# Linnæus University
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## Bachelor Thesis

## Understanding the Relationship between Individuals' Emotional Response and Environmental Protection Intentions

*-A Quantitative Research in the Context of Public Service Advertisements*

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# Acknowledgements

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# Abstract

**Background:** The protection of the environment requires everyone in this world to act together. If more individuals have the intention to protect the environment, then more individuals and a higher probability of taking action to protect the environment. In order to arouse individuals' attention to environmental issues, some non-profit organizations and government agencies have released public service advertisements. As a way of constructing advertisements, message framing can awaken individuals' emotional responses to the content of public service advertisements by conveying positive or negative information. Positive information can arouse individuals' positive emotions, while negative information can cause individuals' negative emotional reactions. Emotional responses could have an impact on individuals. Therefore, this article focuses on whether there is a relationship between emotional responses and intention.

**Purpose:** The purpose of the thesis is to explain how the emotional response to the message framing in public service advertisement impact individuals' intention to protect the environment.

**Methodology:** This thesis followed a deductive approach; thus, the quantitative research method is applied to this paper. The data collection method is the questionnaire, the authors designed a self-completed questionnaire, and it was sent out online. Before the questionnaire sent, there was a small-scale pretest of the questions was conducted. Then, the questionnaire was posted online, and the authors received 590 valid responses as a result. Afterward, the authors used SPSS as the technical tool to analyze the data. Coding, descriptive analysis, Cronbach's alpha, correlation analysis, and multiple linear regression analysis were used to analyze the data and test the hypothesis.

**Findings:** This study found that positive emotional responses to positive message frames in PSAs had a positive impact on individuals' intentions to protect the environment. In addition, negative emotions were found to have no positive effect on negative message framing in PSAs in relation to individuals' intentions to protect the environment.

**Conclusion:** This study shows that positive emotional responses to PSA images depicting positive messages have a positive impact on environmental conservation intentions. From a positive emotional response perspective, the researchers found that the use of natural environments in PSA images elicited strong positive emotions in respondents and could trigger higher levels of pleasure and happiness, as well as lower levels of awe.

In addition, although negative messages in PSA images can trigger negative emotions in individuals (fear, guilt, and sadness), they do not affect individuals' intention to protect the environment. Thus negative emotional reactions do not affect the intention to protect the environment.

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# 1. Introduction

## 1.1 Background

Environmental protection is an urgent global issue in which pollution, climate change, loss of biodiversity, and reduction of fresh water are factors that can lead to a very bad global environment (Brown School, n.d.) In order to advocate for change and action, environmental challenges must be taken seriously and organized from all spheres of society (Brown School, n.d.). This means participating in actions and sustainable behaviors that promote the protection of the environment, involving measures to protect and conserve natural resources, minimize pollution and waste, and support ecological balance, such as doing things to improve the environment, such as recycling plastic bottles or reusing items, saving water, and using non-polluting items (National Ocean Service, n.d.).

To raise awareness about environmental protection, some environmental nonprofit organizations produce public service announcements to draw attention to the issue. Public Service Advertising is a type of advertising also known as Public Service Announcements (PSAs for short in the following). PSAs are generally produced by government agencies or non-profit organizations, and for-profit companies cannot produce PSAs but can support them through donations (Braun Film & Video admin, 2021). Therefore, PSAs are feasible in terms of cost, and not only do they not need to worry about too much expense, but they can also receive some financial support. Second, PSAs are designed to inform the public about issues that can be improved and are widely used to raise awareness and promote individual environmental behavior (Daniels., 2020). Often, it is intended to stimulate individuals to think about issues related to the environment, health, or human rights, and the messages in PSAs are intended to raise public awareness and encourage behavior change (Daniels, 2020; The Media Education Lab, n.d.). For example, the WWF released the "Love it or Lose it" PSA in hopes that individuals will value the earth's resources and care for the natural environment

and ensure that both humans and wildlife can be productive in the future (WWF, n.d.).

However, an important aspect of PSA is the framing of the message, which can convey information differently and elicit various emotional responses from individuals (Indeed Editorial Team, 2022).The relative effectiveness of negative and positive messages among these has been extensively studied. According to a number of studies, PSAs with negative messages frequently play a significant role in educating the public and increasing public awareness. These PSAs typically contain more information and are more compelling than positive messages (Ma, Mo, and Gal, 2020). On the other hand, positive message framing can reap potential benefits and trigger emotional responses in the context of pro-environmental behavior (Zubair et al., 2020). In addition, positively framed images support PSA and have a positive impact on it, which leads to an impact on intentions (Lee, Yan and Glen, 2018). In turn, when individuals have positive emotions, they can be motivated to act (UNHCR's Innovation Service, 2019). Therefore, the need for individuals to have the intention to want to protect the environment is very important if they want to get more individuals involved in taking action to protect the environment.

## 1.2 Problem Discussion

It was discovered through prior research that emotions might play a significant role as a mediator between message frames and conservation intentions (Nabi et al., 2018). And Alvigor (2020) further explained that emotions could act as a specific motivation to articulate individuals' intentions and attach a felt value to them. When individuals are motivated by emotions for a specific goal, they are more empowered to take action (Alvigor, 2020). Although intentions do not mean that individuals will do something immediately, when individuals consider something and plan for it, it is more likely to be achieved (Houlis, 2021).

Therefore this is relevant for emotional responses to influence individuals' intentions to protect the environment.

However, positive emotions have been shown to have a positive effect on motivation and pro-social behavior (Schneider, Zaval and Markowitz, 2021). For example, some public health issues, and climate environmental issues when positive pro-social messages can evoke highly positive emotional responses (Heffner, Vives, and FeldmanHall, 2021). On the other hand, PSAs about negative message framing, on the other hand, usually present some kind of threatening or scary scenario in the advertisement, thus evoking negative emotions and awareness of potential negative consequences for consumers (Krishen & Bui, 2015). And negative ads that evoke strong negative emotions (e.g., sadness and fear), such as anti-smoking ads, are highly applicable and rated as most effective by respondents in anti-DUI ads (Santa & Cochran, 2008; Biener, McCallum-Keeler, & Nyman, 2000 ). After the authors' survey, few articles have directly described the effect of emotional responses on conservation intentions. But Chang, Lo, and Huang (2019) examined the effect of positive or negative emotions in response to pictures containing natural environments on conservation intentions from a neurological perspective. They found that images that created positive emotions caused positive emotions in participants but did not enhance individuals' intention to protect the environment; conversely, images that created negative emotions increased negative emotions and enhanced individuals' intention to protect the environment (Chang, Lo, and Huang, 2019). However, the relationship between positive and negative emotional responses and the intention to protect the environment can be further developed by examining the marketing perspective. Therefore, this paper aims to bridge the gap in the existing literature and provide valuable insights for stakeholders and researchers alike.

Therefore, this paper is a study for the public since all individuals need to take environmental protection seriously. The researcher of this paper will focus on the emotional responses that individuals get from the message boxes in PSAs and individuals' intentions to protect the environment, adding to the academic community's interpretation of this aspect from a marketing perspective. From a practical perspective, this paper will identify how to use emotions in PSAs better and help nonprofit organizations and government agencies discover how to use PSAs more effectively to inform and advocate and thereby increase the number of individuals' intentions to protect the environment.

## 1.3 Purpose

The purpose of this paper is to explain how individuals' emotional responses to the message framing (positive and negative) in PSAs impact the intention to protect the environment.

# 2. Theoretical Framework

## 2.1 Messages Framing in PSAs and Emotions

### 2.1.1 Messages Framing in PSAs

Public service advertisements (PSAs) are funded by nonprofit organizations that speak to general public interest and convey pro-social messages to the public, thereby raising public awareness of these issues and potential solutions (O'Keefe et al., 1990). Moreover, PSAs for environmental conservation can be used to educate the general public on the importance of preserving the environment and to motivate individuals to take steps to lessen their environmental effects (Campos et al., 2021). This is because advertising has the power to encourage individuals' participation and heighten their interest in the environment, thereby bringing

participants' attention to various environmental problems (Campos et al., 2021). Moreover, PSAs that are preceded by environmental themes can facilitate participants' information processing, improving the processing of advertisements placed inside the context of a particular topic and the context itself (Kononova & Yuan, 2015). Additionally, using creative imagery and diverse linguistic resources in the text can elicit various emotional reactions in the target, allowing participants to comprehend the ad's message while deciphering its explicit and implicit messages (Campos et al., 2021).

However, PSAs frequently employ either positive or negative messages in their framing (Ma, Mo and Gal, 2020). Besides, Ma, Mo and Gal (2020) stated that negative PSAs could successfully raise public awareness and spread vital ideas. Meanwhile, Chang and Wu (2015) made the case that only highly motivated individuals will have powerful emotional responses while reading negative messages, resulting in the development of negative bias. Positive PSAs, on the other hand, highlight the advantages of the conduct. They typically give the audience a picture of the advantages of living sustainably, which is non-threatening and non-coercive, frequently producing positive emotions and evaluations (Chan and Chang, 2013). Furthermore, emotional appeals are also used, which evoke a positive emotional response (Chan and Chang, 2013).

## 2.1.2 Emotion and Emotional Response

Humans react to events and situations with emotions, and the sort of emotion that person feels relies on the conditions that set it off (Cherry, K., 2022). Physiological responses, subjective experiences, and behavioral responses can all be used to identify an individual's specific emotions. Positive and negative emotions are, however, separate categories of emotions. Briefly, it indicates that good emotions are feelings we typically associate with pleasurable experiences,

whereas negative emotions are feelings we typically associate with unpleasant ones (Ackerman, 2019). Thus, emotion is a psychological phenomenon that reflects positive or negative feelings experienced directly, as well as a person's attitude toward others and themselves (Muxammadieva, 2021). For example, common positive emotions are pleasure, happiness, awe, etc.; conversely, common negative emotions are fear, anger, sadness, etc. (Ackerman, 2019).

### 2.1.2.1 Positive Emotional Response on Positive Message Framing

Positive emotions are typically cheerful sentiments, and individuals are constantly drawn to them because they give rise to powerful and pleasurable psychological experiences and play a significant role in individuals' daily lives (Ackerman, 2018). Positive feelings can thereby extend individuals' perspectives and inspire them to take action (Davis, 2021). Alexander et al. (2021) contend that while positive emotions imply information that can enhance efficacy perceptions and attitudes, they alone are insufficient to move individuals to action. For instance, individuals use persuasive health messages to threaten their positive feelings since they warn individuals that their current health status could be lost and urge them to stop engaging in unhealthy behaviors (Alexander et al., 2021). As a result, it must be reflected in the material that is selected and pertinent to the subject (Alexander et al., 2021).

Furthermore, confirming that positive emotions have a positive impact on positive messages of engagement with the environment, consistent images and illustrative messages can elicit positive emotions that are beyond the effects of attractiveness or personal intention of the images alone (Poškus et al., 2019). A subsequent study by Fabbro et al. (2021) show that positive images of being immersed in nature's beauty can influence personal happiness and promote a connection to nature, boosting the aesthetic characteristics of natural elements and evoking emotions of happiness. In order to express emotional responses, PSA with images clearly outperforms text-only images (Poškus et al., 2019). Although positive

feelings like pleasure and satisfaction are induced by message framing, Jacobson et al. (2018) found that positive messaging (tested as pleasant) encourages consumers to invest more time and money in environmental advocacy and behavior. Additionally, beautiful stimuli usually provide tremendous pleasure, so while attempting to create a satisfying aesthetic experience, it is crucial to select the right visual stimuli (Fabbro et al., 2021). Because of this, even when associated with information on environmental protection, individuals will frequently avoid aversive and unpleasant stimuli ((Poškus et al., 2019).

In addition, the study by Yang et al. (2018) confirmed the critical effect of a particular internal emotion (awe) on ecological behavior, with the emotion of awe being seen as a typical self-transcendent experience. individuals who experience awe report feeling more connected to nature, which is a particular good sensation that transcends oneself and encourages pro-environmental action (Yang et al., 2018). This is since that individuals have a strong, innate want to connect with nature, known as biophilia, and maintaining this connection is good for both individuals and the environment (Yang et al., 2018). In order to effectively influence ecological behavior through activities that foster a sense of harmony and connection between humans and nature, individuals who experience awe should demonstrate an inner motivation to protect the environment (Yang et al., 2018).

## 2.1.2.2 Negative Emotional Response on Negative Message Framing

A negative emotion is "an unpleasant or unpleasant emotion that is evoked in an individual to express a negative effect on an event or a person" (Ackerman, 2019). However, for negative message frames, where pessimistic future predictions brought on by climate change may elicit emotions like fear or provoke similar emotional responses intended to influence or persuade individuals to take certain actions out of fear (Campos et al., 2021). Therefore, fear is an emotion that

individuals experience when presented with a risk or crisis(Oetting, J., 2018). It can help us react to threats effectively and boost our survival chances. Fear also makes us feel urgent and drives us to act (Oetting, J., 2018).

Additionally, in the context of pro-environmental communication, negative information frames can induce guilt (Stadlthanner et al., 2022). It is also known as guilt, defined as the negative emotion that results from transgressing one's own personal value judgments or social norms (Ackerman, 2019). It compels behavioral modifications that spur beneficial activities (Turner et al., 2018). Thus, it is further demonstrated that losing framing information causes larger negative emotional reactions (Stadlthanner et al., 2022). However, guilt is triggered when a person perceives him/herself as having committed a moral violation, and this guilt can enhance the power of consumer participation in social responsibility programs (Stadlthanner et al., 2022). Particularly in the case of nonprofits, an increase in the intensity of the communicated guilt leads to positive outcomes and an increase in the likability and persuasiveness of the advertisement (Turner et al., 2018).

The relevance of advertising-induced negative emotions as drivers of attitudinal reactions were validated in a study by Bagozzi & Moore (1994) that identified four negative emotions: anger, sadness, fear, and stress. According to the study's findings (Bagozzi & Moore, 1994), negative emotions can boost decision-making and serve as positive motivators. Among other things, sadness is an emotional response that emphasizes other feelings, such as sympathy (Parincu, n.d.). Also, it has been demonstrated that using sorrowful imagery in advertisements can increase empathy and emotional involvement (Parincu, n.d.). According to Liu and Yang's (2020) study, participants' sentiments of sadness were aroused more strongly when the negative message was presented in a narrative style. When the narrative depicted irrevocable losses and unpleasant outcomes, it was more effective at evoking sadness. This implies that losing of information frames may result in more intense sadness (Liu and Yang, 2020). Nevertheless, the message frame about loss (negative) is more effective when it makes the participants feel

sad (Yan, Dillard, and Shen, 2010). In particular, when publicizing natural disasters, negative messages can be more effective in emphasizing prohibited behaviors (Yan, Dillard, and Shen, 2010).

## 2.2 Intention

Intention can be used as a decision that instructs someone to prepare to do something and make a decision for a potential practical action (Fishbein and Ajzen, 2010; Sheeran, 2011). It can be expressed as "I plan to do...", "I intend to do", etc. (Fishbein and Ajzen, 2010). Meanwhile, Fishman et al.'s (2020) study compared the predictive validity of different, commonly used intention measures and found that specifying items of interest had stronger predictive validity. Additionally, it was discovered that specific items containing a "I intend" stem might be the best at predicting intention (Fishman et al., 2020).

However, a distinction is made between behavioral intentions and desired intentions since these can be evaluated using a range of indicators to measure intentions. The theory of planned behavior put out by Ajzen (1991) holds that conduct is impacted by intentions and that an individual's behavioral intentions can directly determine behavior. In other words, a person is more likely to engage in an action as their intention to do so grows (Ajzen, 1991). Among other aspects, Davis & Warshaw's (1992) scale of behavioral intention largely responds to behavioral expectations, defining intention as a belief, i.e., as the subjective likelihood that something is true. This conception, however, is flawed, and researchers can reasonably anticipate that respondents may provide justifications for ambiguous questions like "It is slightly unlikely that I intend to do..." According to the study, substituting the word "will" for "intend" in the phrase "it is slightly likely that I will do..." transforms behavioral intentions into behavioral expectations and gives them more significance (Davis & Warshaw, 1992). However, behavioral expectations are better predictors of behavior than

behavioral intentions, which are expressed as "I expect to do..." and "I will do..." ( Fishbein and Ajzen, 2010).

Moreover, measuring willingness captures unconscious, irrational influences on behavior, which differnt from the measurement of intentions and behavioral expectations (Gibbons, 2020).But the outcomes align with the idea that intentions and behavioral expectations are the fundamental expressions of willingness to engage in the behavior (Fishbein and Ajzen, 2010). Thus, intention encompasses behavioral intentions, behavioral expectations, and willingness (Fishbein and Ajzen, 2010).A single-item measure that asks individuals to rate their desire to engage in a certain behavior on a scale from 1 to 7 was also proposed by Ajzen (2002) (Ajzen, 2002). For instance, "How likely are you to engage in environmentally protective behaviors?" Between "Not at all likely" and "very likely" are available as responses. This indicator is a reliable and valid indicator of intention and has been used in numerous studies in different areas, including health, environment, and consumer behavior (Christopher & Mark, 2010).

# 3. Conceptual Model

*This chapter explains the relationship between emotional responses to message framing (positive and negative) in PSAs and intentions to protect the environment. It also raises the question of how positive and negative message frames in PSAs react to emotions and whether they affect consumers' intention to protect the environment. A conceptual model is given below to illustrate the expected relationship between the variables. The section aims to define the relevant objectives in the course of this paper's research and hypothesise how these*

*objectives can be combined to draw coherent conclusions so that the reader can understand the research more accurately and in greater depth.*

## 3.1 Positive Emotional Response on Positive Message Framing (H1)

The research by Poškus et al. (2019) confirmed that appeals with positive descriptive messages and consistent descriptive images influence behavioral intentions and that positive emotions have a positive effect on engaging with environmental protection messages (Poškus et al., 2019). This is because, even through they may be connected to significant topics like environmental conservation, individuals are averse to unpleasant stimuli and avoid them (Poškus et al., 2019). Additionally, the inclusion of images of the natural world in advertising will enhance both the mental elaboration of the message being promoted and the retention of memory for these messages (Hartmann, Apaolaza, & Alija, 2013). These advertisements with imagery that lead to picturesque natural settings have the potential to arouse positive responses. Furthermore, attractive natural scenery in green commercials may compel highly motivated individuals to act in favor of the environment (Hartmann, Apaolaza, & Alija, 2013).

However, according to Ballew and Omoto (2018), the experience of contact with nature can enhance positive emotions. Although the study found that simply being in a natural setting (such as a local botanical garden) increases feelings of awe and other pleasant emotions like happiness and pleasure, it also explains the potential effects of nature on these emotions(Ballew and Omoto, 2018). And contact with nature has a strong positive impact on emotions and individuals' response to pro-social behavior (Ballew and Omoto, 2018). Furthermore, theoretical frameworks on awe suggest that awe is considered a quintessential self-transcendent experience and has been tested for its effects on pro-social behavior (Yang et al., 2018). Therefore, when self-transcendent values are

prioritized in Yan, Keh, and Murray's (2023) study, awe increases sustainable behaviors and intentions. In addition, Chang, Lo and Huang''s (2019) findings suggest that positive emotional pictures of the environment may promote positive emotions, but reduce the intention to take action to protect the environment. In considering this, researchers tend to believe that viewing consistent descriptive images of nature may have a positive emotional response and may positively influence environmental conservation intentions. Therefore, the researcher proposed the following hypothesis 1:

***H1: Positive emotional responses to positive message framing in public service announcements (PSAs) have a positive effect on individuals' intentions to protect the environment.***

## 3.2 Negative Emotional Response on Negative Message Framing (H2)

Environmental images with negative messages enhance negative emotions and individuals' concern and intention to take action to safeguard the environment (Chang, Lo and Huang, 2019). Different images elicit different emotional responses. Rees, Klug, and Bamberg (2015) made the case that facing environmental damage brought on by humans triggers a significant emotional response (guilt), which in turn predicts the intention to act environmentally and will predict actual activity. The effects of the experimental manipulation on behavioral intentions and actual conduct are mediated by guilt, which, although it predicts good behavioral intentions, does not drive the intention to influence actual behavior (Rees, Klug, & Bamberg, 2015). By avoiding the motive of guilt, these emotional experiences can be exploited to encourage sustained behavioral intentions (Schneider et al., 2017). Due to this, researchers have used guilt as one

of the ITEMs to gauge individuals' intentions to protect the environment and their negative intentions.

Furthermore, Fridkin et al. (2021) found that viewing gun violence PSAs elicited fearful emotional responses. These negative emotions make it more likely that individuals will seek out further information about their subject, while engaging in questions of interest and changing attitudes toward the topic (Fridkin et al., 2021). However, in a situation involving the environment, individuals can also deal with the negative long-term consequences of the climate environmental catastrophe by controlling their fears (Van Zomeren, Spears, and Leach, 2010). In other words, fear makes individuals more likely to take environmental action (Van Zomeren, Spears, and Leach, 2010). Additionally, it has been demonstrated that when negative messages in PSAs focus on bad events (such as when children are used as victims), it causes an appraisal of their suffering and danger and consequently sets off feelings like sadness and fear (Bagozzi & Moore, 1994). These emotions evoke strong emotions and stimulate empathy and increase the likelihood that individuals will take action (Bagozzi & Moore, 1994). Thus, building on previous research, researchers have argued that individuals' guilt, sadness, and fear depend on the type of images used to emphasize the environment. Moreover, that negative information can largely trigger negative emotions, and these emotions can, in turn, increase environmental protection intentions. Therefore, hypothesis 2 set by the researchers was as follows:

***H2: Negative emotional responses to negative message framing in public service announcements (PSAs) have a positive effect on individuals' intentions to protect the environment.***
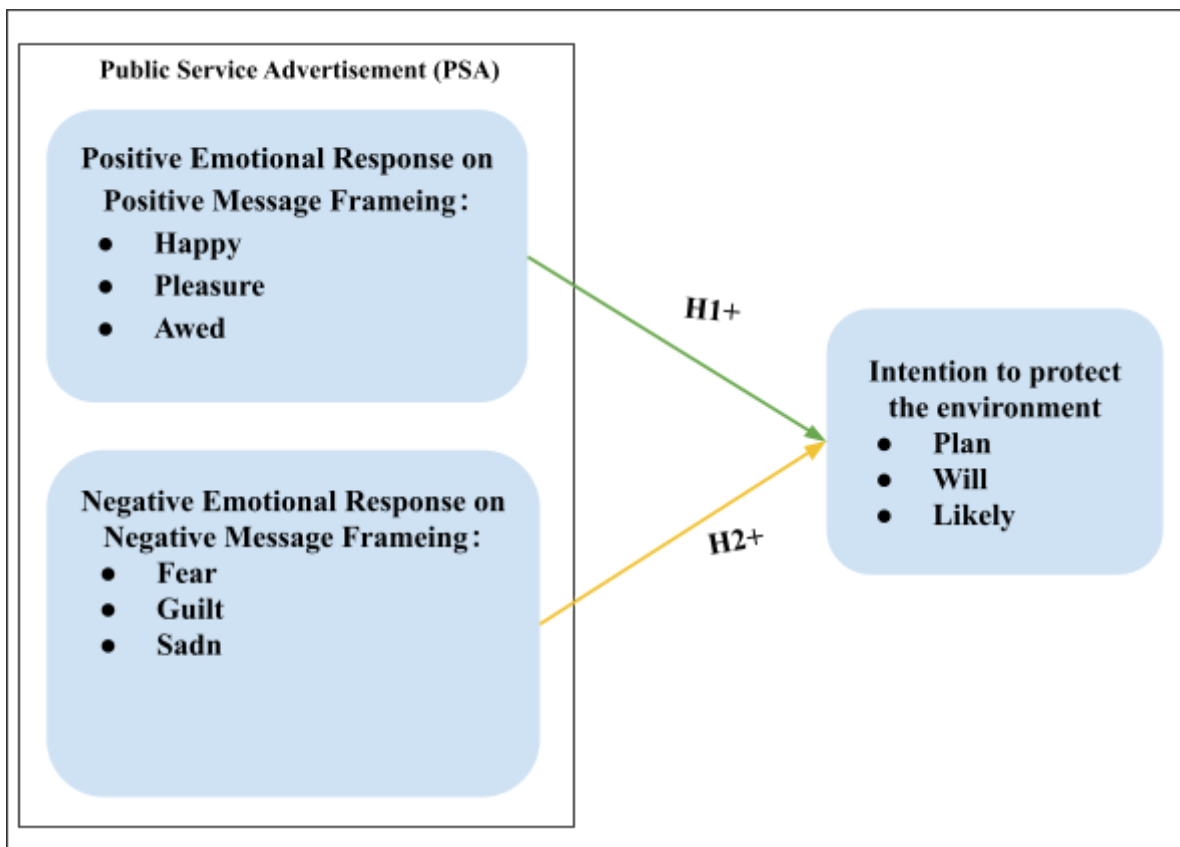
*Model 1, Conceptual Model, own*

# 4. Method

## 4.1 Research Design

Research design can be seen as a frame of reference for data collection and analysis, and it reflects the researchers' decisions on some of the priorities in the research process (Bell, Harley, and Bryman, 2019). include variables and causal relationships between variables; identification of the research objects to observe; the meaning of the study and the implications of that in society; and a tentative understanding of social phenomena (Bell, Harley, and Bryman, 2019). There are

five types of research designs: experimental and related designs, longitudinal design, case study design, comparative design and cross-sectional design. Among them, the cross-sectional design is considered a type of research related to social surveys which use questionnaires or structured interviews to collect data. Therefore, it is mainly used in quantitative research. This method needs to collect quantitative data that relate to the studied variables within a certain period, and then researchers test their correlations (Bell, Harley and Bryman, 2019).

In this study, the authors conduct quantitative research with questionnaires. Additionally, cross-sectional design requires identifying variable relationships and collecting large amounts of data (Bell, Harley, and Bryman, 2019). This is an approach appropriate for this paper. Therefore, this study is suitable for a cross-sectional design. This paper includes two independent variables (positive emotional responses to positive message frames in PSAs and negative emotional responses to negative message frames in PSAs) and one dependent variable (intention to protect the environment). The authors planned to use the questionnaire to collect a large amount of data to analyse the correlation between the independent and dependent variables.

## 4.2 Research Strategy

### 4.2.1 Deductive

The deductive approach is where the researchers set one or more hypotheses based on the theories of a field and their understanding of it. Hypotheses in research need to be translatable into researchable entities, which indicates that researchers can translate hypotheses into operational terms and related data about the hypotheses can be collected. The deductive process needs to follow the

process of theory, hypothesis, data collection, findings, hypotheses confirmed or rejected and revision of the theory (Bell, Harley and Bryman, 2019).

The authors of this paper follow the process of the deductive method, and after clarifying the research purpose and research object, they seek relevant theories as support. Secondly, make assumptions based on the purpose of this article. The relevant theories considered are PSA, emotion and intention theory. In order to link with the purpose, theory of this article and data, the authors set two relevant hypotheses. Afterward, the authors selected suitable objects for data collection and analysis.

## 4.2.2 Quantitative Method

Quantitative research is a research strategy that can be broadly defined as the measurement or calculation of relationships between social phenomena, researchers gather data to demonstrate the relationship between theory, research and reflect the deductive approach (Bell, Harley and Bryman, 2019). Quantitative research is carried out through statistical and operational analysis of numerical data. Researchers must use percentages or statistical coefficients to explain the correlation between numerical data and hypotheses (Bernard, 2013; Neuman, 2014).

Quantitative research consists of many steps (Figure 2) (Bell, Harley, and Bryman, 2019), and there are several aspects that researchers need to consider in the process of conducting quantitative research (Bryman, 2017). First of all, researchers need to determine the subject and the variables to be measured. Usually, researchers need to identify the social phenomenon that needs to be

observed and the data that need to be collected. Second, researchers need to consider causal relationships among variables. Third, the results of quantitative research need to reflect the phenomenon of most individuals, thus, the rationality and scope of the sample need to be carefully considered. Last but not least, researchers should ensure that the research is repeatable, because this helps to avoid bias from researchers and ensure that the research is objective (Bryman, 2017). In quantitative research, a large number of respondents is required because the research results must represent of the majority of the population. Data collection methods for quantitative research include questionnaires, experiments, controlled observations, etc. (Bell, Harley and Bryman, 2019). Before deciding on the questionnaire's content, the authors need to define the study's objectives and clarify the information that needs to be collected to ensure the relevance of the data (Bell, Harley and Bryman, 2019).

Figure 2 The process of quantitative research

*Resource from Bell, Harley, and Bryman (2019)*

Everything has two aspects, therefore, quantitative research is also controversial (Bell, Harley and Bryman, 2019). First of all, quantitative research may ignore the differences between the social world and the natural world, and it roughly interprets individuals' interpretation of the world; secondly, human factors may affect the accuracy of the experiment; third, quantitative research overly relies on using tools and certain situations which may affect respondents answers; fourth,

quantitative research may ignore the meaning of individuals (Bell, Harley and Bryman, 2019).

When the authors of this thesis conduct quantitative research, the authors primarily clarify the subject, theory and variables of the research, and make reasonable assumptions about the relationship between the variables. Afterward, the authors considered how to measure the variables. After integrating theory and variables, the authors designed a questionnaire to collect useful data for the study. When setting the above contents, the authors need to consider the questions in the questionnaire and the rationality of the research objectives to ensure that the data can represent most individuals' situations. The most important thing is that the authors should not have any personal bias in the research process to ensure the objectivity of the research results.

## 4.3 Research Method

### 4.3.1 Questionnaire

Questionnaires are structured, consisting of many questions. It is a relatively cheap, fast and efficient way of collecting large amounts of data (Bell, Harley and Bryman, 2019). All questions in a questionnaire should reflect the purpose of the research. If there are too many questions, individuals have less likely to complete the survey. In addition, the questions should be short and clear, researchers should remove unnecessary questions when designing the questionnaire. The order of the questions in the questionnaire should be set carefully, the logical order of the questions follows from the least sensitive to the most sensitive, from facts to perceptions, and from general to specific. If specific terms need to be mentioned

in the questionnaire, it is necessary to use the most easily -understandable words to make it easy for respondents to read. Before the actual questionnaires are sent out, researchers can conduct small-scale tests to examine the validity of the questions (Bell, Harley, and Bryman, 2019).

## 4.3.1.1 Self-completion questionnaires

Self-completed questionnaires are one of the approaches to collecting data for social surveys. It can be conducted in the form of mail, postal, email or online (Bell, Harley and Bryman, 2019). There are many benefits to using it. First, the self-completed questionnaire requires no meeting or travel costs. Therefore, the cost could be relatively lower. Second, this form of the questionnaire can be easily sent to a large number of individuals at the same time, which is convenient for researchers to collect a large amount of data. Third, it can reduce the influence of researchers. Fourth, self-completion questionnaires use the same questions for all respondents when respondents answer questions. Finally, respondents can complete the questionnaire anytime and anywhere. However, a self-completion questionnaire cannot be perfect, it has drawbacks. When respondents completed the questionnaires by themselves, there were researchers to help them with questions if they did not understand something. In addition, the researchers could not ask additional questions to the respondents or could not include unimportant questions in the questionnaire. Another disadvantage is that researchers do not know who responded to the questionnaire, and sometimes it is not possible to collect more personal information in this form of the questionnaire. Another problem faced by self-completed questionnaires is the low participation rate (Bell, Harley and Bryman, 2019).

Self-completion questionnaires can be conducted online and this cost less and researchers can get faster responses. Thus, it is a very effective way (Bell, Harley and Bryman, 2019). Another benefit of it is that researchers can use rich forms in

the questionnaire to make the questionnaire look attractive. In addition, self-completed questionnaires online have higher levels of participation and completeness, according to the survey. In addition, online questionnaires do not require researchers to enter data again, thus avoiding data errors or more time costs (Bell, Harley, and Bryman, 2019).

Bell, Harley, and Bryman (2019) showed that when researchers design self-completion questionnaires, they should keep the font size easily reading. The answer options for each question can be arranged in a vertical form, and the researchers can code the options. This is helpful when enting data into the software. The form of marking the answers should be clearly stated. The meanings of the scale also need to be clarified.

When setting questions, two questions should not be asked in one question; double-berried questions or very general questions should be avoided; each question should not be designed too long; leading questions should be avoided as well when asking questions. The types of questions are closed questions and open questions. But closed questions are easy to answer, and the probability of individuals participating can be higher. Conversely, open questions require spending more time. Thus, these types of questions have lower participation. Therefore, researchers should reduce the number of open-ended questions when designing questions (Bell, Harley, and Bryman, 2019).

If the research objects involve individuals who speak different languages, a common approach is that researchers translate the questionnaire into the relevant languages and distribute it to the corresponding respondents (Bell, Harley and Bryman, 2019). However, this approach is not perfect, and it is controversial. Some scholars express that when the words are translated into another language,

the original meaning will not be guaranteed, this leads to differences in the results of the questionnaire (Bell, Harley and Bryman, 2019). Griffee (2001) explained that when researchers translate the questionnaire into another language, they cannot just simply translate, but needs to combine the context to express the original meaning clearly. Researchers should carefully detect the meaning of translated texts and use them carefully during their process (Griffee, 2001).

For this thesis, an online self-completed questionnaire was considered since it is a quick and low-cost approach. In addition, it was conducted in the form of an online questionnaire because the Internet can provide better dissemination, and the questionnaire can be answered by individuals from different places. Thus, the authors can collect data from individuals who have different cultures and backgrounds and make the results of the research standard for most individuals' thoughts. Another reason is that online questionnaire can save authors costs and time. When designing the questions, the authors of this paper need to consider the relevance of the questions, avoiding unnecessary questions as well. Also, authors should avoid double-barreled or leading questions. Questions are all shown in the form of closed questions to increase participation. In addition, the meaning of the answer options should clearly appear in the questionnaire instructions. On a scale from 1 to 5, 5 represents the strong degree and 1 represents the strong degree. If a professional term is used, the authors use the most easy-to-understand language to explain to help participants have a better understanding. Since the sample of the research includes participants who speak different mother languages, there are two versions of the questionnaire, one is in English and another one is in  Mandarin. The English version is designed for individuals from all over the world. Due to the authors of this paper are native speakers of Mandarin and they know English. Thus, the secondary version is in Mandarin, can it can be translated from English with accuracy. During the translation process from English to Mandarin, the authors carefully checked the meaning of words and make them consistent.

## 4.3.1.2 Design the questionnaire

### 4.3.1.2.1 PSA pictures for the questionnaire

For the positive PSA picture, there were two choices. Picture 1 includes some famous characters from a cartoon, one person is holding the earth and the earth is surrounded by water droplets and it has a blue background. Picture 2 includes a green background with many plants. And there are two hands holding a plant. According to Kaya and EPPS (2004), green color makes individuals feel happy, relax and it associate with nature, trees and the outdoor environment. The Blue color is controversial, it can be associated with peace, comfort and hope or ocean and water; however, it can also make individuals feel depressed and sad. Therefore, the authors believe that Picture 2 is more suitable for this questionnaire because it is more relevant to the natural environment and sustainability.

There are two pictures as the alternative choices for the negative PSA picture used in the questionnaire. However, only one picture was chosen eventually. One picture (Picture 3) shows a man, but he looks mutated. He looks sad and desperate. Another picture (Picture 4) shows a penguin on a red background. Some white parts of its body look melted, and the red color makes it look like it is bleeding.  According to Zubair, et al (2020), the emotional expressions from the message framing can more easily make readers have emotional responses. From the color aspect, the black color could make individuals associate it with death and mourning, while the red color makes individuals connect to evil, fighting or blood when considering the negative side of red color (Kaya and EPPS, 2004). Based on the above evidence, Picture 3 expresses a sad emotion, thus, this picture can more directly arouse an individual's emotion. Besides, the black color can make individuals think of death which can lead to the image the lives. Thus, Picture 3 was chosen.

4.3.1.2.2 Questionnaire

*See Appendix A2 and A3*

## 4.3.1.3 Pilot and Pretest Questions

The researchers can conduct a pilot study before sending out the questionnaire and collecting the data (Bell, Harley, and Bryman, 2019). To conduct this, a small number of individuals are invited to answer the questions. The pilot is aimed to test if the questions are relevant and help to make the researchers get exact what they need. It could help the researchers check the validity of the questions and the suitability of the statement. Therefore, the researchers can check if the questions are effective before sending out the real questionnaire, which avoids wasting time for the researchers. However, the participants and answers from the pilot test cannot be added to the real samples and results (Bell, Harley, and Bryman, 2019).

Before the questionnaire was sent out on a large scale, the authors conducted a small-scale test. There were around 16 individuals who submitted the questionnaire, but only 14 of them completed the whole questionnaire. Most of the 14 participants agreed with the intention to act to protect the environment and the two pictures which are chosen by the authors can arouse the six kinds of emotions. Therefore, happiness, pleasure and awe can be used to measure the positive emotional responses; fear, guilt and sadness can be the negative emotional responses measurement. There are three measurements of intentions: plan, likely, and will can be used to measure intention effectively. However, two participants did not finish the questionnaire but still submitted it. This noticed the authors that all the questions need to be set as mandatory questions. The two versions of the questionnaire were sent out during the pretest process, the answers and results of them are similar, thus, the translation did not affect the accuracy.

## 4.4 Sampling

Population refers to the range of units for selecting a sample. This range can be a country, a city, or even a company (Bell, Harley, and Bryman, 2019). Sample refers to the population selected for the survey. The sample probability refers to a randomly selected sample so that each unit in the population can have a fair chance of being selected. The advantage of this type is that it can reduce the sampling error. A non-probability sample implies a sample that has not been drawn at random so that some units are more likely to be selected than others (Bell, Harley, and Bryman, 2019).

Convenience sampling is a major type of non-probability sampling (Bell, Harley, and Bryman, 2019). A convenience sample is one that is simply selected because the researcher has greater accessibility to a certain population. It is widely used in the fields of business and management research. Convenience sampling is acceptable when the researchers' access to the eligible population is limited by geography. Convenience sampling may be able to link to the findings in a certain area. But there are disadvantages when using convenience sampling because it may affect the validity and generalizability of the research results (Bell, Harley and Bryman, 2019).

For the study of this article, protecting the environment is something that everyone in society needs to do, thus, the population can be all human beings. Although the scope of the research object in this paper is very large, the number of individuals that the authors can find is very limited. Thus, the authors can only choose the non-sample probability, which indicates that individuals around the authors have a greater probability of being selected to participate in the questionnaire. Due to time, cost and geographical factors, the authors of this paper

chose the convenience sample. Students at the authors' university, as well as the authors' family and friends have a greater probability of being selected as research objects.

## 4.4.1 Sampling size

Due to time and cost limitations, the number of samples needed to ensure validity. The larger the sample size, the higher the precision (Bell, Harley, and Bryman, 2019). When the sample size reaches 1000, the change in precision is very obvious compared to the sample size of only 100 or 200. However, when the sample size exceeds 1000, the change in precision is not obvious. In addition to time and cost factors, researchers also need to consider that questionnaires may not be answered by everyone who received them. Therefore, it is beneficial if researchers can find as many samples as possible (Bell, Harley, and Bryman, 2019).

To calculate how many individuals the authors need to select, there is a sample size formula (Figure 3). It can be applied when the researchers need to have a large number of respondents (Israel, 1992). Before using the formula, the researchers need to decide the population size, margin of error, confidence level and standard deviation. The population size is how many individuals meet the requirements of the study. The margin of error can be seen as how much error the researchers allow to happen. This number can be set as 5% usually. Another number includes in the formula is the confidence level which refers to the confidence of the mean falls in the margin of error. The confidence intervals can be 90% confident, 95% or 99% confident. The Z score is decided by the confidence level, the Z score is 1.96 if the confidence level is 95%. Last but not least, the standard error is about the dispersion between individuals and the mean. The standard deviation can be considered as 0.5 usually (Israel, 1992).

$$\text{Necessary Sample Size} = \frac{(\text{Z-score})^2 \times \text{StdDev} \times (1-\text{StdDev})}{(\text{margin of error})^2}$$

Figure 3 Sample Size Formula

*Resource from Qualtrics*

The authors of this thesis believe that everyone in the world has the obligation to protect the environment, therefore, the population size can reach 8 billion. If it is assumed that the confidence level is 95% and the error range is 5%, the Z score is 1.96, the standard deviation is 0.5, then through the calculation above, the necessary sample size is 385. In addition, considering that there are still some individuals who received the questionnaire but may not answer it, the authors need to plan to choose 450 to 500 individuals to participate.

## 4.5 Operationalization

| Concept | Component | Items | Reference | Questions |
| --- | --- | --- | --- | --- |

| Emotional responses on the message framing in PSA | Positive emotional responses on positive message framing (X1) | Happiness | Fabbro et al. (2021) | This picture makes me feel happy. |
|---|---|---|---|---|
| | | Pleasure | Fabbro et al. (2021); Jacobson et al. (2018) | This picture makes me feel pleasure. |
| | | Awe | Yang et al. (2018) | This picture makes me feel awed. |
| | Negative emotional responses on negative message framing (X2) | Fear | Campos et al, (2021); Oetting, J., (2018) | This picture makes me feel fear. |
| | | Guilt | Stadlthanner et al, (2022); Turner et al, (2018) | This picture makes me feel guilt. |
| | | Sadness | Liu and Yang, (2020); Yan, Dillard,and Shen, (2010) | This picture makes me feel sad. |
| Intention (Y) | Behavioral intention | Plan | Fishbin and Ajzen (2010); Sheeran (2011) | I plan to act in a way to protect the environment |

| | Behavioral expectation | Likely | Davis and Warshaw (1992); Fishbin and Ajzen (2010) | I am likely to act in a way to protect the environment |
|---|---|---|---|---|
| | Willingness | Will | Fishbin and Ajzen (2010); Gibbons(2020) | I will act in a way to protect the environment. |

*Table 1 Operationalization table, own*

# 4.6 Data Analysis

Data analysis requires consideration of data analysis techniques and sample size in the earlier stage of the research (Bell, Harley, and Bryman, 2019). In addition, researchers need to understand the types and measurements of variables. There is a common mistake in that the researchers start thinking about how to analyze data after they have been collected. However, these need to be considered early. SPSS, a computer software widely used in quantitative research, is used to perform statistical analysis (Bell, Harley, and Bryman, 2019).

## 4.6.1 Coding

In the process of content analysis, coding is a crucial step, which usually needs to include two elements: designing a coding schedule and designing a coding manual

(Bell, Harley and Bryman, 2019). A coding schedule is a form that includes all relevant data of the items, and all data should be coded. It can use Roman numerals to group related coded items into categories by various dimensions. By doing this, these projects can quickly import to SPSS. The coding manual is the detail and description of the codes. For example, some words may contain specific definitions or rules. It provides a detailed listing for each category and dimension that needs to be coded (Bell, Harley, and Bryman, 2019).

| No. | Information about the respondent | Code | No. | Measurement of Intentions to protect the environment | Code | No. | Measurement of Emotional responses | Code | No. | Measurement of Emotional responses | Code |
|---|---|---|---|---|---|---|---|---|---|---|---|
| I | Gender | | IV | Plan to act to protect the environment | | VII | happy | | X | Fear | |

| II | Age | | V | Likely to act to protect the environment | | VIII | Pleasure | | XI | Guilt | |
|----|-----|---|----|---|---|------|----------|---|-----|---|---|
| III | Primary employment | | VI | Will act to protect the environment | | IX | Awed | | XII | Sad | |

*Table 2 Coding schedule, own*

| Information about the respondent | Measurement of Intentions to protect the environment (INT) | Measurement of Positive Emotional Response (POS) | Measurement of Negative Emotional Response (NEG) |
|---|---|---|---|
| | | | |

| Ⅰ. **Gender of the respondent** | Ⅳ. **Plan to act to protect the environment (INT_1)** | Ⅶ. **Feel happy (POS_1)** | Ⅹ. **Feel fear (NEG_1)** |
|---|---|---|---|
| Male (1); Female (2); Others (3); I wouldn't like to say (4) | Strongly disagree (1); Disagree (2); Neutral (3); Agree (4); Strongly agree (5) | Strongly disagree (1); Disagree (2); Neutral (3); Agree (4); Strongly agree (5) | Strongly disagree (1); Disagree (2); Neutral (3); Agree (4); Strongly agree (5) |
| Ⅱ. **Age of the respondent** | Ⅴ. **Likely to act to protect the environment (INT_2)** | Ⅷ. **Feel pleasure (POS_2)** | Ⅺ. **Feel guilt (NEG_2)** |
| Under 18 years old (1); 18-30 years old (2); 31-45 years old (3); Over 45 years old (4) | Strongly disagree (1); Disagree (2); Neutral (3); Agree (4); Strongly agree (5) | Strongly disagree (1); Disagree (2); Neutral (3); Agree (4); Strongly agree (5) | Strongly disagree (1); Disagree (2); Neutral (3); Agree (4); Strongly agree (5) |

| Ⅲ. **Primary employment status of the respondent** | Ⅵ. **Will act to protect the environment (INT_3)** | Ⅸ. **Feel awed (POS_3)** | Ⅻ. **Feel sad (NEG_3)** |
|---|---|---|---|
| Student (1); Full-time employed (2); Part-time employed (3); Self-employed (4); Others (5) | Strongly disagree (1); Disagree (2); Neutral (3); Agree (4); Strongly agree (5) | Strongly disagree (1); Disagree (2); Neutral (3); Agree (4); Strongly agree (5) | Strongly disagree (1); Disagree (2); Neutral (3); Agree (4); Strongly agree (5) |

*Table 3 Coding manual, own*

## 4.6.2 Descriptive statistics

Descriptive statistics is one of the statistical methods which consists of describing, organizing and summarizing data (Frey, 2018). This type of statistics can be represented using graphs, numerical indices, and tables. Descriptive statistics can easily present the data and provide researchers with the most basic information about the data to facilitate observation. The most common number in this method are the mean, median and mode. The mean is the sum of all values divided by the number of observations. A median is a number in the middle of a data set. The mode is the number that appears most frequently in the data. In addition, the maximum and minimum values in the sample can influence the mean's discrete value. The standard deviation measures the dispersion around the mean (Frey, 2018).

In addition to numerical representations, statistical descriptions can reflect data distributions (Frey, 2018). Skewness can reflect whether the data is evenly and symmetrically distributed. The skewness is between the range of negative infinity and positive infinity, but when the skewness is 0, it is regarded as a symmetrical normal distribution (Frey, 2018 ; Ho and Yu, 2014). A positively skewed distribution has a long right tail, while a negatively skewed distribution has a long left tail (Frey, 2018). Symmetry deviations are considered when the skewness value exceeds twice the standard error (Pett, 2015). Skewness standard error is the ratio of skewness to its standard error, which is used to test for normality. When the skewness standard error is between $\pm$ 1.96, it can be accepted as having normality (Pett, 2015).

The kurtosis reflects the shape of the peak of the distribution (Frey, 2018). 0 kurtoses can be seen as the mesokurtic that is neither flat nor sharp and can also be regarded as a normal distribution; negative kurtosis is considered to be a relatively flat kurtosis distribution, which has fewer outliers than the normal distribution; positive kurtosis is a distribution with a sharper shape which has more extreme outliers than the normal distribution (Frey, 2018). The standard error of kurtosis is the ratio of kurtosis to standard error, and it is also a way to test for normality (Pett, 2015). When the standard error of kurtosis is between $\pm$ 1.96, it is also considered normal distribution (Pett, 2015).

### 4.6.3 Cronbach's Alpha

Cronbach's alpha test helps researchers assess internal reliability (Bell, Harley and Bryman, 2019). It is conducted by calculating the average of all possible split-half reliability coefficients. When the alpha value in the result is 1, it represents extreme internal reliability; alpha values greater than 0.7 are considered effective

internal reliability (Bell, Harley and Bryman, 2019). George and Mallery (2003) state that the internal reliability is unacceptable if an alpha is less than 0.59. Taber (2018) believes that when alpha is above 0.70, it can be used to explain internal consistency and reliability. However, this simple statistical description is not enough, and researchers need to make further considerations (Taber, 2018).

## 4.6.4 Correlation Analysis

Correlation studies the strength of the correlation or degree of association between two variables (Patrick, et al., 2018). Correlation is useful for assessing the direction and strength of a linear relationship between many constant variables (Gogtay and Thatte, 2017). This analysis method is usually not used alone, it follows by regression analysis (Gogtay and Thatte, 2017). The correlation coefficient should remain between -1 and 1 (Patrick, et al, 2018). The type of correlation may be positive or negative (Gogtay and Thatte, 2017). From 0 to 1 can be interpreted as a positive correlation and from weak to strong negative. While the negative number correlation can be seen as a negative correlation (Gogtay and Thatte, 2017). 0 is no correlation and no internal consistency; 1 is perfect correlation and strong internal consistency (Bell, Harley and Bryman, 2019).

## 4.6.5 Multiple Linear Regression Analysis

Multiple linear regression is suitable for explaining the relationship between one dependent variable and two or more independent variables (Moore, McCabe and Craig, 2017). Among them, the type of independent variable can be relational or categorical. Multiple linear regression analysis can be used to determine the strength of the influence of the independent and dependent variables, how much

the dependent variable could change as the independent variable changes, and to analyze future trends and values (Moore, McCabe and Craig, 2017).

R squared is known as the coefficient of determination, and it is a method used to test the strength of regression relationships used to represent the proportion of variation in a variable explained by other variables in the study (Kasuya, 2018). The range of the coefficient of determination is between 0 and 1. The larger the R-squared value, the more changes the model explains (Kasuya, 2018). Adjusted R squared is a better estimate of R squared, reducing the bias of R squared (Darlington & Hayes, 2017). The value of Adjusted R squared is different from R squared. It can be less than 0, but it can be rounded to 0 (Darlington & Hayes, 2017).

In linear regression analysis, the standardized Beta coefficient can be used to measure the degree of influence of the independent variable on the dependent variable (Pallant, 2020). If the Beta value is positive, it indicates a positive influence; conversely, if the Beta value is negative, it indicates a negative influence; 0 refers to no relationship (Pallant, 2020).

The standard error of the estimate is the square root of the mean square error (Darlington & Hayes, 2017). It is considered an estimate of the standard deviation of the estimation error. It remains the same if the number of samples changes (Darlington & Hayes, 2017).

When using SPSS to test the original hypothesis, the accompanying P value, corresponding to the significance level, can be found next to the t value. Typically, it shows as "Sig." (Darlington and Hayes, 2017). The result might be considered

significant when the significance level (often 5%) is unmet (Darlington and Hayes, 2017).

The F-value is the F test to observe the joint significance of all predicted variables (Sureiman & Mangera, 2020). There is a likely scenario where the variables are not significant when tested individually but are significant when all predicted variables are tested together (Sureiman & Mangera, 2020).

The variance inflation factor (VIF) quantifies the degree of variance inflation, which can be used to test for multicollinearity (Darlington and Hayes, 2017). The regression variance inflation factor is another way to understand the standard error in related statistics. Suppose the VIF value of a variable is too large. In that case, because the correlation of one or more variables in the study is too high, the standard error can be large, and the hypothesis test cannot be very effective. Therefore, the analysis is unreliable if VIF exceeds than 10 (Darlington and Hayes, 2017).

A P-P plot (probability-probability plot) is a tool for assessing whether the distribution of a given variable follows an expected distribution, such as normal distribution (Pallant, 2020). In the P-P plot, the x-axis represents the observed cumulative probability of the distribution, and the y-axis represents the expected cumulative probability. If the observed data distribution matches the normal distribution, then the P-P plot will form a diagonal line. Therefore, the closer the P-P plot is to a straight line, the closer the observed data distribution resembles the normal distribution (Pallant, 2020).

## 4.7 Quality Criteria

Research needs to meet three criteria: reliability, replicability and validity (Bell, Harley and Bryman, 2019). Reliability refers to the fact that the results of the research need to be repeatable, and it also requires the metrics to be stable to repeat. In this case, the results of the research can be simulated again. The second one, replicability, requires the researchers to have a very clear and detailed description of the study so that others can repeat the study. The third criterion, validity, requires the research to be complete and effective. Measuring validity in quantitative research can be done through observational research that reflects what needs to be measured. In addition, the internal validity of the research is also a way to test the validity. Cronbach's alpha can be used to test this. It needs to consider whether the causal relationship is established. External validity considers whether the reserchers' background could allow researchers to conduct the study. The last way of testing validity is ecological validity. The criterion is whether the research is used for daily and natural social and environmental problems (Bell, Harley and Bryman, 2019).

For this study, the authors need to make the research results and research indicators repeatable during the research process. In the paper, the authors need to have a detailed and clear description of the research process and structure to meet the replicability. As for validity, the authors are all undergraduate students from universities with some academic background and research skills. When conducting research, the authors need to ensure that the causal relationship of the research is established and theory, data and purpose are relevant and could fit the social problems of daily life. Thus, the authors used Cronbach's alpha to test the reliability offor the variables. All the alpha results are larger than 0.70, which can be interpreted as acceptable internal reliability and all three variablesvariables can be used.

## 4.8 Ethical Issues

Ethics in research involves procedures, human rights and dignity. Therefore, during the research process, researchers need to pay attention to some ethical issues that should be ignored. Researchers need to ensure that participants are voluntary and safe (Bell, Harley and Bryman, 2019). Participants have the right to be informed about what information needs to be collected, including the benefits, risks and approvals involved in the study. Questions that participants answer about personal information can be anonymized by the researchers so that others cannot identify the participants' information. In addition, for the collected information, the researchers need to keep the participants' information confidential and cannot reveal information to others. If the research may involve psychological or physical harm to participants or social harm and legal risks, researchers need to minimize the impact of these issues. As respondents, they have the right to understand these potential risks (Bell, Harley and Bryman, 2019).

In addition to the possible impact on participants, researchers need to be honest and reliable in the research process and keep the experimental results transparent results (Bell, Harley and Bryman, 2019). First of all, researchers are not allowed to plagiarise the work from others; at the same time, they are not allowed to plagiarise their own previous work or reports. Otherwise, it can be regarded as self-plagiarism. In addition, researchers should not fabricate the data and results or manipulate the data and distort the results (Bell, Harley and Bryman, 2019).

In this study, the authors should guarantee the authenticity of the collected data and results and not plagiarise other individuals' articles. The authors cannot

fabricate the data. The process and results of research need to be open and transparent. In the questionnaire, the authors need to inform the participants of the purpose of the survey and potential risks. Some questions may involve participants' personal information, authors can use anonymity, and the collected participants' personal information needs to be kept confidential. It is also important to note that authors should not force individuals to participate in surveys.

# 4.9 Social Consideration

Climate change is real, and human-caused climate change largely exceeds natural rates of climate change (Babu, 2016). In recent years, the disasters caused by climate change have become more and more obvious. For example, the sea level rises due to climate warming, and individuals may lose their living space on the earth in the future if the situation does not change. Therefore, individuals must act now to protect the environment.

Quantitative research can generate new knowledge and increase understanding of the social world by collecting data and measuring data (Burrell and Gross, 2017). This paper investigated individuals' intention to protect the environment by investigating the emotional impact of PSA on individuals. This paper can better understanding of what emotions can increase individuals' intentions to protect the planet, providing useful reference information for governments and non-profit organizations. This can make their public service advertisements more effective and hope to encourage individuals to protect the environment to reduce the damage to nature.

To apply the above analysis method in this thesis, firstly, the coding process can help to identify when transferring data into SPSS. Secondly, the descriptive analysis clearly shows the respondents' information, this makes the authors easily learn the demographic information. Thirdly, Cronbach's alpha data can examine the internal consistency of the variables of the paper. Lastly, correlation analysis and multiple regression can help the authors test the relationship between independent variables and dependent variables.

# 5. Result

## 5.1 Descriptive Statistics

The study collected 590 responses from around the world, of which 590 were valid. As can be seen from Table 4, the majority of participants were female, 57.1%, while 32.4% were male. There were also participants who considered themselves to be other individuals (4.7%) and those who did not want to inform (5.8%). Furthermore, regarding the age distribution table in Table 5, it is shown that respondents younger than 18 years old represent 3.4% of the total, respondents between 18 and 30 years old represent 61.7% of the total; respondents between 31 and 45 years old represent 17.5%; and respondents over 45 years old represent 17.5%. Finally, in the distribution of primary employment status in Table 6, the results show that students and full-time employees account for a large share, 38% and 39%, respectively. The third largest group, others employment, accounts for 13.4%. In addition, part-time employed and self-employed are almost evenly distributed, with 5.6% and 4.1%, respectively.

| Gender | Frequency | Percentage |
|---|---|---|
| Male | 191 | 32.4% |
| Female | 337 | 57.1% |
| Others | 28 | 4.7% |
| I wouldn't like to say | 34 | 5.8% |
| Total | 590 | 100% |

*Table 4 Gender description for the sample frame, own*

| Age | Frequency | Percentage |
|---|---|---|
| Under 18 years old | 20 | 3.4% |
| 18-30 years old | 364 | 61.7% |
| 31-45 years old | 103 | 17.5% |
| Over 45 years old | 103 | 17.5% |
| Total | 590 | 100% |

*Table 5 Age description for the sample frame, own*

| Primary Employment | Frequency | Percentage |
|---|---|---|
| Student | 224 | 38.0% |
| Full-time Employed | 230 | 39.0% |
| Part-time Employed | 33 | 5.6% |
| Self-employed | 24 | 4.1% |
| Others | 79 | 13.4% |
| Total | 590 | 100% |

*Table 6 Primary Employment Status description for the sample frame, own*

## Descriptive Statistics

The researchers used descriptive statistics to analyze the respondents' responses, which included minimum, maximum, mean, skewness and kurtosis of the variables. According to the results in Table 7, all variables' minimum and maximum values were in the range of 1 and 5, and none of the questions had a mean value below 3. The lowest mean value in the table was NEG_2 (3.32), and the highest was INT_1 (4.27). Secondly, the minimum standard deviation value is 0.847, and the maximum is 1.216. Finally, regarding the kurtosis and skewness values according to the study of Ho and Yu (2015) in Methods, the skewness values should range between negative infinity to positive infinity, the skewness interval in Table 7 is between -1.306 and -0.254, which is acceptable. While the kurtosis interval in Table 7 is between -0.753 and 1.927, which is close to a flare peak. And the standard error of the skewness in the table is 0.101, and the standard error of the kurtosis is 0,201, both between ± 1.96, indicating the acceptance of the normal distribution (Pett, 2015).

| Items | Total Number | Minimum | Maximum | Mean | Standard Deviation | Skewness | Skewness Standard Error | Kurtosis | Kurtosis Standard Error |
|-------|------|---------|---------|------|-----------|----------|----------|----------|----------|
| INT_1 | 590 | 1 | 5 | 4.27 | 0.864 | -1.306 | 0.101 | 1.927 | 0.201 |
| INT_2 | 590 | 1 | 5 | 4.24 | 0.847 | -1.194 | 0.101 | 1.700 | 0.201 |
| INT_3 | 590 | 1 | 5 | 4.21 | 0.905 | -1.122 | 0.101 | 1.108 | 0.201 |
| POS_1 | 590 | 1 | 5 | 4.10 | 0.945 | -0.873 | 0.101 | 0.390 | 0.201 |
| POS_2 | 590 | 1 | 5 | 4.12 | 0.940 | -0.914 | 0.101 | 0.483 | 0.201 |
| POS_3 | 590 | 1 | 5 | 3.85 | 1.195 | -0.658 | 0.101 | -0.702 | 0.201 |
| NEG_1 | 590 | 1 | 5 | 3.87 | 1.098 | -0.818 | 0.101 | 0.044 | 0.201 |
| NEG_2 | 590 | 1 | 5 | 3.32 | 1.191 | -0.254 | 0.101 | -0.753 | 0.201 |
| NEG_3 | 590 | 1 | 5 | 3.62 | 1.216 | -0.592 | 0.101 | -0.559 | 0.201 |

Table 7 *Descriptive Statistics for the sample frame, own*

## 5.2 Cronbach's Alpha

Cronbach's alpha can help researchers measure the reliability of questions and variables (Bell et al., 2019). According to Taber's (2018) study, alpha values of 0.7 and above can adequately measure reliability and internal consistency. In Table 8, the alpha of INT is 0.882, the alpha of POS is 0.820, and the alpha value of NEG is 0.750. where NEG is the minimum value, and INT is the maximum value. It can be seen that all values are above 0.7, and INT is close to 0.9, which means that the data are correlated and highly reliable.

| Variables | Cronbach's Alpha | Number of items |
|-----------|------------------|-----------------|
| INT | 0.882 | 3 |
| POS | 0.820 | 3 |
| NEG | 0.750 | 3 |

*Table 8 Cronbach's Alpha frame, own*

However, when interpreting Cronbach's Alpha results based on the variables individually (see Appendix B), some variables, such as POS and NEG require further interpretation. When the researchers looked at Cronbach's Alpha for each question separately, among the POS variables, the Alpha values for POS_1 and POS_2 were 0.683 and 0.694, respectively. The results were both close to 0.7 and could be shown to be reliable. However, among the NEG variables, NEG_2 and NEG_3 have Alpha values below 0.7, at 0.617 and 0.598, respectively. But this result indicates that the validity of NEG_2 and NEG_3 is very low (very poor between 0.5 and 0.6). Therefore, these problems will not respond to the theory. But when finally tested with NEG_1, a total Alpha value of 0.750 proved to be still valid.

## 5.3 Correlations analysis

Researchers use Pearson's coefficient in correlation row studies to measure the correlation between independent variables. According to Patrick et al. (2018), Pearson coefficient values between -1 and 1 are correlated, and a correlation coefficient greater than 0.9 indicates a strong correlation, while 0.4 represents a "moderate" correlation. Therefore, according to Table 9, the two independent variables are highly significant, and the correlation coefficient value of 0.416 is moderately correlated. In addition, the table shows that all values are positive, indicating a positive correlation between the two variables, and the sign "**" indicates that the Pearson correlation coefficient is highly significant at 0.01 significance (two-sided test). Thus, when one variable increases, the other also causes an increase.

In addition, there is a positive correlation between POS and INT with a correlation of 0.605, while there is also a positive correlation between NEG and INT with a correlation of 0.271. In addition, it is these two variables (POS and NEG) are significant on INT (for a two-tailed test, $p < .001$).

| | | INT | POS | NEG |
|---|---|---|---|---|
| INT | Person Correlation | 1 | 0.605** | 0.271** |
| | Sig. (2-tailed) | | <0.001 | <0.001 |
| | N | 590 | 590 | 590 |
| POS | Person Correlation | 0.605** | 1 | 0.416** |
| | Sig. (2-tailed) | <0.001 | | <0.001 |
| | N | 590 | 590 | 590 |
| NEG | Person Correlation | 0.271** | 0.416** | 1 |
| | Sig. (2-tailed) | <0.001 | <0.001 | |
| | N | 590 | 590 | 590 |

*\*\*Correlation is significant at the 0.01 level (2-tailed)*

*Table 9 Correlation Analysis table, own*

## 5.4 Hypothesis testing

The multiple linear regression table allows testing of the hypotheses of this study and reflects the results of the study. Therefore, the researchers summarized the data for the dependent variable (INT) and two variables (POS and NEG) in the table below to enable the reader to understand the correlation between the independent and dependent variables and whether the hypothesis is accepted.

First, Table 10 does not set control variables; the Exp. Sign column represents the researcher's prediction of the outcome before conducting the hypothesis test. Where "+" means a correlation between the predicted independent variable and the response variable (dependent variable), and vice versa, there is no correlation. Second, the relationship between the independent and dependent variables is shown in Model 1 and Model 2, where the information indicates the B-value and standard error, and the attached "*" represents the significance level. And the significant values in models 1 through 3 are recorded separately: R-squared, adjusted R-squared, estimated standard errors, F-values, and Variance Inflation Factor (VIF). The R-squared in model 3 is 0.366 adjusted to 0.364, all falling within the range of the coefficient of determination between 0 and 1 (Kasuya, 2018). In addition, F-value is a test that observes the common signs of all predictor variables (Sureiman & Mangera, 2020). As seen in Table 10, each F-value is highly significant, especially the F-value for model 1 is 339.324. Additionally, the variance inflation factor (VIF) can be used to test for multicollinearity and the analysis is unreliable for a VIF greater than 10 (Darlington & Hayes, 2017). Therefore a VIF of 1.210 in the table indicates a moderate correlation between the variables. Furthermore, the distribution of specific variables was also assessed using P-P plots, as can be seen from the P-P plots in AppendixC where the data are close to a straight line with some additional data in between but overall close to a normal distribution of normality (Pallant, 2020).

Finally, the data in this table reflect that the hypotheses of positive emotional response (POS) and intention (INT) are accepted. That is, they indicate that the significance level in model 3 is all p<0.01, which implies a strong significance. However, the hypotheses regarding negative emotional response (NEG) and intention were rejected and there was no significance in model 3, indicating the rejection of the original hypothesis.

| | Exp. sign | Model 1 | Model 2 | Model 3 (All Model) | Hypothesis Result |
|---|---|---|---|---|---|
| **Intercept** | | 2.085*** (0.120) | 3.439*** (0.122) | 2.051*** (0.131) | |
| **POS (H1)** | + | 0.605*** (0.029) | | 0.595*** (0.032) | Accept |
| **NEG(H2)** | + | | 0.271*** (0.033) | 0.023 (0.30) | Reject |
| **R²** | | 0.366 | 0.073 | 0.366 | |
| **Adjusted R²** | | 0.365 | 0.072 | 0.364 | |
| **Standard Error of the Estimates** | | 0.62571 | 0.75635 | 0.62602 | |
| **F- value** | | 339.324*** | 46.639*** | 169.701*** | |
| **VIF** | | | | 1.210 | |
| *p <0.05; **p<0.01; ***p<0.001, N=590 | | | | | |
| S.E. (standard error) is presented within parentheses of the independent variables, following below the Beta value | | | | | |

*Table 10 Multiple Regression Analysis Table, own*

# 6. Discussion

## 6.1 Discussion on Positive Emotion Responses (H1)

According to the previous hypothesis mentioned in Hypothesis 1, positive emotions influence behavioral intentions (Poškus et al., 2019). Based on the study's findings, positive emotional response (POS) has an impact on environmental protection intention (INT), as shown in the Results chapter. It is clear from the multiple linear regression table's adjusted R square (Table 10) that positive emotional response as an independent variable explains about 36.5% of the intention to protect the environment. And the beta ($\beta$) shows the strongest value of 0.605 when assessing the variable of positive emotional response compared to other variables. While in Model 3, the beta value of 0.595 when $p<0.001$ indicates that positive emotional responses have a strong significance on the dependent variable. It indicates that positive emotional response contributes significantly to studying the impact of intention to protect the environment.

According to Table 7, the mean values of the answers for each ITEM regarding positive emotional responses are relatively high. This means that PSA images with positive messages evoke emotions of personal happiness (POS_1) and pleasure (POS_2) very well, with mean values of 4.10 and 4.12 for their answers, respectively. However, the mean value for evoking awe (POS_3) is lower among the three items, at 3.85, but also higher than 3. This means that most individuals can feel awe, but the degree of agreement with this statement is not strong. This also validates Yan, Keh, and Murray's (2023) study that awe only increases behavioral intention when self-transcendent values are prioritized. Since the researchers in this study did not give self-transcendent values top priority when choosing their images, inspiring awe by itself might not have a major impact on behavioral intention. Overall, nonetheless, the researchers predicted positive results, which is in line with the discoveries made by Hartmann, Apaolaza & Alija (2013) and Ballew and Omoto (2018). Thus, this study accepts the following hypothesis (H1): Positive emotional responses to positive message framing in

public service announcements (PSAs) have a positive effect on consumers' intentions to protect the environment.

## 6.2 Discussion on Negative Emotion Responses (H2)

In this study, the researchers set the predicted outcome of negative emotional reactions and intention to protect the environment as positive. From Table 10, Model 3 does not show "*", indicating that there is no significance. Therefore, the hypothesis was rejected. However, the beta ($\beta$) for a negative emotional response when assessed alone compared to the other variables was also only 0.271 and showed "***" indicating a p-value < 0.001, which indicates statistical significance when used alone as a predictor variable. However, when both variables were assessed simultaneously, the Beta value for a negative emotional response in the multiple linear regression table (Table 10) was only 0.023. Moreover, the Alpha coefficient for negative emotional response (NEG) in the correlation analysis (Table 9) measuring reliability was only 0.271, which not only proves that there is no strong reliability but also indicates that negative emotional responses contribute little to the overall study.

There is a wide distribution of responses, as can be observed from the descriptive statistics mean and standard deviation data (Table 7). In Table 7, responses to the personal feelings of guilt (NEG_2 mean of 3.32) and sadness (NEG_2 mean of 3.62) are not very satisfactory because guilt, although it predicts positive behavioral intentions, does not drive intentions towards actual behavior (Rees, Klug & Bamberg, 2015) and only guilt in guilt can affect behavioral intentions and actual behavior (Rees, Klug & Bamberg,2015). Additionally, sadness is necessary to arouse powerful feelings and foster empathy in order to raise the possibility that individuals would take action (Bagozzi & Moore, 1994). Therefore, the guilt and sadness that individuals feel from the pictures do not

stimulate high levels of guilty and empathy, resulting in low intention to protect the environment (Rees, Klug & Bamberg, 2015; Bagozzi & Moore, 1994). However, in Table 7 for fear (NEG_1) the mean was higher at 3.87. This is in line with the study of Van Zomeren, Spears, and Leach (2010), where individuals represent the negative consequences of environmental crises in the form of human-animal bonding by regulating their fearful emotions, which can increase personal intentions to protect the environment. Although this study did not discover a connection between negative emotional responses and intentions to conserve the environment, it does not imply that this is the case. This is because if other theory components—guilt, empathy, etc.—are taken into account, the findings can alter. Overall, the study's hypothesis was disproved, indicating that the desire to protect the environment is not positively impacted by negative emotional responses.

**Results of the influence of emotional responses on the intention to protect the environment**
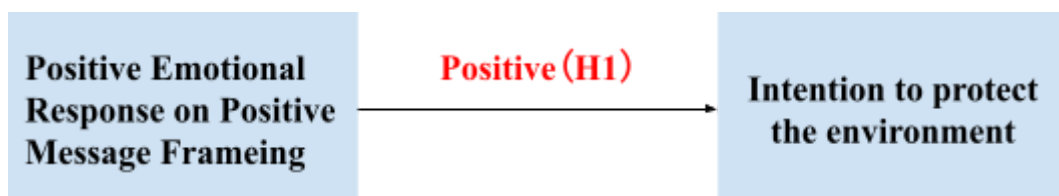


*Model 2, Research Results. own*

# 7. Conclusion

This study aimed to explain the relationship between positive and negative emotional reactions and intention to protect the environment and involved both positive and negative messages expressed in PSAs. The results showed that PSA images displaying positive messages in which individuals reacted to their positive emotional responses had an impact on the intention to protect the environment.

From the positive emotional responses, the researchers found that the use of natural environments in PSA images elicited strong positive emotions in respondents and could trigger higher levels of pleasure and happiness. Triggering awe-inspiring emotions, however, requires prioritizing self-transcendent values, which is part of the paper that was not studied. Thus, leading to lower levels (compared to other items) of awe emotions.

In addition, the results of this study showed that negative emotional responses did not correlate to protecting the environment. The reason for this is that the significance level is too high and lacks statistical significance for the study. Although the PSA images with negative messages covered in this paper elicited moderately high fearful emotions, the feelings of sadness and guilt felt by individuals through the PSAs did not elicit guilty and empathy, which led to lower (compared to other items) sadness and guilt emotions. Thus, negative emotional responses were in the overall study, and the hypothesis was rejected, indicating that the negative messages in the PSA pictures did not affect individuals' intentions to protect the environment, although they could elicit negative emotions. In conclusion, PSAs with images of the natural environment can generate positive emotional responses and can positively influence the intention to protect the environment.

## 7.1 Implications

From a theoretical point of view, this article describes the relationship between emotional responses to both positive and negative message framing in PSAs and the intention to protect the environment from a marketing perspective and a quantitative method. The findings in this paper are that positive responses to

message frames in PSAs can affect individuals' intentions to protect the environment, while negative emotional responses to negative message frames in PSAs do not impact individuals' intentions to protect the environment. In this paper, happiness, pleasure, and awe are used as measures of positive emotions. This verified that there is a positive correlation between positive emotional responses and the intention to protect the environment. Besides, this paper chooses fear, guilt and sadness as the measure of negative emotional responses, but the result shows that negative emotional responses to negative message framing will not impact individuals' intention to protect the environment. The research results are in contrast to some existing research. In Chang, Lo and Huang's (2019) research, the negative emotional responses can have an effect on the intention to protect the environment, and the positive emotional responses will decrease the intention to protect the intention. However, one thing that should be noticed is that the emotions selected in this study are limited; hence, this does not represent that all positive emotions can increase individuals' intention to protect the environment or that all negative emotional responses will not. All in all, this paper has contributed to the relationship between the emotional responses and intention.

From a practical aspect, this article can provide information for non-profit organizations and governments that make public service advertisements. In this paper, happyness, pleasure, and awe are three measures of positive emotional responses, and these emotions have a positive impact on individuals' intention to protect the environment. Consequently, non-profit organizations and governments may consider how to elicit individuals' positive emotional responses when making public service advertisements to raise the intention of environmental protection.

# 8. Limitations and Future Research

## 8.1 Limitations

The picture was used in the questionnaire did not arouse respondents' self-transcendent value. According to Ynag, et al (2018), the self-transcendent experience can make individuals feel more awed. Thus, the picture cannot reflect this aspect. That may lead to the respondents did not feel more awed emotion. Besides, the picture for negative message framing cannot make participants feel empathy and guilty, which are important to arouse sadness. Therefore, the picture choice can affect respondents' answers. The second factor that impacts the research results might be the number of selected pictures of PSA. In this research, the authors have only chosen one picture for positive emotional responses and one picture for negative emotional responses. If more pictures are included, the respondents' answers might differ. But the reason that only used one for each type of emotion is that the questionnaire should be short can simple. Thus, the short questionnaire may not make individuals lose interest in answering it. Another factor might affect the content of message framing. In this research, the authors used two pictures; if there were other pictures that expressed different content, the respondents may have different perceptions of those six emotions. Besides, in this thesis, the form of positive message framing and negative message framing used pictures, which may affect participants' perceive the message. According to Arfé, Delatorre and Mason (2022), text can arouse readers' emotions and, especially when the negative emotions are awakened, will have more impression in the readers' minds. Thus, the form of the message framing is limited in this study.

Secondly, there are many kinds of human emotions. According to Ekman's criteria for basic emotions, basic emotions are considered to be quickly attacked and briefly exist for a period of time and they are unique and universal signals (Sabini and Silver, 2005). Ekman defined the basic emotions include anger, fear, sadness, enjoyment, awe, shame, excitement, contempt, etc. (Sabini and Silver, 2005). However, in this thesis, there are only six emotions were mentioned and tested. If the authors choose other emotions, the questionnaire result may be different. Additionally, different emotions may have different impacts on the intention of environmental protection. Another possibility is that by adding more emotions, the result might be different as well. Therefore, the selected emotions can be seen as a factor in influencing the research result.

## 8.2 Future Research and Recommendations

If similar research is conducted in the future to analyze the relationship between individuals' emotional responses to the message framing in public service advertisements and the intention to protect the environment, researchers can set more positive emotions or negative emotions as options in future studies. This allows for a greater understanding of the impact of various emotions on individuals' intentions. In addition, future researchers can consider visual message framing as an approach to constructing PSA when considering message framing. Visual message framing can pay more attention to the nature of the image and the focus on the stimuli by the content of the picture (Sontag, 2018). Therefore, another message framing can be considered in future research. Apart from pictures, future researchers can consider using videos.

Since the quantitative data collection method questionnaire includes fixed questions and the researchers cannot ask additional questions to the participants

(Bell, Harley and Bryman, 2019), in this case, the researchers cannot specifically understand what factors in the message lead to individuals' emotional responses. Therefore, future research can use qualitative research methods to understand further the factors in the message framing that affects individuals' emotional responses or factors that lead individuals to increase their intentions to protect the environment.

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# Appendix A

## A 1: Questionnaire pictures



Picture 1



Picture 2

Picture 3



Picture 4

## A 2 :Questionnaire English version



Section 1 of 4

**How do emotional responses impact individuals' intentions to protect the environment?**

Hello!

We are students from Linnaeus University, studying in the Marketing Program. Currently, we are working on our Bachelor's thesis. The purpose of our thesis is to understand how the emotional responses caused by the message framing in Public Service Advertisements (PSAs) impact individuals' intention to protect the environment.

We assure you that your information and answers will remain anonymous. We will only use your information and answers for the purpose of this thesis study.

Completing this questionnaire will only take 3-5 minutes. We appreciate it if you could answer the entire questionnaire.

If you have any questions about the questionnaire or need further clarification, please do not hesitate to contact us.

Yaxin Xue: yx222aq@student.lnu.se
Ziyi Zhang: zhang98zy@gmail.com

After section 1    Continue to next section

## Intention

We want you to stand on a scale of 1-5, please indicate the extent to which you engage in actions to protect the environment.

Actions to protect the Environment can be achieved through various ways. For instance, one can protect biodiversity, save nature resources, use sustainable transportation, consume environmentally friendly, plant trees, etc.

1- Strongly disagree
2- Disagree
3- Neutral
4- Agree
5- Strongly agree

---

I plan to act in a way to protect the environment *

|  | 1 | 2 | 3 | 4 | 5 |  |
|---|---|---|---|---|---|---|
| Strongly disagree | ○ | ○ | ○ | ○ | ○ | Strong agree |

---

*

I am likely to act in a way to protect the environment

|  | 1 | 2 | 3 | 4 | 5 |  |
|---|---|---|---|---|---|---|
| Strongly disagree | ○ | ○ | ○ | ○ | ○ | Strongly agree |

---

*

I will act in a way to protect the environment.

|  | 1 | 2 | 3 | 4 | 5 |  |
|---|---|---|---|---|---|---|
| Strongly disagree | ○ | ○ | ○ | ○ | ○ | Strongly agree |

---

After section 2   Continue to next section

Emotional responses on message framing in PSA

Below are two photos of a positive and negative message framed by PSA.

Some explanation
PSA: Public Service Advertisement (also called Public Service Announcement) is a message that is made by governments or non-profit organizations to arouse public awareness about an issue. (Indeed Editorial Team)

We want you to stand on a scale of 1-5 to what extent a specific emotion is awakened or not inside of you when watching the pictures.

1- Strongly disagree
2- Disagree
3- Neutral
4- Agree
5- Strongly agree

Please view the pictures and answer the following questions.



This picture makes me feel happy. *

|  | 1 | 2 | 3 | 4 | 5 |  |
|---|---|---|---|---|---|---|
| Strongly disagree | ○ | ○ | ○ | ○ | ○ | Strongly agree |

This picture makes me feel pleasure. *

|  | 1 | 2 | 3 | 4 | 5 |  |
|---|---|---|---|---|---|---|
| Strongly disagree | ○ | ○ | ○ | ○ | ○ | Strongly agree |

This picture makes me feel awed. *
*Awe is an emotion of reverence or respect

|  | 1 | 2 | 3 | 4 | 5 |  |
|---|---|---|---|---|---|---|
| Strongly disagree | ○ | ○ | ○ | ○ | ○ | Strongly agree |

Please view the pictures and answer the following questions.



This picture makes me feel fear. *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly disagree | ○ | ○ | ○ | ○ | ○ | Strongly agree |

This picture makes me feel guilt. *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly disagree | ○ | ○ | ○ | ○ | ○ | Strongly agree |

This picture makes me feel sad. *

| | 1 | 2 | 3 | 4 | 5 | |
|---|---|---|---|---|---|---|
| Strongly disagree | ○ | ○ | ○ | ○ | ○ | Strong agree |

After section 3    Continue to next section

## Demographic information

Finally, we want to know more about you as a person. Please fill in the below questions and we will keep your personal information anonymous.

---

What is your gender? *

- ○ Male
- ○ Female
- ○ Others
- ○ I wouldn't like to say

---

What is your age? *

- ○ Under 18 years old
- ○ 18 - 30 years old
- ○ 31 -45 years old
- ○ Over 45 years old

---

What is your primary employment status? *

- ○ Student
- ○ Part-time employed
- ○ Full-time employed
- ○ Self-employed
- ○ Others

---

Thanks for your participation!
Description (optional)

# A 3: Questionnaire Chinese version

## 情绪反应如何影响个人保护环境的意图

你好!

我们是林奈大学的学生,攻读市场营销专业。 目前,我们正在研究我们的学士论文。 我们论文的目的是了解公共服务广告 (PSA) 中的信息框架所引起的情绪反应如何影响个人保护环境的意图。

我们向您保证,您的信息和回答将保持匿名。 我们只会将您的信息和答案用于本论文研究的目的。

完成此问卷仅需 3-5 分钟。 如果您能回答整个问卷,我们将不胜感激。

如果您对问卷有任何疑问或需要进一步说明,请随时与我们联系。

Yaxin Xue: yx222aq@student.lnu.se
Ziyi Zhang: zhang98zy@gmail.com

*1. 我们希望您站在 1-5 的等级上，请说明您参与保护环境行动的程度。

保护环境的行动可以通过多种方式实现。 例如，可以保护生物多样性、节约自然资源、使用可持续交通工具、环保消费、植树造林等。

1- 强烈反对
2- 不同意
3- 中性
4- 同意
5- 非常同意

|  | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 我计划采取行动保护环境。 | ○ | ○ | ○ | ○ | ○ |
| 我有概率会采取行动保护环境。 | ○ | ○ | ○ | ○ | ○ |
| 我将采取行动保护环境。 | ○ | ○ | ○ | ○ | ○ |

*2. 下面是 PSA 制作的正面和负面消息的两张照片。

一些解释
PSA：公共服务广告（也称为公共服务公告）是政府或非营利组织为唤起公众对某个问题的认识而发布的信息。 （确实编辑组）

我们希望您在观看图片时站在 1-5 的等级上，在多大程度上唤醒或不唤醒您内心的特定情绪。

1- 强烈反对
2- 不同意
3- 中性
4- 同意
5- 非常同意

请查看图片并回答下列问题。



|  | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 这张照片让我感到快乐。 | ○ | ○ | ○ | ○ | ○ |
| 这张照片让我感到愉悦。 | ○ | ○ | ○ | ○ | ○ |
| 这张照片让我感到敬畏。*敬畏是一种敬畏或尊重的情绪 | ○ | ○ | ○ | ○ | ○ |

请查看图片并回答下列问题。

|  | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 这张照片让我感到恐惧。 | ○ | ○ | ○ | ○ | ○ |
| 这张照片让我感到内疚。 | ○ | ○ | ○ | ○ | ○ |
| 这张照片让我感到悲伤。 | ○ | ○ | ○ | ○ | ○ |

人口统计信息

最后，我们想更多地了解您这个人。 请填写以下问题，我们将对您的个人信息保密。

*4. 性别

- ○ 男性
- ○ 女性
- ○ 其他
- ○ 我不想回答

*5. 年龄

- ○ 小于18岁
- ○ 18-30岁
- ○ 31-45岁
- ○ 大于45岁

*6. 职业

- ○ 学生
- ○ 全职职员
- ○ 兼职职员
- ○ 自我雇佣
- ○ 其他

感谢您的回答！

# Appendix B

## Cronbach's Alpha for each variable and measurement

Cronbach's Alpha for INT

| Variables | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| INT_1 | 8.45 | 2.672 | 0.754 | 0.849 |
| INT_2 | 8.48 | 2.681 | 0.774 | 0.832 |
| INT_3 | 8.52 | 2.478 | 0.790 | 0.818 |

Cronbach's Alpha for POS

| Variables | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| POS_1 | 7.97 | 3.510 | 0.752 | 0.683 |
| POS_2 | 7.95 | 3.556 | 0.741 | 0.694 |
| POS_3 | 8.22 | 3.201 | 0.569 | 0.891 |

Cronbach's Alpha for NEG

| Variables | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
|---|---|---|---|---|
| NEG_1 | 6.94 | 4.683 | 0.488 | 0.762 |
| NEG_2 | 7.49 | 3.880 | 0.619 | 0.617 |
| NEG_3 | 7.19 | 3.744 | 0.634 | 0.598 |

# Appendix C

## VIF and P-P Plot

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | 2.051 | .131 | | 15.617 | <.001 | | |
| | POS | .528 | .032 | .595 | 16.472 | <.001 | .827 | 1.210 |
| | NEG | .019 | .030 | .023 | .644 | .520 | .827 | 1.210 |

a. Dependent Variable: INT



Normal P-P Plot of Regression Standardized Residual
Dependent Variable: INT