be addressed by my local government.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

29. I think marine plastic pollution should be addressed by international authorities.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

30. I think marine plastic pollution is being correctly handled by the federal government.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

31. Seeing social media posts about marine plastic pollution makes me feel helpless.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

32. Seeing social media posts about marine plastic pollution makes me feel hopeful.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

33. I believe marine plastic pollution is a serious problem.

- a. Strongly agree
- b. Mildly agree
- c. Neutral
- d. Mildly disagree
- e. Strongly disagree

**Post Questions:**

*Respondents will answer these survey questions after seeing social media posts in Appendices 2 and 3.*

Even if this does not reflect a change from your normal behavior, please answer these questions to the best of your ability.

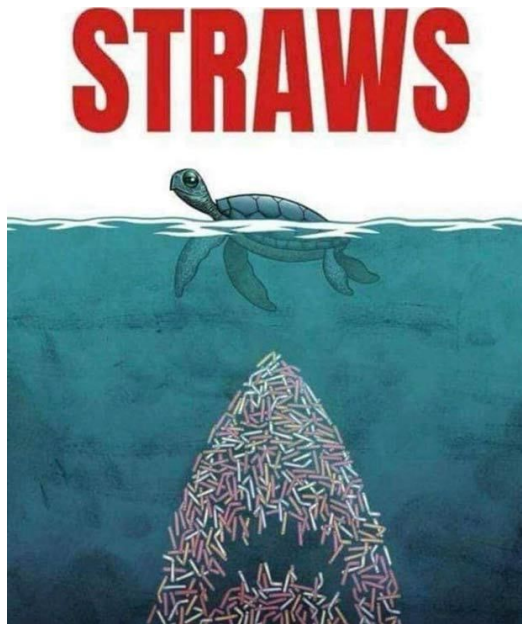
1. How likely are you to recycle your next plastic product?
  - a. Very Likely
  - b. Likely
  - c. Neutral
  - d. Unlikely

- e. Very unlikely
2. How likely are you to refuse single-use plastics?
    - a. Very Likely
    - b. Likely
    - c. Neutral
    - d. Unlikely
    - e. Very unlikely
  3. How likely are you to pursue a little-to-zero waste lifestyle?
    - a. Very Likely
    - b. Likely
    - c. Neutral
    - d. Unlikely
    - e. Very unlikely
  4. How likely are you to attend a local beach cleanup?
    - a. Very Likely
    - b. Likely
    - c. Neutral
    - d. Unlikely
    - e. Very unlikely
    - f. I do not live near the coast so I cannot.
  5. I believe marine plastic pollution is a serious problem.
    - a. Strongly agree
    - b. Mildly agree
    - c. Neutral
    - d. Mildly disagree
    - e. Strongly disagree
  6. Has your opinion on marine plastic pollution changed after seeing these images? If so, how did it change? If not, why?
  7. Do you think more posts (like the ones pictured above) should be shown on social media outlets?



## APPENDIX 2

Humorous Social Media Posts:



Follow the link below to watch a humorous video about marine plastic pollution:

<https://www.youtube.com/watch?v=-DEc16dEMns>

### APPENDIX 3

Shocking/Somber Social Media Posts:



Follow the link below to watch a somber post about plastic pollution.

<https://www.youtube.com/watch?v=IA9O9YUbQew>

## APPENDIX 4

The frequency and percent of responses for each ethnicity in the shock and humor data sets.

Appeal		N	Percent
Shock	American Indian or Alaskan Native	2	1.8
	African American or black	9	8.3
	Asian	9	8.3
	Hispanic or Latino	10	9.2
	Native Hawaiian or other Pacific Islander	1	0.9
	White	77	70.6
	Other	1	0.9
Humor	American Indian or Alaskan Native	2	2.2
	African American or black	13	14.4
	Asian	5	5.6
	Hispanic or Latino	13	14.4
	Native Hawaiian or other Pacific Islander	0	0.0
	White	56	62.2
	Other	1	1.1

## APPENDIX 5

Breakdown of frequency and percent of each political affiliation between the shock and humor samples.

Appeal		Frequency	Percent
Shock	Prefer not to say	19	18.8%
	Democrat	37	36.6%
	Republican	19	18.8%
	Independent	26	25.7%
Humor	Prefer not to say	12	15.2%
	Democrat	32	40.5%
	Republican	13	16.5%
	Independent	18	22.8%
	Other	4	5.1%

## APPENDIX 6

## Breakdown of academic major of participants at the University of New Haven.

Academic Major Category	Majors included within category
Criminal Justice/ Forensic Science	Criminal Justice Forensic Science- Biology Forensic Science- Chemistry National Security Cybersecurity Investigative Services Homeland Security Fire Science
Biology/Chemistry	Biology Chemistry Biochemistry Cellular and Molecular Biology Pre-med Paramedicine Genetics and Biotechnology
Marine/Environmental Science	Marine Biology Environmental Science Marine Affairs
Psychology	Psychology Forensic Psychology
Engineering	Civil Engineering Mechanical Engineering Electrical Engineering Computer Science
Facilities	School Position Financial Aid Athletics
Business	Sports Management Accounting Business Management Business Analytics
Communication	Communications
Other	English Interior Design Music Industry Nutrition and Dietetics Political Science Undeclared

## APPENDIX 7

The time participants spend on social media in a day for the shock and humor data sets.

Appeal		Frequency	Valid Percent
Shock	Less than thirty minutes	5	5.1
	30 minutes to 2 hours	41	41.8
	2 to 4 hours	48	49.0
	More than 6 hrs	4	4.1
Humor	Less than thirty minutes	5	6.5
	30 minutes to 2 hours	28	36.4
	2 to 4 hours	35	45.5
	More than 6 hrs	9	11.7

## APPENDIX 8

Time spent on Twitter in a day by participants in both the shock and humor groups.

Appeal		Frequency	Valid Percent
Shock	Do not use Twitter	47	48.0
	Less than 30 minutes	22	22.4
	30 minutes to 2 hours	23	23.5
	2 to 4 hours	6	6.1
	Total	98	100.0
Humor	Do not use Twitter	39	50.6
	Less than 30 minutes	12	15.6
	30 minutes to 2 hours	24	31.2
	2 to 4 hours	2	2.6
	Total	77	100.0

## APPENDIX 9

Time spent on Facebook in a day by participants in both the shock and humor groups.

<u>Appeal</u>		<u>Frequency</u>	<u>Valid Percent</u>
Shock	Do not use Facebook	22	22.4
	Less than 30 minutes	56	57.1
	30 minutes to 2 hours	16	16.3
	2 to 4 hours	4	4.1
	Total	98	100.0
Humor	Do not use Facebook	22	28.6
	Less than 30 minutes	30	39.0
	30 minutes to 2 hours	24	31.2
	2 to 4 hours	1	1.3
	Total	77	100.0



## APPENDIX 10

Time spent on Instagram in a day by participants in both the shock and humor groups.

Appeal		Frequency	Valid Percent
Shock	Do not use Instagram	3	3.1
	Less than 30 minutes	15	15.3
	30 minutes to 2 hours	63	64.3
	2 to 4 hours	16	16.3
	More than 6 hours	1	1.0
Humor	Do not use Instagram	3	3.9
	Less than 30 minutes	15	19.5
	30 minutes to 2 hours	49	63.6
	2 to 4 hours	8	10.4
	More than 6 hours	2	2.6

## APPENDIX 11

Frequency percent of responses for which social media outlet participants spend the most time on.

Appeal		N	Percent
Shock	Facebook	31	17.2
	Twitter	76	42.2
	Instagram	31	17.2
	Snapchat	30	16.7
	Tik Tok	6	3.3
	Other	6	3.3
Humor	Facebook	24	17.4
	Twitter	63	45.7
	Instagram	25	18.1
	Snapchat	15	10.9
	Tik Tok	3	2.2
	Other	8	5.8

## APPENDIX 12

Percent of responses for which social media outlet participants viewed a post about marine plastic pollution.

Appeal		N	Percent
Shock	Facebook	33	24.6
	Twitter	32	23.9
	Instagram	65	48.5
	Don't know/don't remember	4	3.0
Humor	Facebook	31	28.4
	Twitter	23	21.1
	Instagram	51	46.8
	Don't know/don't remember	4	3.7

## APPENDIX 13

Percent of participants who threw their last plastic product in the trash or recycling.

<u>Appeal</u>		<u>Frequency</u>	<u>Percent</u>
Shock	Trash	25	24.8
	Recycle	66	65.3
	Don't remember/don't know	10	9.9
	Total	101	100.0
Humor	Trash	10	12.7
	Recycle	63	79.7
	Don't remember/don't know	6	7.6
	Total	79	100.0

## APPENDIX 14

Percent of participants and frequency of utilizing in-home recycling.

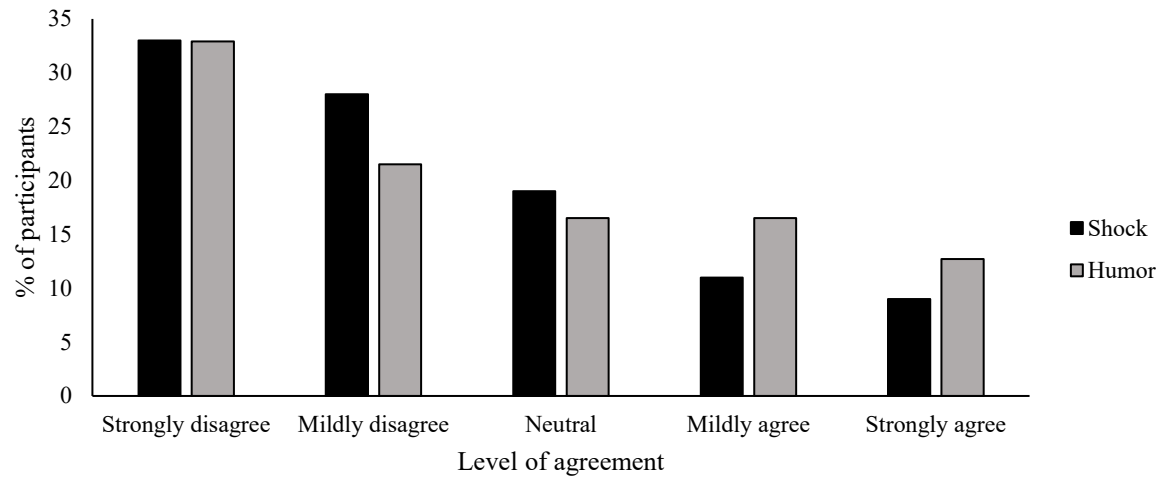
<u>Appeal</u>		<u>Frequency</u>	<u>Percent</u>
Shock	Never	6	5.9
	Rarely	8	7.9
	Sometimes	14	13.9
	Frequently	33	32.7
	Always	40	39.6
Humor	Never	1	1.3
	Rarely	4	5.1
	Sometimes	12	15.2
	Frequently	16	20.3
	Always	46	58.2

## APPENDIX 15

Percentage of participants and frequency of utilizing re-useable bags.

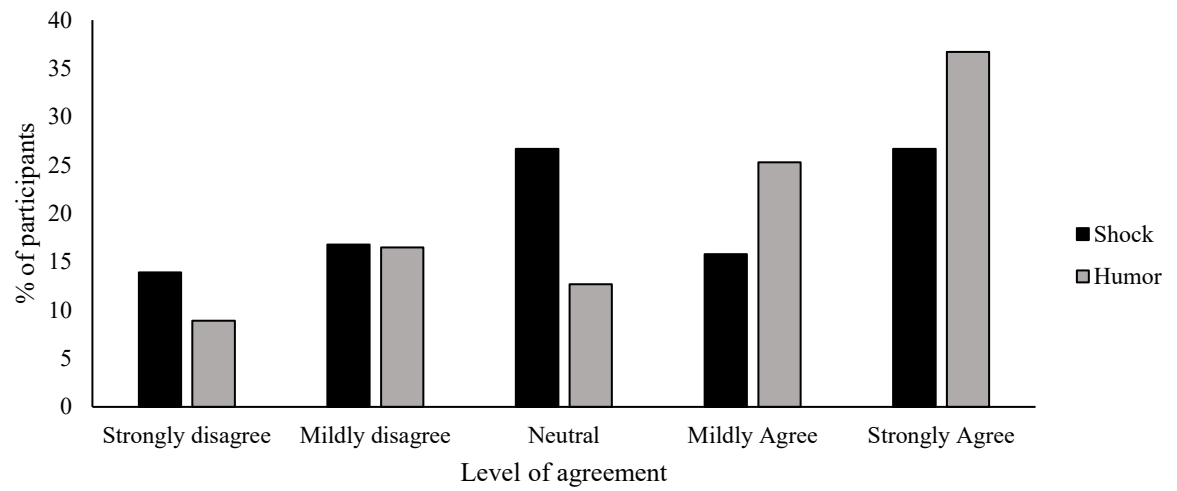
Appeal		Frequency	Percent
Shock	Rarely	9	8.9
	Sometimes	30	29.7
	Frequently	16	15.8
	Always	46	45.5
Humor	Never	1	1.3
	Rarely	7	8.9
	Sometimes	16	20.3
	Frequently	22	27.8
	Always	33	41.8

## APPENDIX 16



Participants' level of agreement with the statement "I refuse plastic straws".

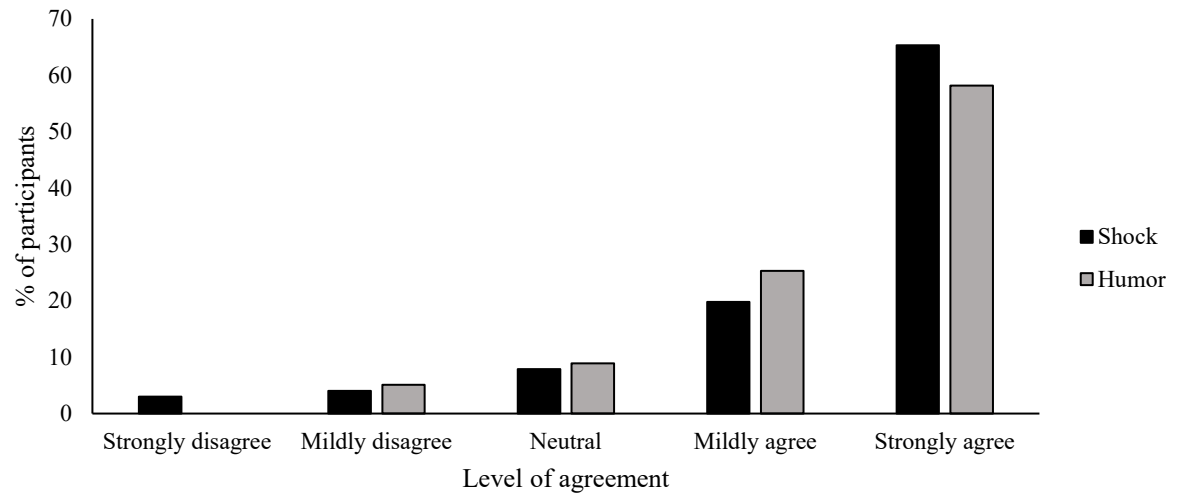
## APPENDIX 17



Participants' level of agreement with the statement "I refuse plastic bags".

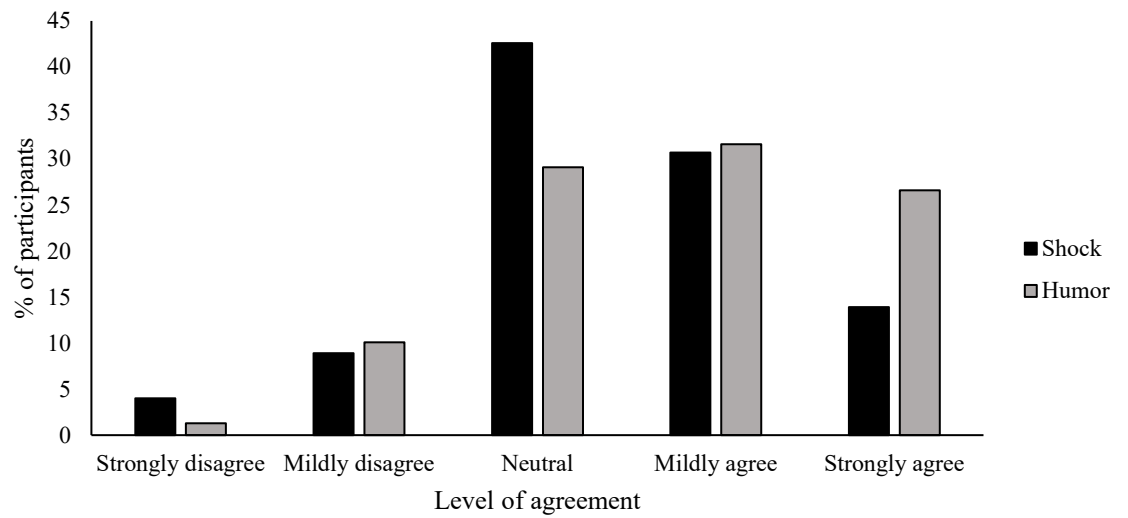


## APPENDIX 18



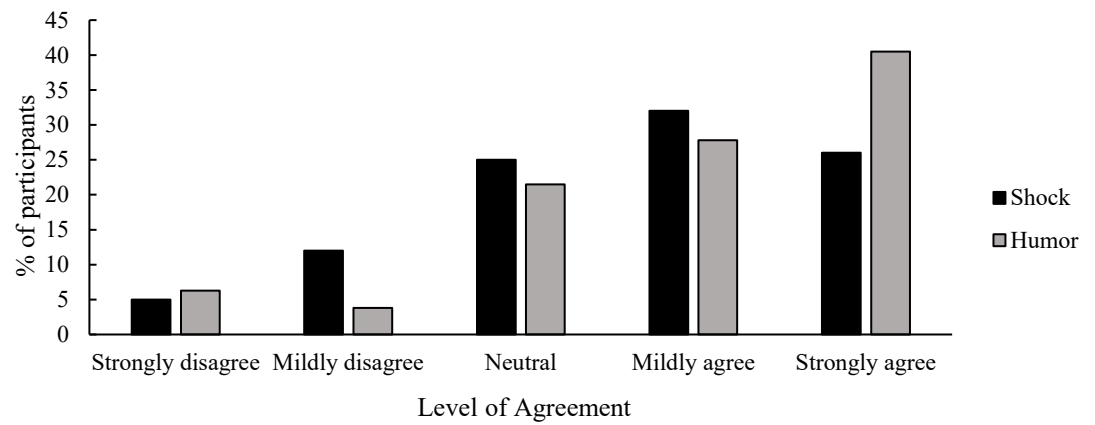
Participants' level of agreement with the statement "I use re-useable water bottles."

## APPENDIX 19



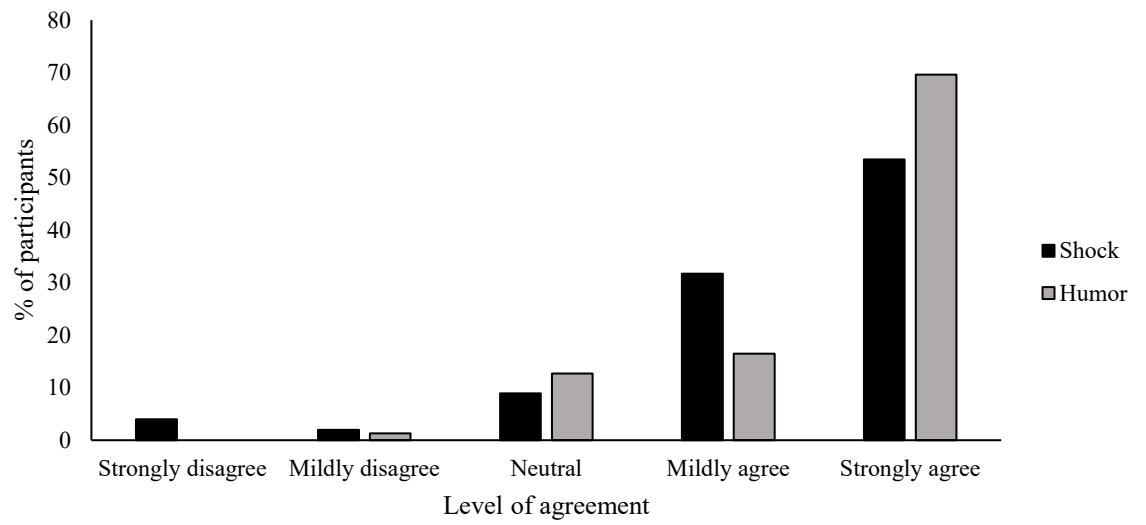
Participants' level of agreement with the statement "I believe a zero-waste lifestyle is one of the best ways to live".

## APPENDIX 20



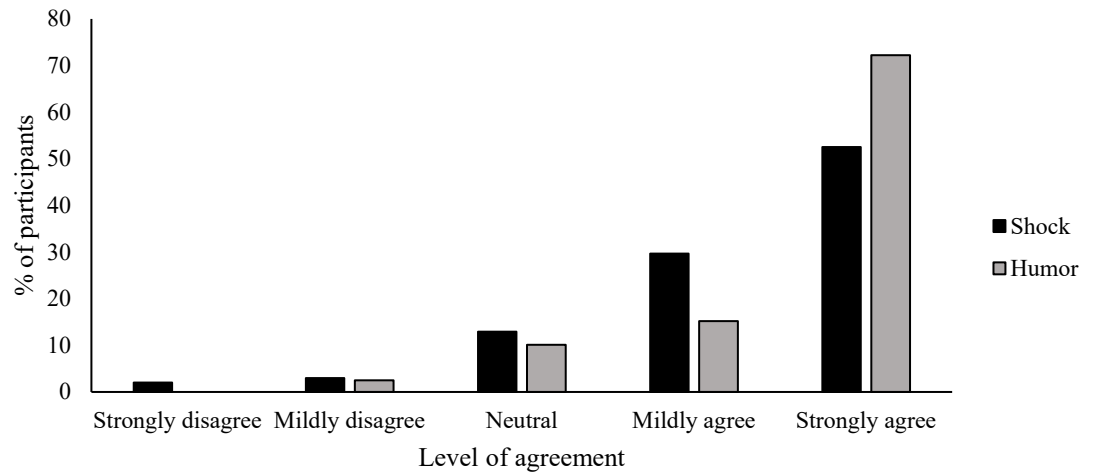
Level of agreement to the statement “I believe that marine plastic pollution affects my life” for shock and humor data sets.

## APPENDIX 21



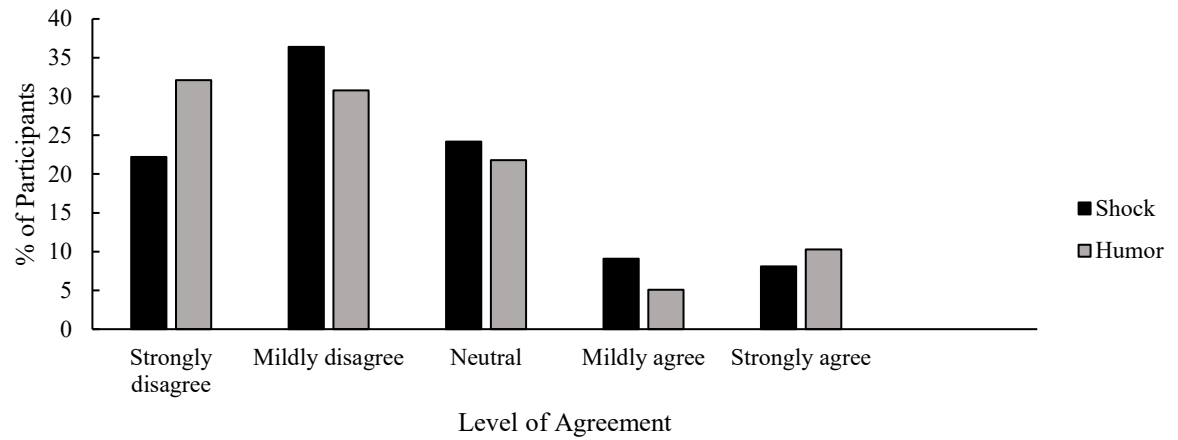
Participants' level of agreement to the statement "I believe that marine plastic pollution should be addressed by the local government".

## APPENDIX 22



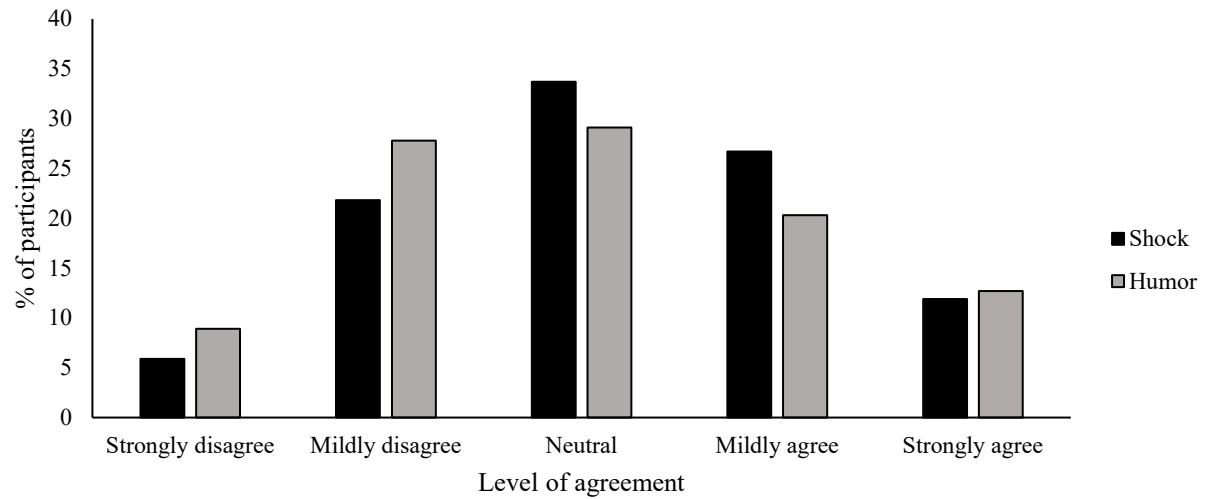
Participants' level of agreement with the statement "I believe that marine plastic pollution should be handled by the international government".

## APPENDIX 23



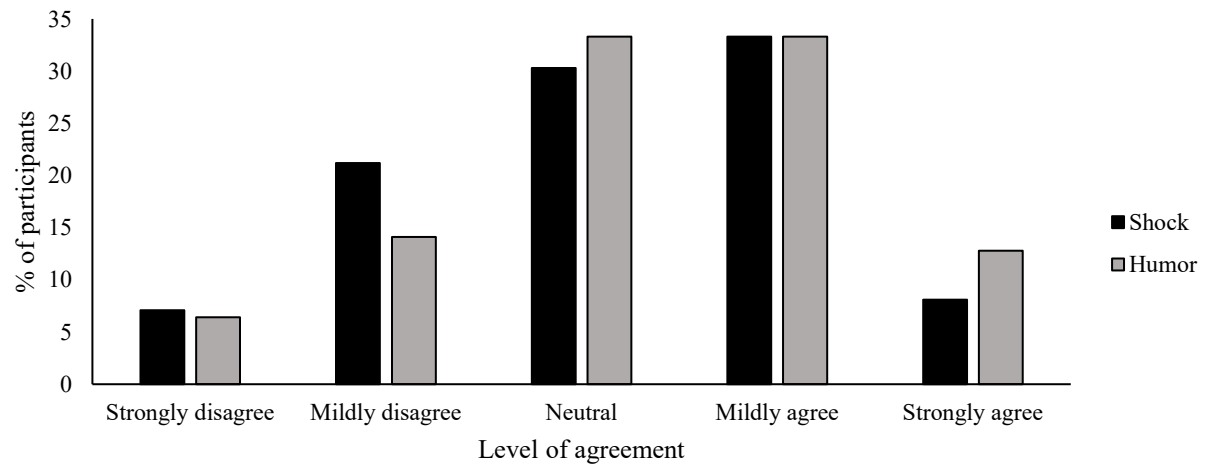
Level of agreement for participants with the statement “I believe marine plastic pollution is being handled correctly by the federal government”.

## APPENDIX 24



Level of agreement for participants with the statement “Seeing posts about marine plastic pollution makes me feel helpless.”

## APPENDIX 25



Level of agreement for participants with the statement “Seeing posts about marine plastic pollution makes me feel hopeful.”



## APPENDIX 26

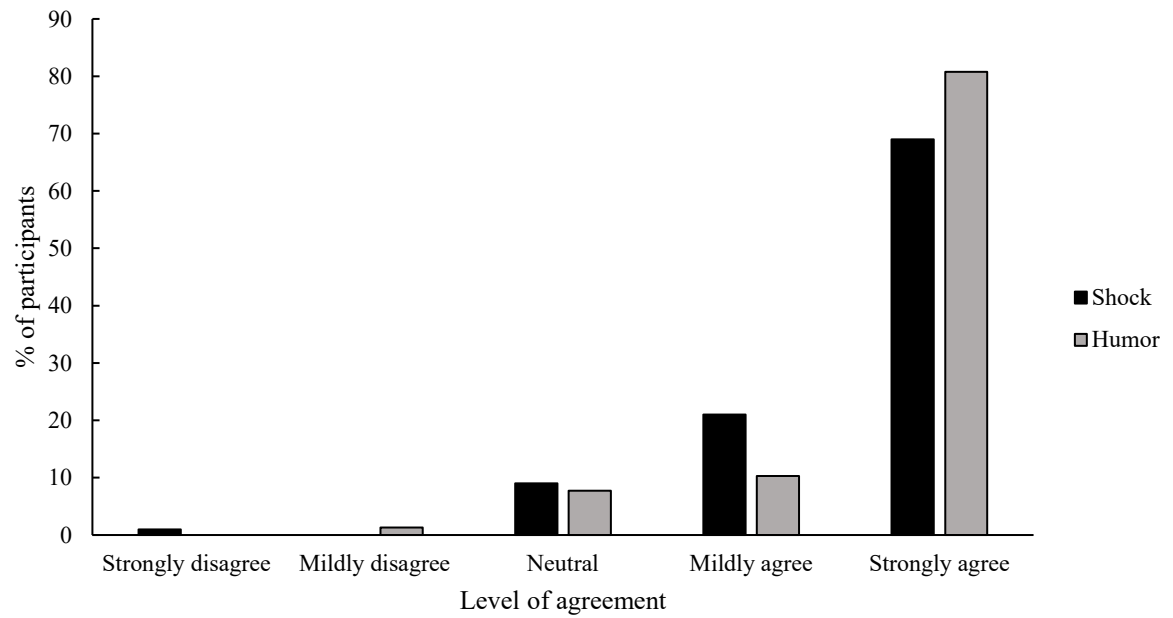


Figure 11. Participants' level of agreement with the statement "I think marine plastic pollution is a serious problem" before viewing pollution examples.

## APPENDIX 27

Likelihood of participants to recycle their next plastic product in the humor and shock data sets.

Appeal		Frequency	Valid Percent
Shock	Very Unlikely	1	1.0
	Unlikely	1	1.0
	Neutral	3	3.0
	Likely	33	33.0
	Very Likely	62	62.0
Humor	Unlikely	2	2.5
	Neutral	4	5.1
	Likely	19	24.1
	Very Likely	54	68.4

## APPENDIX 28

Likelihood of participants' likelihood to refuse single-use plastics in the humor and shock data sets.

Appeal		Frequency	Valid Percent
Shock	Very Unlikely	7	7.0
	Unlikely	7	7.0
	Neutral	31	31.0
	Likely	33	33.0
	Very Likely	22	22.0
Humor	Very Unlikely	4	5.1
	Unlikely	8	10.3
	Neutral	19	24.4
	Likely	21	26.9
	Very Likely	26	33.3

## APPENDIX 29

Participants' likeliness to pursue a zero-waste lifestyle after viewing examples of social media posts for the shock and humor data sets.

Appeal		Frequency	Valid Percent
Shock	Not applicable	1	1.0
	Very Unlikely	12	11.9
	Unlikely	14	13.9
	Neutral	32	31.7
	Likely	27	26.7
	Very Likely	15	14.9
Humor	Very Unlikely	5	6.4
	Unlikely	16	20.5
	Neutral	19	24.4
	Likely	27	34.6
	Very Likely	11	14.1

## APPENDIX 30

Likelihood of respondents to attend a local beach cleanup after viewing the examples of marine plastic pollution posts.

Appeal		Frequency	Valid Percent
Shock	Very Unlikely	3	3.0
	Unlikely	10	10.0
	Neutral	24	24.0
	Likely	35	35.0
	Very Likely	28	28.0
Humor	Very Unlikely	3	3.8
	Unlikely	8	10.3
	Neutral	19	24.4
	Likely	28	35.9
	Very Likely	20	25.6