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ABEER A. MAHROUS

Cairo University

YOMNA MOHSEN

MSA University

Enhancing prosocial behaviour and donation intentions through neuroscientific techniques (EEG and eye tracker): Exploring the influence of charitable advertisement appeals

ABSTRACT

This study investigates the impact of charitable advertisement appeals on prosocial behaviour and intentions to donate, employing cutting-edge neuroscientific techniques such as electroencephalography (EEG) and eye tracker. It also seeks to analyse the moderating effect of altruism, social norms and moral intensity on

KEYWORDS

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the relationship between advertising appeal and prosocial behaviour and intention to donate. Findings indicate that negative appeal is more effective than positive appeal in influencing prosocial behaviour and intent to donate. Furthermore, using an eye tracker showed that individuals try to avoid painful scenes in charitable advertisements. This study provides valuable insights into the underlying mechanisms that drive prosocial behaviour and donation intentions by delving into the influence of various charitable advertisement appeals (both positive and negative) on individuals' neural and ocular responses. We therefore, argue that findings from this research hold significant implications for marketers and advertisers seeking to create more effective and persuasive charitable advertisements, ultimately promoting greater engagement and support for philanthropic causes.

INTRODUCTION

Recognizing the power of social norms, various marketing communication programmes used information as a primary tool for changing socially oriented behaviours leading to the emergence of 'social-norms marketing campaigns' (Schultz et al. 2007: 429) as an alternative to more traditional approaches such as information campaigns and fear-inducing messages to reduce undesirable behaviours in various areas such as alcohol consumption, drug use, recycling and littering. Previous donation campaigns indicate that poorly implemented advertisements can irritate and drive off potential donors.

Organizations' understanding of the demographic characteristics of donors, and how they perceive charitable institutions can lead to a better advertising campaign. Therefore, it is essential to consider the images of people, particularly concerning their emotionality, used in advertisements for charitable organizations in answering the question of what makes people donate (Burt and Strongman 2005; Smith and McSweeney 2007). Despite the emergence of new methodological techniques that can better assess charitable advertising campaigns, this area of research has been lacking, particularly in Egypt. While some studies in neuromarketing (Abdelhamid and Mahrous 2023) analysed the effect of print ads on the intention to donate, no previous research has discussed the impact of altruism collectively, prosocial behaviour, moral intensity in the charitable advertisement, and their impact on intention to donate using neuroscientific techniques (Vecchiato et al. 2011).

The primary purpose of this article is to investigate the effect of charitable ads on prosocial behaviour and donation intentions, considering the moderating effect of altruism, social norms and moral intensity. The current research aligns with the rising attention of marketing scholars to the redirection from traditional research techniques towards the usage of the neuroscientific methods labelled neuromarketing (Debener et al. 2006; Lee et al. 2007; Ohme et al. 2010; Hein and Singer 2010; Kenning and Linzmajer 2011; Bergerud 2013; Plassmann et al. 2015; Demšar 2023; Alsharif et al. 2023).

Alsharif et al. (2023) stated that neuromarketing is the application of neuroscience measurement methods to understand how consumers react to marketing, consciously and unconsciously. This evolving approach lies in the connection of consumer behaviour, neuroscience, economics and psychology while examining various marketing areas such as persuasion, decision-making, cognition and ethics. Lately, technological advances have allowed marketers to use multiple neuroscientific techniques to investigate research questions in a new way. Such applications of neuroscientific techniques to

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study consumers' emotional and cognitive reactions have initiated the field of consumer neuroscience.

LITERATURE REVIEW

Charitable advertisements

Lwin and Phau (2014) state that charitable donation researchers have concentrated on planned giving, donor characteristics and the anticipation of intrinsic benefits, such as increased self-esteem, public gratification, satisfaction and fulfilment through meeting one's obligation, helping behaviour and charitable donation behaviour. However, variations in social, political and economic environments in many countries worldwide have led to falling support for charities, making it hard for charities to collect donations. Charitable organizations increasingly use diverse advertising strategies to influence individual donations. These strategies include using emotions and social influence and tailoring the charitable cause to make it more relatable to donors, all to encourage higher donation compatibility (Bae 2023). Conversely, if mismanaged, these advertisements can cause irritation, anger and displeasure towards the advertisement and risk refusal by potential donors. Therefore, understanding donors and their motivations to contribute to charities is of utmost interest to non-profit organizations. An advertisement's persuasive style or emotional appeal may be revealed through its message content and effect intensity (Bülbül and Menon 2010). How the message is delivered, and what is stated reflects the advertisement content. The level of emotion is its intensity during exposure to the advertisement (Taute et al. 2011). The message's impact on its intended audience is a measure of its effect or emotional power.

Erlandsson et al. (2018) define negative appeals as advertisements emphasizing the negative effects of failing to comply with demand while representing positive appeals as advertisements highlighting the benefits of complying. A variety of names refers to these forms of appeals. For example, negative appeals can be in the form of sad appeals, loss-framed appeals and guilt appeals, while warmth appeals, gain-framed appeals and altruistic appeals described as constructive appeals. Negative appeals attempt to convince people to comply by informing them of unfavourable and frequently unsettling incidents that may happen in the future and providing a means for the reader to escape these events (Mogaji 2016). On the other hand, positive appeals attempt to convince people to cooperate by informing them of desirable events that have occurred in the past or may occur in the future, as well as a method for approaching and realizing these events.

According to previous research, charity appeals often elicit negative emotions more easily than positive ones (Baberini et al. 2015), so the baseline valance of charity appeals is arguably negative. Thus, when a charitable appeal is 'positive', it does not mean it increases positive or reduces negative emotions; instead, it elicits more positive and fewer negative emotions than a similar but negatively framed appeal (Zheng 2020).

Attention

The amount of conscious thought devoted to an advertisement at any given time is referred to as attention (Alonso Dos Santos et al. 2017). Since eye-tracking and EEG methodology have shown that attention level is linked to memory and attitude towards the brand being marketed, it is critical to

quantify attention (Lee and Ahn 2012; Li et al. 2016) and the attitude towards advertising in general (Goodrich 2014) or towards the product (Treleven-Hassard et al. 2010; Hernández-Ménde and Muñoz-Leiva 2015). Subjects must perform reading tasks and view graphic displays in NGOs' typical advertisement format. The data processing type and its relation distinguish text from graphics and self-relevant from irrelevant information.

Furthermore, according to the elaboration probability model, self-relevant information is stored in the human brain at the mid-level rather than the peripheral level. According to Hernandez et al. (2017), visual attention is divided into two types: spatial and feature-based. Spatial attention is the method of focusing attention from a visual field on a particular location that enables people to selectively process all visual information in a visual area. It is evident by eye movement to the centre of attention (Higgins et al. 2014). On the other hand, the feature-based focus is used to distinguish and highlight specific features in a visual field. It works both within and outside the attention's spatial orientation. As debated by Lu (2019), emotional appeals can be very successful at attracting attention and helping advertisements stand out in a cluttered media climate, resulting in more favourable convincing outcomes. The role of emotion in media processes and effects has grown in popularity, encompassing a wide range of communicative contexts.

H1: In light of EEG, The spatial attention rate for positive charitable advertisements is more significant than that for negative charitable advertisements.

H2: Indicated by eye fixation hits through the eye-tracking device, the focus on the advertisement characters is higher for the positive charitable advertisements than the negative charitable advertisements.

H3: Indicated by verbal measures through the eye-tracking device, the focus on the organization's contact for donation is higher for positive and negative charitable advertisements.

Prosocial behaviour

Hauke defined prosocial behaviour such as helping, comforting, sharing and cooperating as 'actions intended to benefit one or more people other than oneself' (2018: 20). However, only a subset of these behaviours is related to altruism, defined as the motivation to increase another person's welfare and includes actions such as self-sacrificial helping or helping without obvious external rewards (Van Tongeren et al. 2016).

In recent decades, social scientists attempted to understand the factors that prompt people to help others (Baumsteiger and Siegel 2019). In the context of charitable giving, theories that explain peoples' prosocial behaviour are manifold (Nook et al. 2016). Some researchers suggest that donors behave purely altruistically and are motivated by the consequences of their donations on the welfare of the beneficiaries. According to Small and Cryder (2016), prosocial consumer behaviour research builds on decades of social psychology literature dealing with helping others with an attempt to understand situational and personality variables that affect whether people support others. On the other hand, research on prosocial consumer behaviour looks at what motivates or dissuades people from supporting unknown and sometimes abstract groups of people (Bülbül and Menon 2010). Individuals seldom come into contact with beneficiaries throughout these situations. Instead, their decisions are influenced by details in charity ads, their connection to a cause or

association, their sense of obligation towards future beneficiaries, and other factors (Twenge et al. 2007). Understanding the underlying processes that lead to altruistic behaviour is particularly important to designing advertisements that effectively increase charitable giving (Hauke 2018).

It was also questioned whether the recognizable victim effect could be used to persuade people. Marketers succumb to the 'more is better heuristic' and depict a slew of victims rather than a single victim. Some advertisers make the mistake of simultaneously appealing to the heart and the brain by posing an identifiable victim and victim statistics. Researchers pointed out other sympathy prejudices that distort charitable donations. For example, knowing a victim of a specific misfortune increases generosity towards victims but not victims of other misfortunes (Loewenstein and Small 2007). This means that causes with many direct ties to wealthy people (like breast cancer) get much money. For instance, victims of loss (such as those caused by natural disasters) receive more sympathy and assistance than victims of chronic poverty, where just as people are emotionally sensitive to their losses, they are often emotionally susceptible to the failures of others.

H4: Positive and negative charitable advertisement appeals significantly impact prosocial behaviour differently.

Intentions to donate

Typically, individuals' intentions to donate are driven by the incentives to contribute and the advantages they perceive in return as donors. According to Konrath and Handy (2018), just as consumers seek benefits from their purchases, rational donors seek benefits from their donations. These advantages may be monetary (e.g. tax avoidance) or nonmonetary in the case of donations (guilt avoidance, recognition). Benefits may directly benefit donors, while others may be indirect. Furthermore, according to Konrath and Handy (2018), motives initiated by personal and public benefits are only sometimes distinct and can sometimes overlap. In essence, individuals contribute to charitable causes driven by various factors that encompass private and public advantages. Altruism, trust in philanthropic organizations, and social considerations exemplify the motivations behind supporting public benefits.

Moreover, incentives linked to personal benefits include social interactions, self-interest, financial constraints, guilt and self-esteem (Knowles et al. 2012). However, it is essential to acknowledge additional significant motivations such as compassion towards impoverished individuals, responses to calamities such as earthquakes and religious convictions guiding charitable acts across various faith groups. For instance, in Arab and Muslim countries, individuals adhering to Islam may seek the pleasure of Allah by providing sustenance to the hungry or assisting the less fortunate. Research focussing on antecedents of specific behaviours revealed that attitudes towards the behaviour and the object determine behavioural intentions (Mehta 2000). In the context of charitable giving, this emphasizes the role of individuals' attitudes towards helping others and their attitudes towards philanthropic organizations (Teah et al. 2014).

Previous studies have demonstrated that positive appeals, emphasizing success stories, benefits to recipients, and the overall impact of donations, tend to evoke feelings of empathy, satisfaction and altruism among potential donors (Fisher et al. 2008). Such emotional responses are often linked to

higher intentions to donate. Conversely, negative appeals, which highlight the suffering, challenges and urgent needs of beneficiaries, are thought to trigger guilt, compassion and a sense of moral responsibility. These emotional reactions can also increase intentions to donate (Casais and Proença 2022). Moreover, recent neurocognitive research underscores the intricate interplay between emotional processing and decision-making mechanisms, suggesting that positive and negative appeals may activate distinct neural pathways, yielding differential effects on individuals' willingness to donate (Demšar 2023). Therefore, this study underscores the need for a more nuanced understanding of the mechanisms through which positive and negative charitable advertisement appeals exert influence.

H5: Positive and negative charitable advertisement appeals significantly impact intentions to donate differently.

Altruism

Andreoni et al. (2017) argued that it is undeniable that humans have tremendous potential for generosity. People are courteous to strangers, donate money to charity, volunteer to support others and even sacrifice their lives in selfless acts. Initially, such outward altruism was due to indirect selfishness. The initial findings of economists who eliminated these incentives in anonymous, one-shot dictator games among random strangers shocked many. Subjects often avoided self-interested decisions, with many opting for even splits. If indirect selfishness cannot account for giving, a taste for altruism can (MacAskill 2015). However, we soon discovered that people were concerned not only with final consumption allocations but also with the means of achieving such allocations. The assumption is that utility depends on giving; supporting others provides a warm glow. However, rather than answering why people offer warm glow, the warm-glow theory is a placeholder for more complex models of individual and social motives. Human well-being today and in the future depends on the long-term sustainability of society and ecosystems (Hauser et al. 2014). A transdisciplinary approach to understanding the neurobiology of sustainable decision-making is needed to empower more individuals to behave responsibly regarding social stability and environmental protection.

Berman et al. (2018) argued that charitable contributions would do best if directed to causes that resulted in the most significant welfare benefits. The effective altruism movement aims to bring this idea to life. Effective altruism is based on consequentialist ethics proposing that people can use expected benefit maximization instead of consulting one's emotions when determining where to donate. Donors should strive to maximize social welfare benefits on each pound donated, much as an investor seeks to maximize the financial gain on each dollar invested. Effective altruism has spawned groups that have educated the public about the success of charities in recent years. However, it is still determined whether providing this information would affect decision-making.

We can infer that the request's effectiveness is derived from the emotional response it provokes in a potential giver. This aligns with other studies that show empathic triggers often precede altruistic actions (FeldmanHall et al. 2015). Under this incentive, the urge to give must come after the question, not before it, and one can control both emotions and give by managing exposure to the ask. Many who avoid the ask are not insensitive or selfish; instead, they

are 'good people' (Wagner et al. 2011: 67) who avoid empathic triggers as they ask to control their giving and guilt.

H6: Altruism moderates the relationship between positive and negative charitable advertisements appeals and prosocial behaviour.

H7: Altruism moderates the relationship between positive and negative charitable advertisements, appeals and intentions to donate.

Social norms

According to Jayachandran (2020), norms are classified as general behavioural expectations in a social context. Many important customer behaviours are influenced by community or social norms, such as family, colleagues and others examining and evaluating the brand of a person's shirt and the type of vehicle they drive. People behave in a socially directed way to reduce social costs and feelings of shame. Bertoldo and Castro (2016) suggested a model that organized the various norms involved in the SDT motives along a continuum of increasing self-integration. The most external motivator in this model is descriptive social norms, which are accompanied by injunctive social norms. Descriptive social norms refer to the usual or expected behaviour in a given situation, providing details for the intrapersonal goal of acting correctly (Cislaghi and Heise 2020). According to Bertoldo and Castro (2016), injunctive norms refer to a social group's acceptance or disapproval of particular conduct. This is why injunctive norms are so crucial for the interpersonal purpose of forming and sustaining social bonds. Several studies have shown that social expectations can significantly impact consumer behaviour (Fisher and Ackerman 1998; Everett et al. 2015). For example, consumers often buy advertised goods to obtain perceived acceptance from significant acquaintances or escape perceived rejection from substantial acquaintances. When exposed to predictable stimuli, we respond with a series of learned behaviours, and social and personal norms have filtered these learned habits.

Prior research has found a connection between social and personal moral norms (Osterhus 1997). As a result, social expectations are thought to interfere with the moral norm–donation willingness relationship. Osterhus also discovered that personal norms could interact with willingness-to-pay variables. Therefore, moral norms and donation intentions are thought to be related.

H8: Social norms moderates the relationship between positive and negative charitable advertisements appeals and prosocial behaviour.

H9: Social norms moderates the relationship between positive and negative charitable advertisements appeals and intentions to donate.

Moral intensity

Butterfield et al. (2000) argued that moral intensity influences each step in the ethical decision-making process. Moral intensity describes the moral issue itself (Lincoln and Holmes 2011). The six dimensions of moral intensity are magnitude of consequences, temporal immediacy, social consensus, proximity, probability of effect and concentration of effect. The magnitude of consequences refers to the degree to which an individual may be harmed by or benefit from the decision-makers action – a greater degree of harm or benefit results in an increase in moral intensity (Tsalikis et al. 2008).

Rousselet et al. (2020) stated that temporal immediacy refers to the time between the action and its consequences. An effort that results in immediate adverse effects significantly increases moral intensity than an action for which the effects are delayed. Social consensus is the degree of agreement among a social group that an effort is good or bad. This social group could be society as a whole (e.g. an illegal act is not morally acceptable by society because a law prohibits it) or a smaller social group, such as an individual’s academic peers. A solid social consensus that an act is morally wrong increases moral intensity. Proximity refers to the nearness of the decision-maker to the individuals potentially affected by the consequences (Rousselet et al. 2020). Proximity can be a feeling of physical, cultural, social or psychological nearness. An increase in proximity results in an increase in moral intensity. Probability of effect refers to the likelihood that the predicted consequences and expected harm/benefit will occur. Moral intensity increases if the probability that the action will occur and cause the expected harm is high. The final dimension, concentration of effect, refers to the relationship between the number of people affected and the magnitude of damage. If the concentration of the effect is excellent, moral intensity increases.

In light of the above discussion of moral intensity, the strength of moral considerations plays a role in influencing how positive and negative appeals in charitable advertisements impact people’s likelihood to engage in prosocial behaviours. Figure 1 depicts the research framework.

H10: Moral intensity moderates the relationship between positive and negative charitable advertisements appeals and prosocial behaviour.

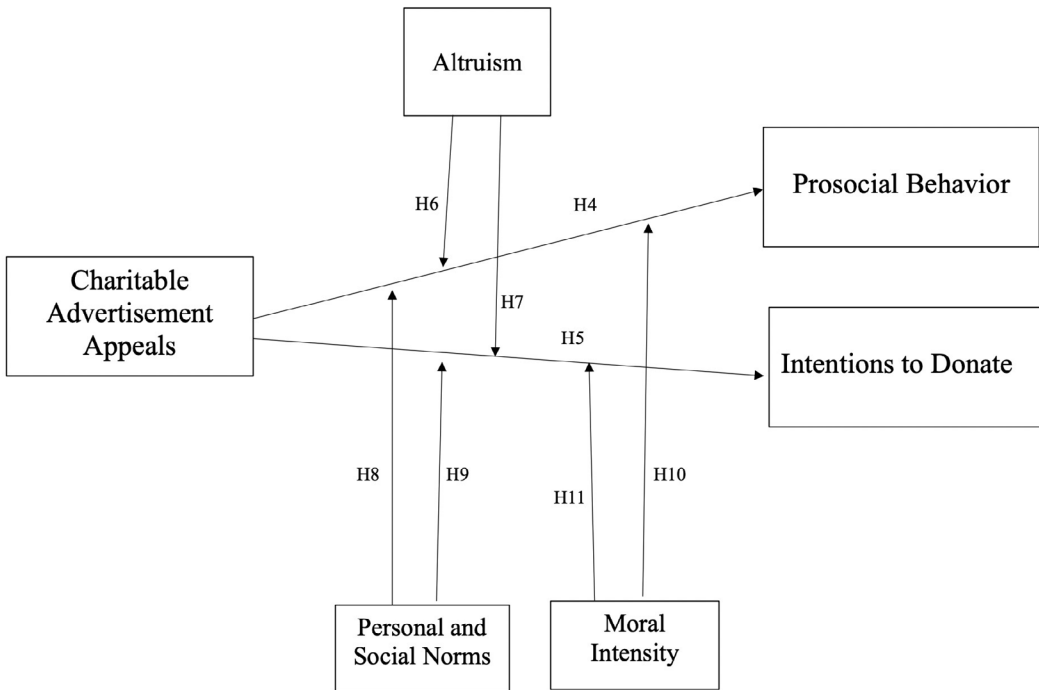


Figure 1: The Research Framework.

H11: Moral intensity moderates the relationship between positive and negative charitable advertisements appeals and intentions to donate.

METHODOLOGY

Experiment design and survey measures

We manipulate the two dimensions of the primary variable to examine their effect on the dependent variables. These variables are prosocial behaviour, moral intensity, social norms and intention to donate. As it was interesting to examine the real impact of the positive and negative charitable advertisements on the intention to donate, concerning the other variables, the study was designed as an Experimental Repeated Measures (Within Subjects) Design. Field and Hole (2003) state that a Repeated Measures Design is used when the participant gives one result for every experiment condition. This design reduces the variation in scores between conditions due to the random participant differences. Moreover, the design will more likely reveal the effects of the different study manipulations (Bazaraa et al. 2022).

The experiment encompassed two neuroscientific techniques used by many behavioural researchers (e.g. Alonso Dos Santo et al. [2017]: EEG and Eye-tracking devices [Tangmanee 2016]). In addition to that, a self-administered questionnaire was used. The researcher translated the questionnaire into Arabic for the convenience of Egyptian participants. The participants were asked to complete the questionnaire after exposure to negative and positive ads. The questionnaire items were derived from previously validated research. It is important to note that counterbalancing was done within the experiment where we changed the sequence of the experimental conditions to eliminate the main disadvantage of the repeated measures design, which is the carry-over effect.

Sample selection and data collection

The study was conducted in an Egyptian context investigating Egyptian citizens' prosocial behaviour and donation behaviour. We used a quota sample to select a sample representative of the population. The demographics (age, gender, education, occupation and marital status) of the citizens were important when choosing the sample as per the previous research (Khatab and Mahrous 2016). Therefore, the percentage of males and females and other different demographic characteristics were considered for this research. The sample consisted of 40 adults from Cairo and Alexandria, as indicated in Table 1.

A group of undergraduate students at Cairo University created a positive charitable ad promoting The Japanese Abo El Rish Pediatric Hospital. One of the researchers created a negative charitable ad containing dramatic testimonials from the parents of patients in the hospital. We placed a black hole around the screen to test whether the respondents' eyes would avoid the dramatic scenes by looking at it or not. Next, we tested both ads to ensure they contained the stimuli needed for the experiment. Finally, we ran a discussion group to collect feedback regarding the two ads to see if any modifications were required. We chose The Japanese Abo El Rish Pediatric Hospital because it is one of the most credible organizations to Egyptians yet has a problem of low donation level (Shazly and Mahrous 2020). In addition, there

Table 1: Sample characteristics and profile.

Category	Percentage
Gender	
Male	27.5%
Female	72.5%
Age	
16–25	37.5%
26–35	47.5%
36–45	5%
More than 45	10%
Educational level	
High school	5%
University student	12.5%
Bachelor's degree	37.5%
Post graduate degree	45%
Occupation	
Unemployed	20%
Private-sector employee	50%
Public-sector employee	15%
Professional	10%
Businessman/woman	5%

was little to no exposure to any charitable advertisement related to this hospital, ensuring a low level of bias.

The experiment was conducted at The Cyber-Physical Systems Lab at the Egypt-Japan University of Science and Technology in Borg El Arab City. An eighteen-inch PC screen was placed at a distance of 60–65 cm approximately. The room and the lighting were prepared as needed to serve the experiment's aim. Before consent, participants were told that the study's objective was to see what happens in our bodies when we are subjected to charitable advertising. Then, we cleaned the face of the participant with disinfectant, on the forehead, in the earlobes, and in the places where the vertical electrooculogram (VEOG) and horizontal electrooculogram (HEOG) electrodes were placed. This procedure is essential for removing dead skin and decreasing the impedance of the skin in those places.

The electrode placement system used was a 10–10 system, where the first frontal electrodes are placed 10 per cent of the total length above the nation and the rest of the electrodes are spaced 10 per cent between them. While presenting the TV advertisements, the subjects were isolated from anything that could distract them. Finally, the participants answered a self-administered questionnaire in which the intention to make donations, social norms, altruism, prosocial behaviour and moral intensity were measured through a 5-point Likert scale. We used a within-subjects design, whereas the same participants

took part in each condition of the charitable advertisements (positive and negative).

RESULTS

Experiment results

We chose to utilize SmartPLS due to its compatibility with small sample sizes and its ability to provide enhanced accuracy, contingent on the bootstrapping approach. Another advantage of SmartPLS is its capability to efficiently assess diverse measurement levels within the same model – including the first-level dependent variable, second-level reflective mediators, formative variables, and even situations where each construct has only one item. This feature prevents identification issues (Mahrous et al. 2020). Lastly, SmartPLSs operate seamlessly with non-normally distributed data. In SmartPLS 3.0, you can apply a bootstrapping procedure for the significance of the path coefficient with a two-tail significant level of 5 per cent. If t -values are greater than the critical value (1.96) and p -values smaller than 0.05, the statistical significance of your hypothesis is accepted, as indicated in Figure 2 (Mahrous 2016).

As shown in Table 2, H1 is supported as charitable advertisement appeal significantly positively affects prosocial behaviour by 65% with 95% confidence. H2 is also supported as the charitable advertisement significantly positively affects the intentions to donate by 80% with 95% confidence. Conversely, all the moderating effects of altruism, personal and social norms and moral intensity do not affect the relationship between the dependent and independent variables. Therefore, all hypotheses with the moderating effects of altruism, personal and social norms and moral intensity were rejected in both positive and negative appeals cases. However, the difference between the two conditions tested the direct relationships between charitable advertisement appeals, prosocial behaviour and intentions to donate. In the positive charitable advertisement, the advertisements have a relationship with prosocial behaviour and the intention to donate. Meanwhile, in the negative charitable advertisement, the advertisements significantly affect prosocial behaviour but do not affect the intentions to donate.

EEG results

Through Brainwave Visualizer, researchers commonly use software to analyse the attention rate that Mindwave EEG Handset Device tests. It provides raw scores of specific brainwaves that represents the level of attention. The average value is reported on a relative scale from one to 100 for all different attention results.

On this scale, a value between 40 and 60 at a given time is considered neutral. A value between 60 and 80 is slightly high and interpreted at higher-than-normal levels. Values between 80 and 100 are high, meaning they are a strong indicator of very high attention rates. At the other end of the scale, values between 20 and 40 show low attention levels, while a value between 0 and twenty is associated with deficient attention levels. Figure 3 shows how the Brainwave Visualizer indicates a precise level of attention on a scale from 0 to 100. First, we examined the means and standard deviation from the areas of interest for each attention indicator according to the EEG. The purpose was to determine whether the positive charitable advertisement received more spatial attention than the negative one. To do this, we used the dependent t -test.

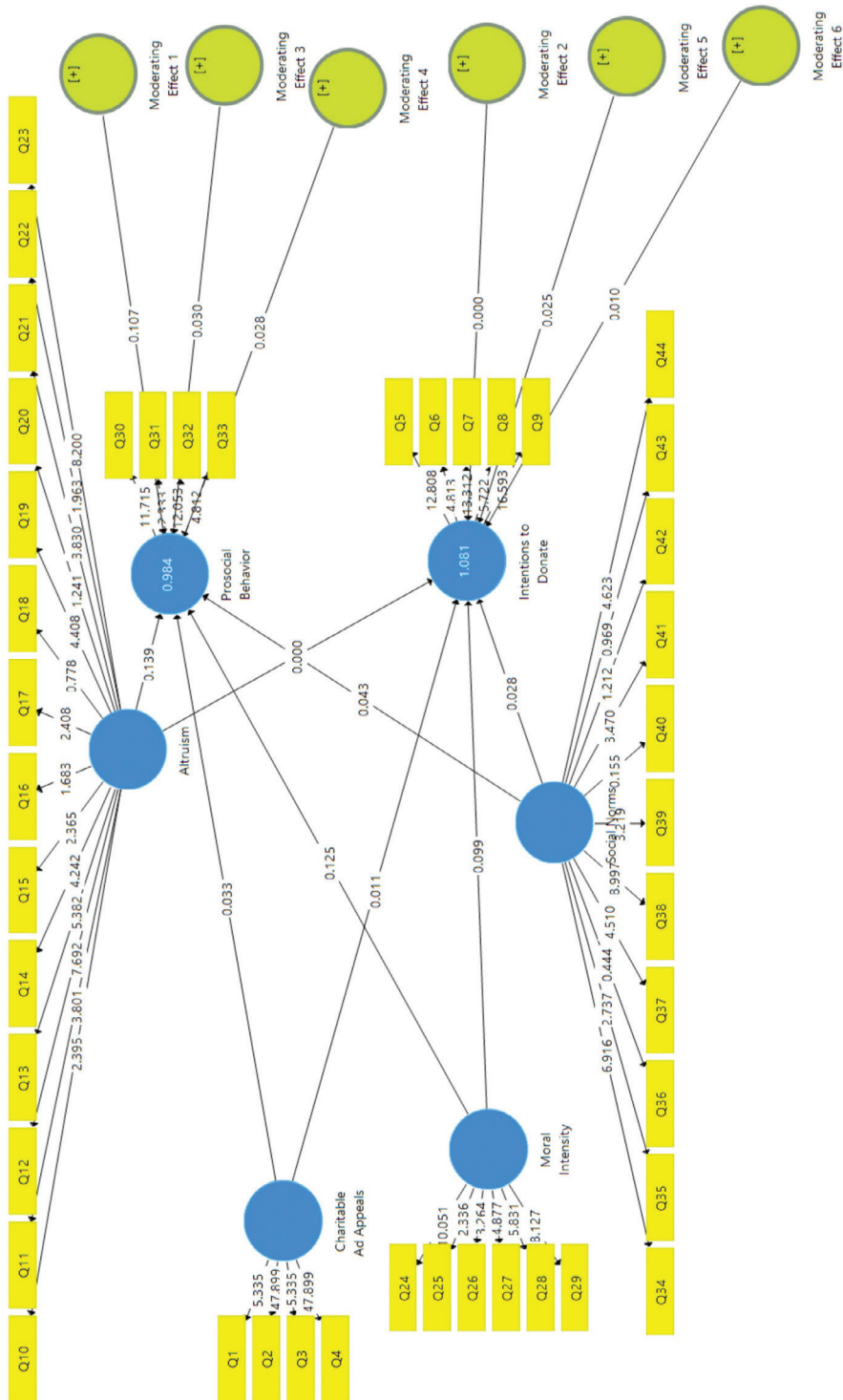


Figure 2: The theoretical model.

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Table 2: Hypotheses testing for positive vs. negative ads.

Hypotheses testing	Original sample (O)	Sample mean (M)	Standard deviation (SD)	t statistics (O/STDEV)	p-values	Decision
H4 Positive and negative charitable advertisement appeals have a different significant effect on prosocial behaviour.	0.638	0.649	0.078	8.148	0.000	Accepted
H5 Positive and negative charitable advertisement appeals have a different significant effect on intentions to donate.	0.786	0.796	0.051	15.407	0.000	
H6 Altruism moderates the relationship between positive and negative charitable advertisements appeals and prosocial behaviour.	-0.361	-0.145	3.384	0.107	0.915	Rejected
H7 Altruism moderates the relationship between positive and negative charitable advertisements, appeals and intentions to donate.	-0.001	0.277	12.847	0.000	1.000	
H8 Personal and social norms moderate the relationship between positive and negative charitable advertisements appeals and prosocial behaviour.	-0.085	-0.061	3.002	0.028	0.977	
H9 Personal and social norms moderate the relationship between positive and negative charitable advertisements, appeals and intentions to donate.	-0.049	0.066	4.852	0.010	0.992	
H10 Moral intensity moderates the relationship between positive and negative charitable advertisements appeals and prosocial behaviour.	0.109	-0.016	3.598	0.030	0.976	
H11 Moral intensity moderates the relationship between positive and negative charitable advertisements appeals and intentions to donate.	-0.488	-0.764	19.669	0.025	0.980	

Note: ****Confidence level is 99.9%, significance level p value < 0.001..., t value ± 3.29 (acceptance level of experimental research).

***Confidence level is 99%, significance level p value < 0.01, t value ± 2.58 (acceptance level of experimental research).

**Confidence level is 95%, significance level p value < 0.05, t value ± 1.96 (acceptance level of social research).

*Confidence level is 90%, significance level p value < 0.1, t value ± 1.65 (Acceptance level of exploratory research) (Hair et al. 2014).

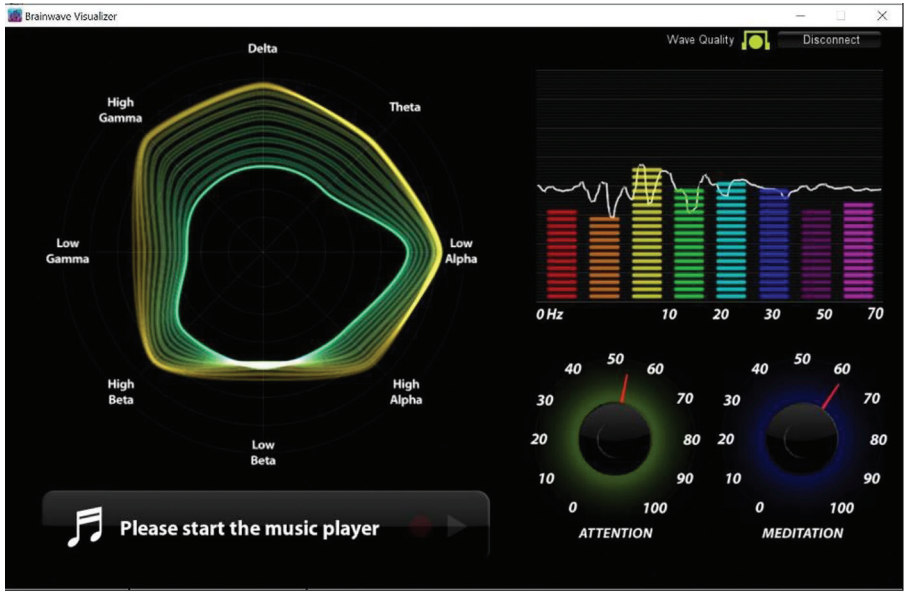


Figure 3: Brainwave Visualizer data.

Table 3: T-test findings on spatial attention rates between positive and negative ads.

Ad appeals	Mean	Standard deviation
Positive advertisement	53	14.436
Negative advertisement	64.25	11.140

Differences were found between the positive and negative appeals. As shown in Table 3, the *t*-test was conducted to show that the spatial attention on the negative advertisement is higher than the positive one, despite the previous researchers’ claims and the findings of the exploratory research claiming that the positive charitable advertisements make the respondents more attentive to the cause of the ad than the negative advertisement.

Eye tracker results

According to Hernandez et al. (2017), eye-movement data, including both gaze duration and fixation, are informative of the visual attention process. Therefore, analyses were conducted on the fixation location of two factors in both advertisements. In the positive ad, the positive elements (soap balloons, teddy bear, smiling children, game) received high eye fixations, defined as the frequency of hits on the area of interest. In addition, in the negative advertisement, the scenes were framed in a black frame/scope, allowing the respondents to look away from the misery of the ill children if needed. Therefore, the eye fixation on the black frame was higher than in the middle of the screen. To ensure that the customers responded to the cause of the advertisement by checking the contact numbers of the charitable institution per each fixation, fixations that lasted less than 100 milliseconds were not considered (Hernandez et al. 2017).

Although the spatial attention rate of the negative advertisement was higher than the positive advertisement, statistical evidence revealed that the respondents exerted all their attention away from the middle of the screen, through which the main characters of the ad demonstrated the negative side of the cause. As shown in Figure 4 and Figure 5, most respondents moved their eye fixation point to the black frame placed around the characters to test whether they would respond to and comprehend the negative elements in the advertisement. In previous research, positive advertisements would have more frequent eye fixations on the advertisement characters than negative advertisements in the charitable advertisements discipline. Through the *t*-test results and as shown in Table 4, there is a significant effect of the frequency of eye fixations on the middle of the screen in the positive advertisement than in the negative advertisement as captured by the eye-tracking measures with a *p*-value of 0.003. Therefore, H2 was supported by the eye-tracking data (eye fixation rates). As for the verbal measures, an independent *t*-test was performed to test the reaction of the respondents to the charitable organization's contact number at the end of the advertisements. Results showed a highly significant difference between the two advertisements, with a *p*-value of 0.02.

In contrast, the respondents showed a high level of attention and memory to the contact numbers of the charitable institution in the positive advertisement more than in the negative ad. Eye movement and memory tested through the eye-tracking device showed that through the final screen of the contact

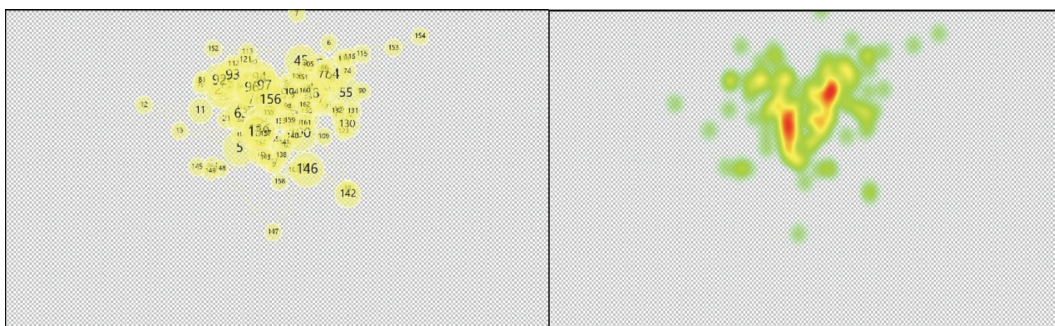


Figure 4: Gaze plots vs. heat map for positive advertisement.



Figure 5: Gaze plots vs. heat map for negative advertisement.

Table 4: Summary of eye-tracking statistical analysis.

Dependent variable	Standard		t-value	p-value
	Mean	deviation		
Eye fixation hits on ad characters:				
Positive advertisement	3.57	1.08	-2.367	0.003
Negative advertisement	2.11	1.46		
Attention to verbal measure:				
Positive advertisement	4.21	0.93	-2.811	0.02
Negative Advertisement	2.27	1.38		

numbers in the negative advertisement, the respondents moved their eyes away from the contact numbers to check the logo of the charitable organization or out of the PC screen. On the other hand, all respondents checked the contact numbers quickly once the final screen appeared as a positive advertisement.

DISCUSSION AND IMPLICATIONS

This study significantly contributes to the existing marketing literature by examining the effects of positive and negative charitable advertising appeals on the prosocial behaviour of Egyptian citizens and their intentions to donate to charitable institutions. By employing a comprehensive approach utilizing multiple techniques such as neuroscientific methods (i.e. EEG, eye tracker) and experimental research, this research sheds light on the intricate dynamics of the relationship between charitable advertisement appeals, prosocial behaviour and donation intentions.

Drawing upon recent academic literature and the latest advancements in neuromarketing research, this study addresses a significant gap in the field. While previous studies have explored the impact of charitable advertisements (Septianto and Tjiptono 2019; Lwin and Phau 2014; Sung et al. 2023; Bae 2023; Balaskas et al. 2023; Abdelhamid and Mahrous 2023), the combination of eye-tracking and EEG techniques to measure attention to donation intentions and evaluate advertising performance in the not-for-profit and non-governmental sectors remains largely unexplored. Therefore, this study offers a unique and valuable practical contribution to the marketing community.

Additionally, this research considers the specific Egyptian context, which needs similar studies, further enhancing its relevance and applicability. By providing insights into Egyptian donors' behaviour towards charitable advertisements and their underlying perceptions, this study assists marketing practitioners in developing more effective ads that positively influence prosocial behaviour and donation intentions in the Arab and Middle East and North African (MENA) countries context.

Notably, the findings generated with eye tracking and EEG show that negative appeal is more effective than positive appeal in influencing prosocial behaviour and intention to donate. These results contradict previous descriptive studies (e.g. Yousef et al. 2021; Casais and Proença 2022) that found positive appeal is more effective than negative appeal. These results support the notion that negative appeals create a sense of urgency and guilt, compelling individuals to take action. Also, these results are contrary to the findings of the studies (e.g. Cypryańska and Nezelek 2020; Agrawal and Duhachek 2010) that

suggested that negative appeals may lead to negative emotions, such as feelings of helplessness or overload, which can decrease the likelihood of prosocial behaviour.

Nevertheless, the findings reveal that the audience paid close attention to negative advertisements, primarily focusing on avoiding the painful scenes depicted. This finding supports the results of Bae (2023) about message order and negative appeals in charity advertisements. In light of these results, marketing practitioners can utilize positive or mixed appeals in their advertisements. These could include success stories of survivors of severe illnesses, serving as motivational narratives to encourage donations. By shifting the focus from solely negative and painful aspects to more uplifting content, potential donors are more likely to be engaged and motivated to contribute.

Theoretical implications

This study addressed a gap in the neuromarketing literature, which is limited in scope and methodology for charitable advertisements. Combining eye-tracking and EEG techniques to quantify attention and evaluate advertising performance in the not-for-profit and non-governmental sectors is innovative and adds practical value. The use of EEG in advertisement research is anticipated to increase, given the advancements in technology and computational capabilities that enable the detection of subtle changes in commercial stimuli with unrivalled millisecond time resolution, thereby influencing marketing effectiveness.

Furthermore, this study contributes by employing a comprehensive approach that combines multiple techniques to test the variables simultaneously. Previous research on charitable advertisement appeals primarily relied on descriptive methods or experimental designs using self-administered questionnaires. Additionally, the available literature could be more conducive to further research. Thus, this study fills a gap by adopting a more robust and contemporary methodology.

While donor characteristics are crucial to understanding charitable behaviour, most research in this field has focused on the United States and Europe, with limited attention given to other regions like Asia-Pacific and Africa. Therefore, this study's findings provide valuable insights and data into the charitable advertising literature specific to Arab and Middle Eastern countries similar to Egypt.

Moreover, the research utilizes advanced statistical programmes such as Brainwave Visualizer and Tobii Pro Analyzer Software, enhancing the accuracy of the results. Previous descriptive studies typically employed SPSS or AMOS for data analysis. The combination of findings from multiple techniques and programmes contributes to a more comprehensive understanding of the behaviour of the sampled respondents, adding further value to the study.

Lastly, the findings suggesting that a negative appeal is more effective than a positive appeal for charity advertisements carry significant theoretical implications for marketing. Firstly, these results challenge the conventional belief that positive emotions and uplifting messages are more persuasive in eliciting prosocial behaviour. The finding of the superiority of negative appeals raises questions about the underlying mechanisms and calls for a deeper understanding of the psychological processes behind negative emotions and their persuasive power. Secondly, this finding highlights the importance of emotional arousal and attention in advertising effectiveness. Negative

appeals may capture attention more effectively due to their ability to evoke strong emotions, leading to greater engagement and cognitive processing. This challenges the notion that positive emotions are always more attention-grabbing. Finally, these findings have implications for the ethical considerations surrounding using negative appeals in charity advertising. While negative appeals may be more effective in achieving short-term behavioural outcomes, further research is needed to understand the potential long-term consequences, public perception and ethical implications of using negative emotional triggers for charitable purposes.

Managerial implications

The findings of this study have important implications for marketing practitioners aiming to create more effective advertisements that positively influence prosocial behaviour and donation intentions. Given that the audience displayed a high level of attention towards negative advertisements while actively avoiding the painful scenes, it is recommended that institutions utilize positive or mixed appeals in their advertisements. These could include success stories of survivors who have overcome severe illnesses, motivating donors to contribute rather than solely focusing on the negative and distressing aspects of the cause.

Furthermore, it is advisable to provide evidence of the impact of donations to increase donors' trust in charitable institutions. Sending text messages to donors after their contributions, highlighting the tangible outcomes of their donations, can help bridge the trust gap identified in this study (Shazly and Mahrous 2020). This approach addresses the lack of sympathy towards negative advertisements and increases the willingness to watch and donate in response to positive advertisements.

Additionally, the contextual elements identified in the advertisements studied can serve as a guide for advertising agencies and philanthropic institutions to enhance the content of their advertisements. By leveraging these elements, marketers can deliver more valuable and compelling messages to their target audience, thereby improving the effectiveness of charitable advertisements in the Egyptian media.

CONCLUSION

In summary, this study significantly contributes to the marketing literature by exploring the effects of positive and negative charitable advertising appeals on Egyptian citizens' prosocial behaviour and donation intentions. It introduces novel techniques and approaches within the context of neuromarketing research and provides practical insights for marketing practitioners. By leveraging negative or mixed appeals and implementing strategies to build trust, marketers can create more effective ads and foster increased engagement and willingness to donate among the target audience. Overall, these findings provide valuable insights into the role of emotions and attention in advertising effectiveness, challenging traditional assumptions and offering directions for future research in the field of marketing.

LIMITATIONS AND FUTURE RESEARCH

Future research should explore the variations in donation behaviour and perception of charitable advertisements across different demographic categories. By comparing and analysing the responses of various demographic

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groups, scholars can uncover valuable insights into how donation behaviour might differ among individuals based on factors such as age, gender, income and education. This examination of demographic differences will contribute to a more comprehensive understanding of donor behaviour and aid in developing targeted marketing strategies.

Furthermore, there is a need for future studies to incorporate neuroscientific techniques to investigate the citizens' perception of public awareness advertisements related to charitable and social causes. Researchers can delve deeper into the cognitive and emotional processes underlying individuals' responses to these advertisements by employing advanced neuroimaging and physiological measures. This neuroscientific approach will provide a nuanced understanding of how these ads are perceived, processed and emotionally experienced by viewers. Addressing these research gaps is of utmost importance, as it will enhance our knowledge of donor behaviour and the effectiveness of charitable advertising. By expanding our understanding of how different demographic groups respond to appeals and how neuroscientific measures can capture their perception, marketing scholars can contribute to developing more targeted and impactful marketing strategies for charitable and social causes.

Lastly, the findings of this study carry ethical implications regarding the utilization of negative appeals in charity advertising. Although negative appeals may demonstrate greater effectiveness in attaining short-term behavioural outcomes, it is crucial to conduct additional research to comprehend the possible long-term ramifications, public perception and ethical consequences of using negative emotional triggers for charitable purposes.

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CONTRIBUTOR DETAILS

Abeer A. Mahrous, Ph.D., is a professor of marketing at Cairo University in Egypt. Her research interests are digital marketing, neuromarketing and consumer behaviour. Her research appeared in top-tier journals and conferences, such as the *Journal of Business Research*, *Journal of Global Marketing* and *Journal of Travel Research*. Also, she assumes the role of editor-in-chief for the *Journal of Humanities and Applied Social Sciences* while lending her expertise to the editorial teams of other reputable journals.

Contact: Faculty of Commerce, Business Administration Department, Cairo University, Campus, Giza, PO Box 12613, Egypt.
E-mail: abeer.mahrous@cu.edu.eg

 <https://orcid.org/0000-0002-6082-4621>

Yomna Mohsen (Ph.D.) is a marketing and international business lecturer at October University for Modern Sciences and Arts in Egypt. Dr Yomna is specialized in advertising, neuromarketing, services marketing and consumer behaviour. Her research has appeared in refereed journals such as *Marketing and Management of Innovations* and *The International Journal of Business and Management*.

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Contact: Faculty of Management Sciences, Marketing, and International Business, October University for Modern Sciences and Arts, October Campus, PO Box 12573, Egypt.
E-mail: ymhusein@msa.edu.eg

 <https://orcid.org/0000-0002-5729-069X>

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