Article

Determinants of Memory Encoding of Altruistic Messages: M-Delphi and F-DEMATEL Approach

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Abstract: One of the key challenges of non-profit organizations is the effective communication of values beneficial to society, such as altruism. Communication can be deemed effective if the message is memory encoded by the recipient. This paper applies social cognitive theory to analyze the determinants of the memory encoding of altruistic messages transmitted to audiences via television. The data were analyzed by the modified Delphi [M-Delphi) and Fuzzy Decision-Making Trial and Evaluation Laboratory [F-DEMATEL]. The researchers initially proposed ten factors, and two factors were added after the first Delphi round. The analysis revealed three causal factors and four effect factors. The findings provide several contributions to communication literature. They also provide managerial implications for managers in non-profit organizations on the effective communication of altruism.

Keywords: social cognitive theory; memory encoding; altruism; M-Delphi; F-DEMATEL

1. Introduction

Non-profit organizations perform many activities for the benefit of society. These organizations function in various sectors such as education, health, disaster relief, business and industry, environment, and agriculture. What lies at the core of non-profit organizations' work in their various sectors is altruism [1]. Non-profit organizations also aim to pass on their values, such as altruism, to their audiences through civic education [2]. Once people have altruistic views, they are likely to help others in need because their altruistic beliefs push them to prioritize the interest of others in their undertakings [3]. Ultimately, societal welfare is enhanced because general welfare is prioritized at the expense of individual interest and benefit as individuals act in a manner that assists others in need.

The success of non-profit organizations in their work partly depends on public engagement and positive public perceptions [4]. Stakeholders who actively participate and hold favorable views of non-profit organizations tend to rally behind their missions, demonstrating an increased likelihood of aligning their actions with the organizations' messages [5,6]. To achieve engagement and positive perceptions, non-profit organizations must communicate effectively with their audiences. Thus, one of the key challenges organizations face is crafting messages that will be remembered by their audiences [4]. There is a dearth of research on how non-profit organizations can effectively communicate messages about altruism to their audiences. Prior studies have focused more on effectively communicating policy and social issues [4–6]. However, altruism is one of the key areas many non-profit organizations engage in. It is essential to study how effective communications are crafted to ensure messages are memory encoded by the audience.

Civic education is conducted in several ways. When non-profit organizations assist their target audiences, they actively inform or instruct their beneficiaries about the concept of helping others [7]. Non-profit organizations educate beneficiaries through mass media such as television [8]. The rapid evolution of television has led to the generation and presentation of a rapidly diverse set of content [9], and only the content

which is more appealing to them is remembered [10]. Therefore, non-profit organizations must communicate effectively to ensure that their messages will be memory encoded by their audiences.

Most prior studies examining non-profit organization communication take homogenous approaches to examine the determinants of effective non-profit organization communication. For instance, ref. [11] examined how stakeholder-initiated engagement can shape the success of NGO communications via traditional media and social media. Ref. [12] examined the role of the target audience's participation in disaster risk reduction. Ref. [13] examined the role of financial resources in ensuring the social impact of non-profit organizations. However, the success of communication depends on multiple factors, which may not have equal degrees of impact on the success of communication. It is, thus, essential to examine, from a multidimensional perspective, the factors affecting the encoding of non-profit organizations' messages to have a clear picture of which factors have a higher or lesser degree of influence. Due to the paucity of studies examining the determinants of effective non-profit organization communication from a multidimensional perspective, this study examines the possible effect of ten factors on memory encoding altruistic messages.

Prior studies have used social cognitive theory to examine people's decisions on adopting specific perspectives based on the information they receive from their environments. Social cognitive theory emphasizes the role of individual factors, environmental factors, and cognitive processes in shaping and explaining human actions [14]. Most prior studies have dwelled mainly on behavior as an indicator of the internalization of messages and the adoption of new perspectives on given issues [15,16]. However, individuals' acceptance of information and resultant changes in perspectives are not evidenced solely by behavior. Other cognitive processes, such as memory encoding, also demonstrate the retainment of messages [17]. This study, therefore, draws from social cognitive theory to explore the environmental and personal factors that could be associated with the memory encoding of altruistic communications.

Against this backdrop, this research addressed two research questions: (1) What factors should be considered in the communication of altruistic values to ensure that the messages are anchored by audiences? (2) What are the interrelationships among the factors? This study has two primary objectives. First, it examines the determinants of memory encoding in altruistic communication. Secondly, the study examines the interrelationships among the factors associated with altruism. This study makes several contributions to communication literature. First, it highlights the factors that should be considered when crafting messages about altruism. Prior research has only focused on other forms of non-profit organizations' communication, such as policy advocacy, social activism, and the promotion of citizen engagement [4–6]. The study provides a clearer understanding of how non-profit organizations can communicate altruism effectively. Secondly, the study demonstrates how non-profit organizations can communicate effectively through media technologies such as television. Prior research has not indicated how mass media communication can be effectively conducted such that messages are memory encoded by audiences, considering the increasing difficulty of ensuring that media messages are remembered by audiences [18]. Third, the study provides a multidimensional view of the determinants of effective communication by non-profit organizations, an approach that has widely been ignored by prior studies [11–13]. The study also provides managerial considerations for altruistic communication.

The rest of the paper is structured as follows: the literature review is presented after the introduction. The methodology and results are presented, followed by discussion and conclusions. The literature review provides a review of relevant studies related to this study's topics. The methodology section describes the tools and procedures utilized in this study, the discussion section lays down a discussion of the results, and the conclusion, limitations, and future directions section presents the ending of the paper, its weaknesses, and areas that future studies could address.

2. Literature Review

This section reviews prior studies on altruism and memory encoding in the context of non-profit organizations. It also presents the factors proposed by the study and elucidates their linkages to memory encoding.

2.1. Non-Profit Organizations and Altruism

Non-profit organizations exist primarily to bring about positive social change [13]. At the core of non-profit organization operations is altruism, which drives the organizations' initiatives. The organizations also aim to communicate their altruistic values, mission, and initiatives to engage stakeholders, raise awareness about the issues they seek to address, and inspire positive change in society [18]. When an organization effectively communicates altruism to stakeholders, it obtains the trust of the stakeholders, which in turn encourages them to get involved in the organization's work [19]. Sincere conveyance of altruism can impact an organization's efforts to engage and retain supporters. Many non-profit organizations leverage different media platforms, such as television, to send out altruistic messages to stakeholders. Television has unique attributes such as visual narratives and emotional storytelling; these affordances have distinctive effects on how audiences process information [20]. Given the complexities associated with transmitting communications via television, it is important to understand how effectively altruism can be communicated. Thus, this study explores the factors that ought to be considered in altruistic communication.

2.2. Memory Encoding

There are various indicators of successful message reception by a receiver of information. One of the indicators is the encoding of the message into the memory of the receiver [21]. Memory encoding is modifying and storing sensory information in the brain [17]. For a stimulus to be encoded, it must be distinctive [22]. Distinctiveness refers to a stimulus's ability to appear dissimilar from a background of analogous stimuli [23]. Because encoding is based on selectiveness, events regarded as unique are deemed more deserving of attention, and these tend to be remembered more. Distinctiveness is what adds specialness to a stimulus. In this study, we examine several factors that could be considered to enhance the distinctiveness of a message to ensure that it is encoded by the audience to which it is directed.

Memory encoding follows central or peripheral paths [24]. The central path is associated with the frontal cortex of the brain and results in the intentional, effortful, rational, and conscious processing of information [25,26]. Information processed centrally tends to last longer in the memory system of the individual [27]. On the other hand, the peripheral path is associated with the brain's limbic system and processes stimuli instinctively and subconsciously [28]. Although information processed peripherally is sensational and lasts shorter than that processed centrally, it is regarded as effectively persuasive, mainly if it is hedonic and emotional. This study demonstrates how centrally and peripherally processed stimuli can result in memory encoding.

2.3. Determinants of Successful Communication by Non-Profit Organizations

Apart from performing the essential functions for which they exist, organizations are also concerned with communicating their values to their target audiences [18]. Prior research has focused on examining the drivers of organizations' successful communication of their functions. However, most of these studies have not examined the communication processes in the context of digital mass media, particularly television. The drivers identified by the prior studies can be placed into several broad categories. One category is network connectivity. Non-profit organizations that work with other stakeholders to promote essential issues are more successful in communication [19,29]. The support provided by the network organization increases the receptiveness of the audience to the messages being communicated. Other scholars have studied the factors that shape effective communication among non-profit organizations working on refugee welfare from a network perspective [5].

They established that the network position of a non-profit organization ensures effective communication of refugee welfare issues. Takahashi et al., 2015 [7], examining non-profit organizations' communication of climate policy issues, found that frequent meetings between organizations and their audiences lead to effective information dissemination. Clarity is another determinant of effective communication by non-profit organizations. It reduces confusion about the message and clarifies the point [30]. Extensive discussion of the primary subject of communication leads to effective communication. Ref [6] established that explaining climate change's impacts, actions, and efficacy guarantees effective communication of climate issues. Thus, a holistic explanation of the specifics of the issue being communicated enhances the audience's understanding. Other studies showed that considering audience characteristics, such as culture, in the communication process enhances communication effectiveness. Non-profit organizations operate in multiple areas with diverse cultures [31]. Failure to consider the audience's culture results in psychological and social conflict between the organization and the audience. As such, the message is resisted, rendering the communication a failure [32].

Because non-profit organizations exist to drive social change and to help disadvantaged groups, altruism lies at the core of their functions [33]. Altruism drives individuals and entities to help others. If it is communicated effectively, it draws an imprint on the memory of the audience [34]. It is, therefore, crucial to understand how altruism can be communicated effectively so that the communications are encoded into the audience's memory.

2.4. Social-Cognitive Theory

Social cognitive theory argues that the formation of perspectives by individuals is influenced by environmental, personal factors, and behavioral factors [14]. The environmental factors are external stimuli, including physical and social factors [15]. Personal factors are the cognitive, affective, and biological factors occurring within the individual [35]. Behavioral factors entail the individual's knowledge of the behavior and skills needed to perform it [14]; prior research has generally argued this point [16]. However, Ref. [17] argued that several other cognitive processes could prove that the recipient takes up that information. One such process, Ref. [17] claimed, is memory encoding. However, studies examining the formation of perspectives through memory encoding have remained rather scant. As such, this study aims to demonstrate that people's altruistic perspectives, evidenced by their memory encoding of altruistic messages, can be formed by several environmental factors. This research proposes environmental and personal determinants of the memory encoding of altruistic messages. The proposed ecological factors are argument quality, emotional appeal, source expertise, interpersonal information, and social proof. The proposed personal factors are outcome desirability to self, outcome desirability to others, personal experience, homophily, and trust.

2.5. Factors Associated with Memory Encoding of Altruistic Messages

Based on a literature review, this study initially proposed ten factors associated with the memory encoding of altruistic messages. These factors are discussed in greater detail below.

2.5.1. Argument Quality

Argument quality refers to the persuasive strength of arguments [36]. It is based on relevance, actuality, accuracy, and comprehensiveness [37]. Prior research has demonstrated that the strength of an argument determines the consumer's adoption and usage of the information. The importance of argument quality in enhancing information retainment is partly rooted in the language performativity hypothesis, which states that speech acts have the power to convey information and bring about relatively stable change [38]. Convincing arguments lead to greater adoption of communicated information by individuals [39]. Opinions from external sources stimulate cognitive activity in brain regions associated with storing and retrieving the received information [40]. Therefore, argument quality

is proposed as one of the factors related to the memory encoding of altruistic messages. Because arguments come from external sources [40], this study categorizes argument quality as an external factor.

2.5.2. Emotional Appeal

According to dual-process theories, individuals' preferences and cognitive activity generally have a systematic, rational path and a peripheral, heuristic path [39]. Emotional information is processed without much cognitive effort and is processed via the peripheral path [41]. The link between emotion and memory encoding can be explained by Damasio's somatic market hypothesis, which, along with bodily sensations, plays important roles in decision making and the strength and quality of memories [42]. Brain imaging studies have shown that emotional stimuli activate the amygdala, the brain part responsible for emotional memory [43]. In addition, [44] argues that the amygdala affects explicit memory by activating other brain regions involved in memory. Emotional appeal also has a positive association with the retainment of information because it increases the intrinsic value of the information to the receiver [44]. On the other hand, it induces a lasting altruistic concern in the receiver of information [45]. Thus, emotion has both neural and feeling connections to information storage. Therefore, this study proposes that the emotional appeal of altruistic content on television will lead to its viewers' greater encoding of the content. This factor is an environmental factor because the emotional load of a message depends on whether the framer designs it as such [46].

2.5.3. Source Expertise

Source expertise refers to the degree to which the sender of information can provide correct information [47]. One of the sender's positive qualities affects the receiver's acceptance of the communicated content because they prefer information sources with a high degree of experience and expertise in communicating the issue [48]. Expertise emanates from the experience and knowledge of the issue's source [49]. Information given by credible sources is more valuable than that provided by unreliable sources. We thus propose that altruistic information will be memory encoded if a credible expatriate source communicates it with experience in communicating messages to do with altruism. Source expertise is categorized as an external factor because it is a cue that emanates from the message's source, which is external to the receiver.

2.5.4. Trust

Trust refers to the willingness of an individual to be vulnerable to the information presented by another party based on the expectation that the sender gives information necessary to the trusting party, regardless of whether the recipient of the information can monitor or control the other party [50]. Because trust has to do with the individual, we propose it to be a personal factor. A message recipient trusts information if it is valid, honest, and straight to the point [48]. If a receiver does not trust, a message is unlikely to be encoded into the memory of the receiver because it will not be valuable or essential to the receiver.

2.5.5. Interpersonal Information

Interpersonal information is an environmental factor that refers to information passed from one individual to another about a subject of interest [51]. When individuals receive information about a subject, they tend to collect more information about the issue and the reputation and ability of the communicator from their social ties [52]. Audiences regard interpersonal information as unbiased perspectives on the content of the communication and the communicator's ability, such that positive interpersonal information about a topic increases the likelihood of the audience's adoption of the information [18].

2.5.6. Social Proof

Social proof refers to individuals referencing people around them to deal with unfamiliar situations [53]. When making decisions, people infer from their cultural norms and established ways of doing things before acting [54]. Social proof is, therefore, an environmental factor. In communication, information in line with accepted ways of doing things is obtained relative to that which is not [55]. Thus, altruistic messages that align with established ways of doing things in the audience's society are accepted.

2.5.7. Outcome Desirability to Self

Outcome desirability refers to individuals' appraisals of the favorability of a course of action [56]. Before accepting information, individuals conduct intrinsic and extrinsic assessments of the desirability of what is being communicated to them individually [57]. The evaluation of benefits to oneself is achieved personally and categorized as a personal factor. Helping behavior brings intrinsic happiness and mood regulation [58,59], making people esteemed by others [60]. Thus, if individuals are exposed to information likely to bring them positive rewards, they will most likely assimilate the information to reap the rewards that the assimilation of this information brings.

2.5.8. Outcome Desirability to Others

Altruistic individuals are concerned about others' welfare [61]. They are willing to put others' interests above theirs without any personal benefit to themselves [62]. They have a preference for activities that have the potential to bring out social change and enhance the societal moral image [63]. Given that altruistic information communicates behaviors that enhance the livelihood of others in society, it is likely to be accepted if the audience believes that the information brings desirable outcomes for other people.

2.5.9. Personal Experience

Personal experience provides first-hand information about the consequences of an action to the individual [64]. It is, therefore, a personal determinant of behavior. If, based on experience, a stimulus has positive outcomes, it is likely to be accepted, whereas if it has adverse effects, it is likely to be avoided [64]. Similarly, individuals who have been helped before are likely to assist others because they have the experience of being in need and bailed out by others [48]. Thus, individuals who have the experience of benefiting from the altruism of others are likely to be more receptive to altruistic messages and to remember them. Therefore, personal experience increases receptiveness to messages about altruism.

2.5.10. Homophily

Homophily is an individual's perception of the similarity between the self and a message sender. Homophily enhances the acceptability of information communicated by the sender to the receiver by reducing the psychological distance between parties in communication [65]. If individuals perceive similarities between themselves and the communicating organization, they are likely to be more receptive to the information communicated to them.

2.5.11. Personal Interest

Personal interest refers to an individual's curiosity, attraction, or passion for a specific subject of communication [66]. It emanates from the individual's belief that the subject of communication is of inherent value. Personal interest assures the individual's attention because the subject of communication is perceived as relevant and interesting. It also results in enhanced cognitive processing, which entails engagement with the message [67]. Engagement, in turn, leads to a deeper retainment of information, which could result in memory encoding [8].

2.5.12. Atmosphere

Atmosphere refers to the environmental context in which information is presented [68]. People's surroundings play an important role in shaping how they perceive, process, and remember information. For instance, the atmosphere can evoke emotions linked to the information being presented [69]. A conducive environment can also enhance an individual's attention and focus on the information, which can enhance message retention [24]. In addition, certain atmospheres evoke semantic associations related to the information being presented, which makes it likely that the information is recalled by the audience [69].

3. Methodology

This study collected data from 14 experts who were asked to give opinions on the extent to which they believed each factor would lead to the memory encoding of altruistic messages. The experts were media communication experts from Da Ai Television, a media and communications arm of Tzu Chi Foundation, a Taiwanese non-profit charity organization. To qualify for participation in the study, individuals must have worked in the media production industry for at least fifteen years in producing altruistic programs with television stations. Prior to collecting the data, the researcher explained the meaning of every individual factor and provided a sheet of paper containing the definitions of the factors to the experts for their use during the rating process.

3.1. The Modified Delphi (M-Delphi) Method

The M-Delphi method gathers and evaluates expert opinions on a topic. Its ultimate aim is to achieve a reliable consensus among experts on a topic of interest [70]. The method solicits information from experts through a series of iterative rounds, with feedback provided between the rounds. The process is iterative and ends in convergence on key points of agreement among the experts. Before gathering the opinions of experts, the researcher can develop an initial set of possible factors via a literature review [71]. During the Delphi rounds, the experts can suggest additional factors. The Delphi procedure continues until the experts reach a consensus on the causal effect of the factors on the outcome variable. This study solicited expert opinions through the M-Delphi method to ensure that the proposed factors were concrete enough and to minimize the possibility of random factors being included in the model.

3.2. The DEMATEL Method

The DEMATEL technique originated in the 1970s at the Banelle Institute of Geneva. An exceptional feature of this method is its capacity to establish connections among factors. Researchers have employed this approach in diverse areas like consumer behavior, supply chain management, and health promotion [8,62,63] DEMATEL is effective in addressing complex issues involving multiple factors in situations of uncertainty. Communication processes are occasionally subject to uncertainty due to the influence of various external factors. Consequently, in this study, a modified variant of DEMATEL, known as the F-DEMATEL method, is employed.

3.3. F-DEMATEL

The F-DEMATEL method is a modified form of the DEMATEL method, a technique used to solve complex laboratory decision problems and establish relationships among variables. The expert respondents make fuzzy linguistic ratings based on their experiences [72]. Fuzzy techniques are incorporated into DEMATEL to reduce subjectivity. The F-DEMATEL technique has been empirically applied in such contexts as supply chain management [73], construction [74], and health communication [75]. This study applies the F-DEMATEL method because multicriteria decision methods such as DEMATEL help prioritize factors to be considered when making decisions. In the case of this study, the results of the F-DEMATEL analysis would indicate which factors need to be considered when drafting altruistic messages to ensure that they are memory encoded by the audience. Figure 1

demonstrates the process framework for the M-Delphi and F-DEMATEL techniques used in this study. The twelve factors were derived using the M-Delphi technique, after which the interrelationships among the factors and the causal effects of each factor on the outcome variable were examined via F-DEMATEL. The computational steps involved in F-DEMATEL are explained below.
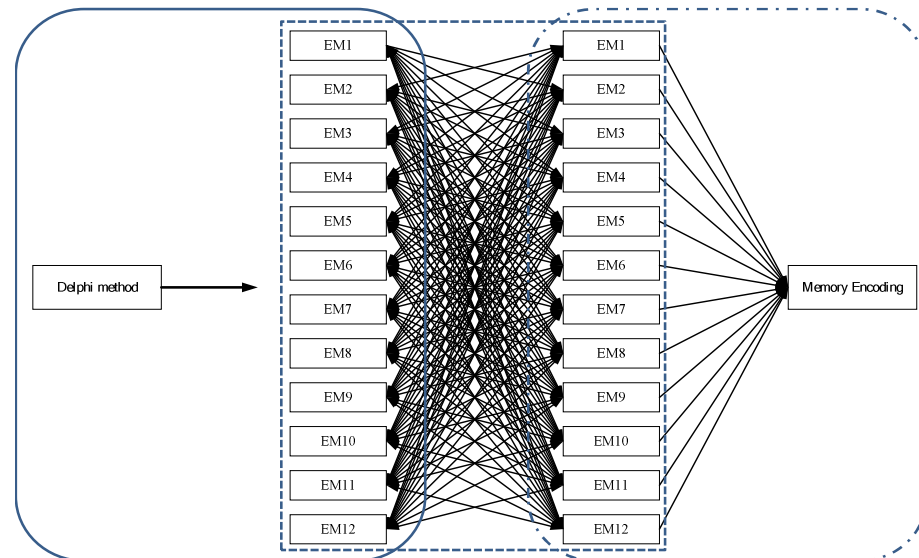
Figure 1. M-Delphi-Fuzzy DEMATEL process framework. Note: EM1 = Argument quality, EM2 = Emotional appeal, EM3 = Source expertise, EM4 = Trust, EM5 = Social factors, EM6 = Social proof, EM7 = Outcome desirability to self, EM8 = Outcome desirability to others, EM9 = Personal experience, EM10 = Homophily, EM11 = Personal experience, EM12 = Atmosphere.

3.3.1. Step 1: Determination of the Influencing Factors in the System

Based on a literature review, factors affecting the variable of interest are determined. These factors are then handed out to experts to solicit their opinions on their perception of the degree of influence between every pair of factors; and each factor on the variable of interest.

3.3.2. Step 2: Designing the Fuzzy Linguistic Scale

The degrees of influence among various factors are pre-determined by the researcher. The degrees of influence are in five levels, semantically labeled as no influence, very low influence, low influence, high influence, and very high influence. The fuzzy linguistic scale is shown in Table 1. The semantic expression corresponds to triangular fuzzy numbers, which are triple numbers.

Table 1. The fuzzy semantic expressions and their corresponding numbers.

Linguistic Expression	Triangular Fuzzy Numbers
No influence [NI]	0.000, 0.000, 0.250
Very low influence [VL]	0.000, 0.250, 0.500
Low influence [L]	0.250, 0.500, 0.750
High influence [HI]	0.500, 0.750, 1.000
Very high influence [VH]	0.750, 1.000, 1.000

3.3.3. Step 3: Computing the Initial Direct Relation Fuzzy Matrix

The experts are asked to evaluate the relationships between every pair of proposed factors. Assuming that the number of experts is p, the ratings for every pair of criteria by

expert k are denoted by Z_{ij}^k. For every respondent, the initial direct-relation fuzzy matrix is as follows:

$$
Z^K = \begin{bmatrix} 0 & Z_{12}^k & \cdots & Z_{1n}^k \\ Z_{21}^k & 0 & \cdots & Z_{2n}^k \\ \vdots & \vdots & \ddots & \vdots \\ Z_{n1}^k & Z_{n2}^k & \cdots & 0 \end{bmatrix} k = 1, 2, \ldots, p \tag{1}
$$

$$
\text{where } Z_{ij}^k = [l_{ij}^k, m_{ij}^k, u_{ij}^k]
$$

3.3.4. Step 4: Normalizing the Direct-Relation Fuzzy Matrix

$$
r^k = \max_{1 \le i \le n} \left(\sum_{j=1}^n u_{ij}^k \right) k = 1, 2, \ldots, p \tag{2}
$$

To compare the proposed criteria, the linear scale transformation is used. Thereafter, the normalized direct relation fuzzy matrix X^k is obtained:

$$
X^K = \begin{bmatrix} X_{11}^K & X_{12}^k & \cdots & X_{1n}^k \\ X_{21}^k & X_{22}^k & \cdots & X_{2n}^k \\ \vdots & \vdots & \ddots & \vdots \\ X_{n1}^k & X_{n2}^k & \cdots & X_{nn}^k \end{bmatrix} k = 1, 2, \ldots, p \tag{3}
$$

$$
\text{where } X_{ij}^k = (L_{ij}^k, M_{ij}^k, U_{ij}^k) = \left(\frac{Z_{ij}^k}{r^k} \right) = \left(\frac{l_{ij}^k}{r^k}, \frac{m_{ij}^k}{r^k}, \frac{u_{ij}^k}{r^k} \right).
$$

The average matrix of X^k for every respondent k = 1, 2, …, p is calculated using Equation (4).

$$
L = \begin{bmatrix} L_{11} & \cdots & L_{1n} \\ \vdots & \ddots & \vdots \\ L_{n1} & \cdots & L_{nn} \end{bmatrix}, M = \begin{bmatrix} M_{11} & \cdots & M_{1n} \\ \vdots & \ddots & \vdots \\ M_{n1} & \cdots & M_{nn} \end{bmatrix}, U = \begin{bmatrix} U_{11} & \cdots & U_{1n} \\ \vdots & \ddots & \vdots \\ U_{n1} & \cdots & U_{nn} \end{bmatrix} \tag{4}
$$

$$
\text{where } L_{ij} = \frac{1}{p} \sum_{k=1}^p L_{ij}^k, M_{ij} = \frac{1}{p} \sum_{k=1}^p M_{ij}^k, U_{ij} = \frac{1}{p} \sum_{k=1}^p U_{ij}^k.
$$

3.3.5. Step 5: Generating and Analyzing the Structural Model

The total-relation fuzzy matrix T is obtained after normalizing the direct-relation fuzzy matrix. The total-relation fuzzy matrix is calculated using Equation (5) to Equation (8).

$$
TL = \left[TL_{ij} \right] = \lim_{c \to \infty} [L + L^2 + \ldots + L^c] = L[1 - L]^{-1} \tag{5}
$$

$$
TM = \left[TM_{ij} \right] = \lim_{c \to \infty} [M + M^2 + \ldots + M^c] = M[1 - M]^{-1} \tag{6}
$$

$$
TU = \left[TU_{ij} \right] = \lim_{c \to \infty} [U + U^2 + \ldots + U^c] = U[1 - U]^{-1} \tag{7}
$$

$$
T^K = \begin{bmatrix} [TL_{11}, TM_{11}, TU_{11}] & [TL_{12}, TM_{12}, TU_{12}] & \cdots & [TL_{1n}, TM_{1n}, TU_{1n}] \\ [TL_{21}, TM_{21}, TU_{21}] & [TL_{22}, TM_{22}, TU_{22}] & \cdots & [TL_{2n}, TM_{2n}, TU_{2n}] \\ \vdots & \vdots & \ddots & \vdots \\ [TL_{n1}, TM_{n1}, TU_{n1}] & [TL_{n1}, TM_{n1}, TU_{n1}] & \cdots & [TL_{nn}, TM_{nn}, TU_{nn}] \end{bmatrix} \tag{8}
$$

3.3.6. Step 6: Obtaining the Defuzzification Value of the Total Relation Fuzzy Matrix

To de-fuzzify the sums of the rows $[D_i]$ and columns $[R_i]$, the best non-fuzzy performance [BNP] method is applied. The BNP value is calculated using Equation (9), and Equation (10) is used to obtain the defuzzification values of total-relation matrices.

$$BNP = 1 + \frac{(u-1) + [m-1]}{3} \tag{9}$$

$$T^K = \begin{bmatrix} T'_{11} & T'_{12} & \cdots & T'_{1n} \\ T'_{21} & T'_{22} & \cdots & T'_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ T'_{n1} & T'_{n2} & \cdots & T'_{nn} \end{bmatrix} \tag{10}$$

$$\text{where } T'_{ij} = TL_{ij} + \frac{(TU_{ij} - TL_{ij}) - [TM_{ij} - TL_{ij}]}{3}$$

3.3.7. Step 7: Establishing and Analyzing the F-DEMATEL Diagram

The summations of rows and columns are plotted as vectors D_i and R_i. Prominence, which is the vector for the horizontal axis $[D_i + R_i]$, is obtained by summing the rows and columns for each factor. Relation $[D_i - R_i]$, which is the vector for the vertical axis, is obtained by subtracting the columns from rows for each factor. Thereafter, the criteria are classified into cause-and-effect sets. Factors with positive $D_i + R_i$ values are causal factors, and factors with negative $D_i + R_i$ values are effect factors. The causal model is obtained by graphing the values of $D_i + R_i$ and $D_i + R_i$.

$$D_i = \sum_{x=1}^{n} T'_{ix} \tag{11}$$

$$R_i = \sum_{y=1}^{n} T'_{yj} \tag{12}$$

4. Procedure

Based on a review of existing literature, the researcher initially proposed a set of twelve factors influencing the memory encoding of altruistic messages. The researchers conducted an extensive literature review on anchoring, focusing on publications from 2018 to 2023 available on the Google Scholar database. Various key search phrases were utilized to identify these factors, including terms like "determinants of memory encoding in communication," "factors contributing to memory encoding in communication," and "antecedents of memory encoding in communication." The first ten factors elaborated in Section 2.5 were subsequently identified through this process. In order to validate the applicability of these factors within the F-DEMATEL framework, a modified Delphi (M-Delphi) procedure was undertaken involving a panel of ten experts. These experts, affiliated with Da Ai Television in Taiwan, were requested to assess the perceived influence of each factor on the memory encoding of altruistic messages. The selection of these experts was based on convenience sampling. The rating was conducted on a 5-point Likert scale. After the first round, one expert proposed two more factors as possible determinants of memory encoding: personal interest in the issue being communicated [personal interest] and the external atmosphere of the recipient at the time the message is delivered [atmosphere]. These two factors were included in the following three Delphi rounds to solicit the experts' opinions on the extent to which each factor affects the memory encoding of altruistic messages. The average rating of each expert for each factor over all three rounds was higher than 75%. After the fourth round, it was concluded that the experts had reached the consensus that each of the four factors led to the memory encoding

of altruistic messages. After the four M-Delphi rounds, the factors were further analyzed using f-DEMATEL.

5. Results

Equations (1), (2), and (8) were used to obtain the initial direct relation matrix, normalized direct relation matrix, and the fuzzy total relation matrices, respectively. The fuzzy total relation matrix is shown in Table 2. After obtaining the fuzzy total relation matrix, the indices of each defuzzification criterion were attained using Equations (9) and (10). After that, prominence $[D_i + R_i]$ and cause and effect relationships $[D_i - R_i]$ were obtained by summing and subtracting values obtained from Equations (11) and (12). The cause and- effect diagram [Figures 2 and 3] was developed based on prominence and cause and effect values.

Table 2. Fuzzy Total Relation Matrix.

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	EM9	EM10	EM11	EM12
						i′ij						
EM1	0.003	0.015	0.018	0.018	0.019	0.017	0.019	0.019	0.018	0.016	0.012	0.019
EM2	0.030	0.006	0.029	0.026	0.027	0.026	0.028	0.029	0.023	0.024	0.020	0.024
EM3	0.022	0.018	0.006	0.019	0.020	0.022	0.021	0.023	0.018	0.019	0.015	0.017
EM4	0.022	0.019	0.022	0.005	0.023	0.025	0.021	0.022	0.020	0.019	0.017	0.022
EM5	0.019	0.021	0.023	0.022	0.006	0.022	0.021	0.023	0.023	0.019	0.015	0.021
EM6	0.023	0.020	0.025	0.023	0.024	0.007	0.025	0.026	0.025	0.023	0.020	0.023
EM7	0.016	0.013	0.015	0.013	0.014	0.016	0.003	0.014	0.015	0.015	0.013	0.016
EM8	0.016	0.016	0.016	0.015	0.017	0.020	0.016	0.005	0.017	0.015	0.013	0.015
EM9	0.026	0.023	0.026	0.025	0.026	0.026	0.024	0.024	0.005	0.020	0.018	0.023
EM10	0.017	0.018	0.017	0.019	0.019	0.018	0.017	0.017	0.015	0.003	0.014	0.019
EM11	0.027	0.025	0.027	0.025	0.027	0.027	0.026	0.027	0.026	0.027	0.005	0.027
EM12	0.019	0.020	0.021	0.019	0.022	0.019	0.019	0.020	0.019	0.020	0.017	0.006
						m′ij						
EM1	0.011	0.031	0.035	0.033	0.034	0.032	0.034	0.034	0.033	0.032	0.028	0.035
EM2	0.045	0.012	0.045	0.044	0.045	0.045	0.045	0.045	0.040	0.040	0.036	0.041
EM3	0.037	0.031	0.011	0.034	0.034	0.036	0.037	0.039	0.034	0.035	0.031	0.034
EM4	0.038	0.035	0.038	0.012	0.039	0.041	0.037	0.039	0.036	0.036	0.034	0.040
EM5	0.033	0.034	0.037	0.037	0.012	0.037	0.036	0.039	0.038	0.034	0.030	0.036
EM6	0.039	0.035	0.041	0.037	0.039	0.011	0.041	0.042	0.040	0.039	0.035	0.039
EM7	0.030	0.028	0.030	0.028	0.029	0.031	0.009	0.028	0.029	0.030	0.027	0.030
EM8	0.031	0.030	0.031	0.029	0.031	0.034	0.031	0.011	0.031	0.029	0.027	0.029
EM9	0.040	0.037	0.041	0.040	0.040	0.040	0.040	0.040	0.011	0.036	0.034	0.039
EM10	0.030	0.030	0.030	0.033	0.032	0.032	0.032	0.032	0.030	0.009	0.028	0.034
EM11	0.043	0.041	0.044	0.041	0.043	0.043	0.041	0.043	0.041	0.043	0.012	0.044
EM12	0.034	0.034	0.037	0.034	0.038	0.035	0.034	0.035	0.035	0.036	0.032	0.013

Table 2. *Cont.*

	EM1	EM2	EM3	EM4	EM5	EM6	EM7	EM8	EM9	EM10	EM11	EM12
						u'_{ij}						
EM1	0.020	0.049	0.053	0.051	0.052	0.051	0.052	0.052	0.051	0.051	0.046	0.053
EM2	0.059	0.022	0.059	0.058	0.058	0.059	0.058	0.059	0.057	0.055	0.052	0.057
EM3	0.056	0.052	0.022	0.053	0.054	0.056	0.056	0.058	0.054	0.054	0.050	0.053
EM4	0.057	0.054	0.058	0.022	0.058	0.059	0.056	0.057	0.055	0.054	0.052	0.057
EM5	0.052	0.053	0.056	0.056	0.022	0.056	0.055	0.057	0.056	0.053	0.049	0.055
EM6	0.057	0.053	0.057	0.055	0.056	0.022	0.058	0.059	0.059	0.057	0.054	0.057
EM7	0.048	0.044	0.047	0.046	0.047	0.048	0.019	0.048	0.049	0.046	0.043	0.047
EM8	0.048	0.047	0.048	0.048	0.050	0.053	0.050	0.021	0.050	0.048	0.046	0.050
EM9	0.058	0.055	0.058	0.058	0.058	0.058	0.059	0.059	0.024	0.056	0.054	0.059
EM10	0.048	0.049	0.049	0.051	0.050	0.049	0.051	0.052	0.050	0.019	0.046	0.053
EM11	0.059	0.058	0.060	0.058	0.060	0.060	0.058	0.058	0.057	0.058	0.022	0.059
EM12	0.053	0.053	0.055	0.052	0.055	0.052	0.052	0.054	0.053	0.052	0.048	0.020

Note: EM1 = Argument quality, EM2 = Emotional appeal, EM3 = Source expertise, EM4 = Trust, EM5 = Social factors, EM6 = Social proof, EM7 = Outcome desirability to self, EM8 = Outcome desirability to others, EM9 = Personal experience, EM10 = Homophily, EM11 = Personal experience, EM12 = Atmosphere.
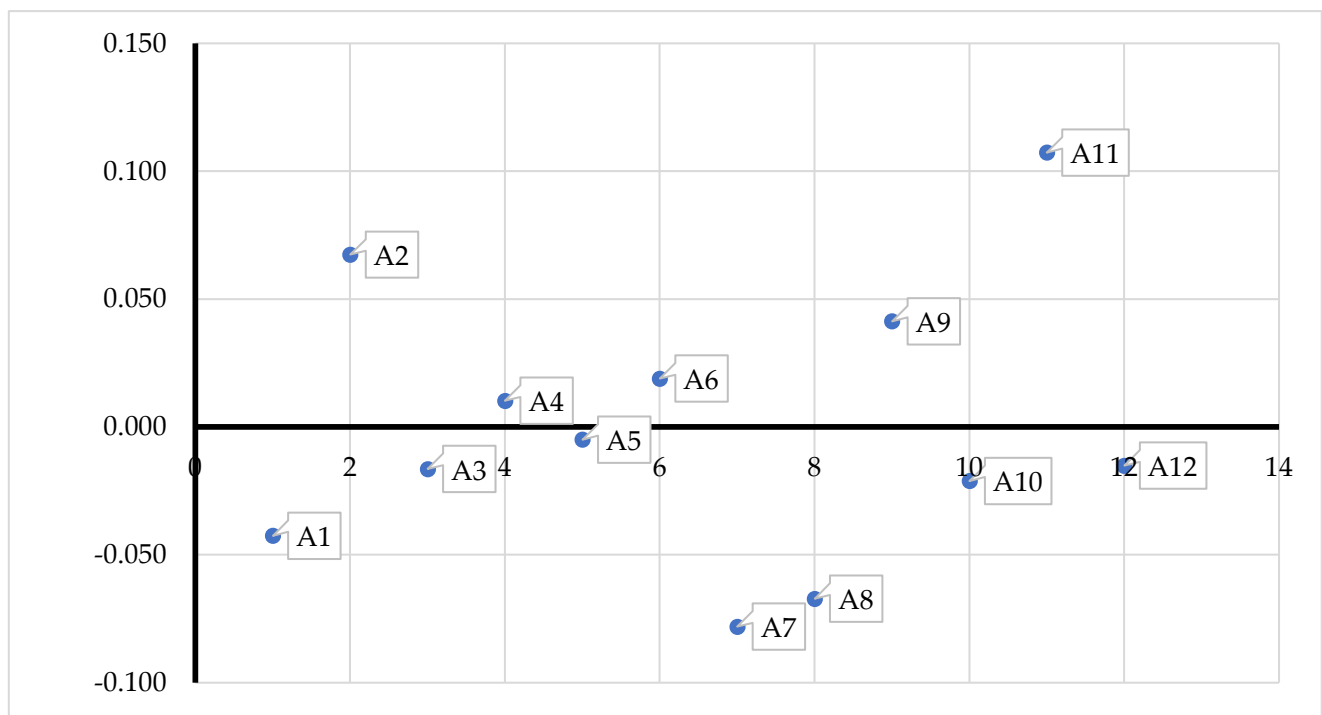
Figure 2. F−DEMATEL Scatter Diagram. Note: A1 = Argument quality, A2 = Emotional appeal, A3 = Source expertise, A4 = Trust, A5 = Interpersonal information, A6 = Social proof, A7 = Outcome desirability to self, A8 = Outcome desirability to others, A9 = Personal experience, A10 = Homophily, A11 = Personal interest, A12 = Atmosphere.
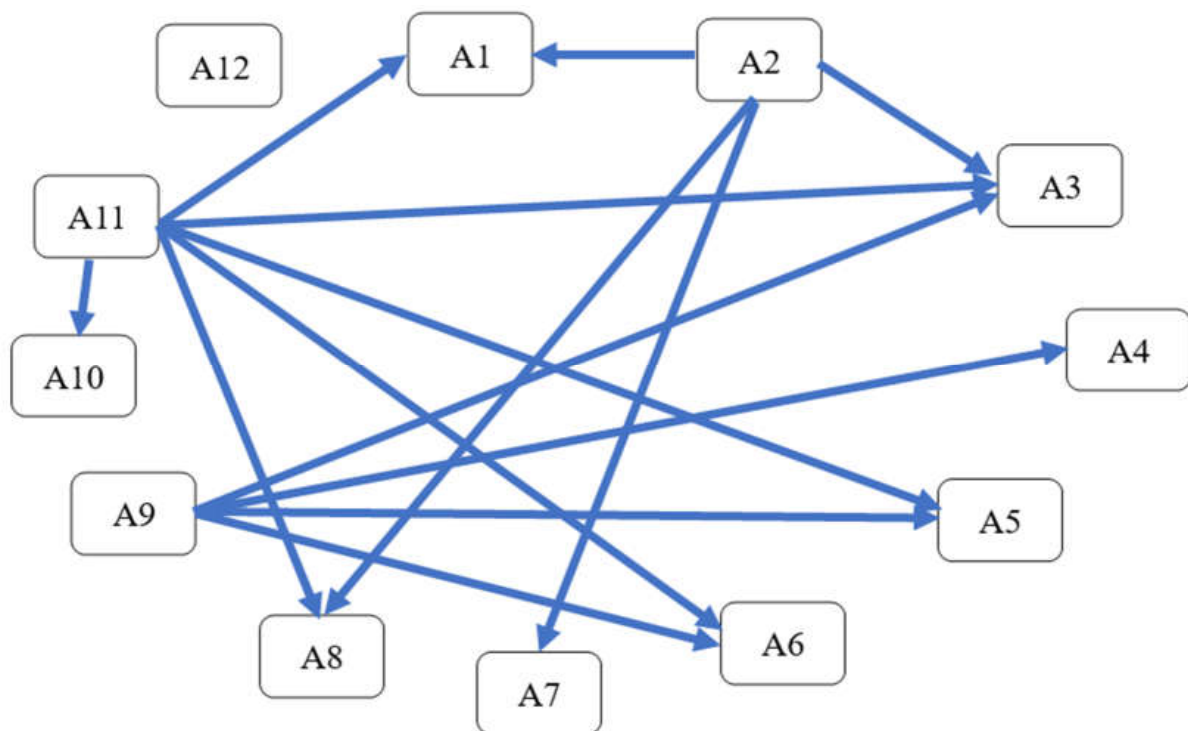
Figure 3. F-DEMATEL Cause and Effect Diagram. Note: A1 = Argument quality, A2 = Emotional appeal, A3 = Source expertise, A4 = Trust, A5 = Interpersonal information, A6 = Social proof, A7 = Outcome desirability to self, A8 = Outcome desirability to others, A9 = Personal experience, A10 = Homophily, A11 = Personal interest, A12 = Atmosphere.

The F-DEMATEL data were analyzed following the F-DEMATEL analysis procedure outlined in Section 3.3. The detailed analysis procedure is explained in the Supplementary File S1. Based on their D_i and R_i values, the factors were organized in two ways. First, they were organized based on their degree of importance $[D_i + R_i]$ and whether they were cause or effect factors $[D_i - R_i]$. The results indicated that social proof [A6] had the highest degree of importance $[D_i + R_i = 0.876]$. The rest of the factors, from the smallest to largest degree of influence, were A2, A9, A11, A4, A5, A3, A12, A1, A8, A7, and A10. The factors were also categorized into cause and effect factors. A cut-off point $[\alpha = 0.035]$ was set by calculating the average of the mean values of L_{ij}, M_{ij}, and U_{ij}. All $D_i - R_i$ values with absolute values greater than 0.035 were deemed as significant, whereas those with absolute values less than 0.035 were considered insignificant. The results [see Table 3] showed three significant causal factors: personal interest $[D_i - R_i = 0.107]$, emotional appeal $[D_i - R_i = 0.067]$, and personal experience $[D_i - R_i = 0.041]$. Three effect factors were established. In order of their $D_i - R_i$ values, these factors were outcome desirability to self $[D_i - R_i = -0.078]$, outcome desirability to others $[D_i - R_i = -0.067]$, and argument quality $[D_i - R_i = -0.043]$. The findings also demonstrate that personal interest has causal effects on argument quality, source expertise, interpersonal information, social proof, outcome desirability to others, homophily, and atmosphere (see Table S6 in the File S1). Personal experience has causal effects on source expertise, trust, interpersonal information, and social proof. In addition, emotional appeal also affects argument quality, source expertise, outcome desirability to self, and outcome desirability to others.

Table 3. Prominence and cause and effect relationships.

Factor	Di	Ri	Di + Ri	Di − Ri
A1	0.263	0.306	0.569	−0.043
A2	0.350	0.282	0.632	0.067
A3	0.296	0.313	0.609	−0.016
A4	0.309	0.299	0.608	0.010
A5	0.306	0.310	0.616	−0.005
A6	0.332	0.313	0.645	0.019
A7	0.232	0.310	0.542	−0.078
A8	0.252	0.319	0.571	−0.067
A9	0.337	0.296	0.634	0.041
A10	0.266	0.287	0.553	−0.021
A11	0.358	0.251	0.609	0.107
A12	0.287	0.302	0.589	−0.015

Note: A1 = Argument quality, A2 = Emotional appeal, A3 = Source expertise, A4 = Trust, A5 = Interpersonal information, A6 = Social proof, A7 = Outcome desirability to self, A8 = Outcome desirability to others, A9 = Personal experience, A10 = Homophily, A11 = Personal interest, A12 = Atmosphere.

6. Discussion

This section delves into the findings of the paper, providing a detailed analysis of the findings within the context of the study. It explores how the obtained results align with prior research and what they imply in the context of non-profit organization altruistic communication.

6.1. General Discussion

The findings of this study indicate that personal interest is the most significant determinant of the memory encoding of altruistic messages. This finding is consistent with the findings of prior studies, which established that the recipient's interest in communication ensures that the message is retained [7]. For communication to be influential, parties in the communication process need to take an interest in the communication process. Interest in an issue being communicated increases the individual's engagement in the communication process, which implies active processing of messages in the communication and remembrance of the messages [67]. Consequently, the messages that they receive become encoded into their memory. Thus, personal interest helps achieve memory encoding by ensuring information is processed centrally. The results also indicate that personal interest has causal effects on argument quality, source expertise, interpersonal information, outcome desirability to others, homophily, and atmosphere. The findings also demonstrate that emotional appeal is another important determinant of encoding altruistic messages. This is consistent with prior research, which has established the critical role of emotions in the retainment of emotion [76,77]. Emotional appeal also has causal effects on argument quality, source expertise, outcome desirability to self, and outcome desirability to others. Emotions are mainly associated with the peripheral path of information processing [41]. Altruism is primarily an emotional endeavor because it stems from the individual's concern for the welfare of others [62]. Messages that are emotionally loaded appeal to the emotions of the audience. This finding demonstrates that altruistic messages are also processed through the peripheral path, associated mainly with emotions [44]. Personal experience is also a significant determinant of the memory encoding of altruistic messages, and also has causal effects on source expertise, trust, interpersonal information, and social proof. This finding is also in line with prior research, which established that individuals' experience with a certain phenomenon enhances their retainment of information related to that phenomenon in future [68]. Thus, when individuals have first-hand experience of benefiting from others'

helping behavior, they have pre-existing evidence about the benefits of altruism and understand the importance of altruism [48]. As such, they would value subsequent messages about altruism, and, because the messages are considered valuable, they are encoded into their memory. This finding provides further evidence to prior empirical findings that personal experience affects the likelihood of an individual's acceptance of an external stimulus [64].

The study's findings also demonstrate that outcome desirability to self and outcome desirability to others are the first and second most significant factors, respectively. Prior research has suggested that altruism is primarily associated with the individual's concern for others [62]. The study's results indicate that concern for self and others contributes to altruism. If the causal factors are addressed accordingly, the recipient considers the altruism communicated in the message beneficial to self and others, consistent with prior research [78]. Thus, if individuals are interested in altruistic messages, it is partly because they believe it benefits themselves and others. This could explain why self-interest would ensure that outcome desirability to self and outcome desirability to others is achieved. The results indicate that outcome desirability to self has a higher degree of significance than outcome desirability to others. This finding is particularly interesting given that Taiwan is a collectivist culture, and one would expect outcome desirability to others to have a greater degree of significance than outcome desirability to self. Future research could examine the mechanisms that explain this phenomenon. Furthermore, emotions can be elevated when an individual directly experiences altruism or when they witness the experiences of others and are aware of the advantages of altruism to themselves and others [41]. As such, emotional appeal and personal experience would ensure that outcome desirability to oneself and others is addressed. The results also indicate that argument quality is another significant effect factor, implying that arguments are perceived to be high quality if the causal factors are addressed. Personal interest in the communication helps build the recipient's engagement and, subsequently, their perception of the quality of the arguments presented in the communication [67]. Appeal to emotions ensures that the information is also processed peripherally and is remembered by the recipient of the message [44]. In addition, the results indicate that an argument presented to an individual with personal experience with the issue being communicated can be encoded. This occurs due to encoding specificity, whereby memory is enhanced when the context of encoding matches the context of retrieval [79].

6.2. Theoretical Implications

This study makes three contributions to the literature on non-governmental organizations' social marketing. First, the study demonstrates the critical factors that non-profit organizations need to consider when crafting messages about altruism. Although prior studies have examined how non-profit organizations can more effectively communicate to their target audiences, they have mainly focused on communications in other contexts, such as policy advocacy, social activism, and citizen engagement promotion [4–6]. However, many non-profit organizations aim not only to help and serve people in their target audiences but also to communicate their core values to them. One of the non-profit organizations' core values is altruism, which drives their service efforts to their target audiences. By communicating these values to their audiences, the organizations pass on the awareness of the need for help and its benefits. Consequently, many become driven to help others, boosting general societal welfare. This study's results indicate that personal interest, emotional appeal, and personal experience should be considered to communicate effectively to their audiences. This study demonstrates that emotional appeal, personal experience, and personal interest are causal factors leading to memory encoding. These factors also have causal effects on other factors proposed in this study. Thus, considering these factors in crafting altruistic messages leads to memory encoding.

Secondly, the results of this study demonstrate the affordances of altruistic communication via television. Prior studies examining non-profit organization communications

have examined communication through other platforms such as social media [18], billboard communication, and interpersonal communication [80,81]. However, different modes of communication work differently, such that the communication dynamics on a specific mode may not necessarily apply to other modes. Our study adds to the literature on non-governmental organization communication by demonstrating how organizations can communicate more effectively through visual media, particularly television. Furthermore, we examine the determinants of altruistic communication using a relatively different methodological perspective. Multicriteria decision making methods have widely been ignored in studies examining altruistic communication [3,7,48]. Given that multicriteria decision methods such as F-DEMATEL provide insights about which factors ought to be given more attention in decision making, these methods are also applied in examining altruistic communication.

Third, using social cognitive theory, this study provides a multidimensional view of the determinants of effective social communication by non-profit organizations. Our results demonstrate that it is not enough for non-profit organizations to focus only on specific enablers of effective communication. Instead, paying attention to multiple factors would help ensure communication is more effective. Our results demonstrate that personal interest, personal experience, and emotional appeal (an indicator of message superiority) are essential determinants for the memory encoding of altruistic messages. Prior studies on non-profit organization social communication have largely ignored the approach taken by this study. Most previous studies have taken a unidimensional approach to examining the determinants of non-profit organizations. For instance, Ref. [13] examined the role of information transparency in effective communication by non-profit organizations. Ref. [12] demonstrated that participatory communication ensures the effectiveness of communication, whereas [11] explained the role of network formation in ensuring effective communication by non-profit organizations. Our results contrast these prior studies because they indicate that focusing on just one enhancing factor in the communication process may not be enough. A more holistic approach to ensuring more effective communication would lead to the encoding of communicated messages by their recipients.

6.3. Managerial Implications

This study has several implications for non-profit organizations' social communication practitioners. First, practitioners must not focus on just one aspect of the social communication process. Our results indicate that for altruistic messages to be memory encoded by recipients, communications must consider the characteristics of the target audience (their interest in the message being sent out and their experience with altruism) and the features of the message being sent (emotional appeal). Furthermore, managers must devise mechanisms to boost the audience's interest in the message. Audience interest can be achieved by assuring audiences of their privacy, personalizing messages, and ensuring they are not too overloaded with information [82,83]. In addition, managers need to ensure that the audience they target with social communications about altruism have some experience with altruism and that the messages appeal to the recipients' emotions. The audience's emotions can be triggered using positive valence words and images [46]. Considering these factors, the communicated message can be encoded by the audience they are meant for. However, non-profit organizations need to ensure that the altruistic information that they systematically send out is authentic and not harmful to the audience. Sending out inaccurate and harmful information would mean that the organizations fail to achieve their ethical responsibility to protect the stakeholders from harm.

For instance, The Tzu Chi Cultural and Communication Foundation is a renowned non-profit organization that operates globally, dedicated to promoting compassion, altruism, and positive social change. Founded in 1999 as an extension of the Tzu Chi Buddhist Compassion Relief Foundation, the Cultural and Communication Foundation focuses on leveraging effective communication strategies to disseminate meaningful and impactful messages to a wide audience. With a strong emphasis on ethical communication, the

foundation aims to inspire individuals to embrace values such as empathy, kindness, and sustainable living. The foundation employs a comprehensive approach to ensure the authenticity and benefit of its altruistic messages. This approach encompasses rigorous fact-checking and research to verify information accuracy, aligning messages with ethical values, engaging in open communication with the audience, and promoting the concept of "benefiting oneself while benefiting others." The foundation's commitment to accuracy and ethical communication is reflected in its meticulous content evaluation and expert review, fostering credibility and trust. The foundation customizes messages to meet specific needs and interests through active engagement in dialogue with the audience. Furthermore, the foundation's emphasis on mutual benefit underscores how altruistic actions foster personal growth and fulfillment for both those who give and receive. In conclusion, the foundation's initiatives highlight its commitment to disseminating authentic and beneficial altruistic messages, advancing positive transformation through ethical communication and nurturing personal development for the betterment of society.

7. Limitations and Future Research Directions

This study has several limitations which future studies could address. First, the data used were collected from participants based in one country. Furthermore, the non-profit organization and television station the participants were based on are in the same region. However, cultural differences across countries might imply differences in people's perceptions of determinants of effective communication. This is mainly because communication dynamics differ across countries [84,85]. Future studies could, therefore, examine the determinants of memory encoding in altruistic communication in other contexts. Secondly, different media platforms have different affordances [86,87]. Thus, the determinants of memory encoding may differ depending on the platform on which they are communicated. Future studies could examine the determinants of the memory encoding of altruistic messages communicated through other platforms, such as social media. This could clarify how effectively altruism can be communicated across different platforms.

Furthermore, the study used data collected from experts. However, the individuals in the audience are the ones who are involved in the encoding of the messages. Therefore, examining this framework using data collected from the audience could provide a richer understanding of the determinants of memory encoding of altruistic messages. Finally, the study could not examine the intervening mechanisms and indirect mechanisms through which the factors affect memory encoding. Future studies could use other approaches to examine possible moderating effects and mediating effects in the relationships between the factors and memory encoding, hence providing a more comprehensive understanding of the effects of the factors on memory encoding.

8. Conclusions

The effective communication of altruistic values is crucial for non-profit organizations, given the dynamism and complexity of the environment within which the organizations operate. This study used the F-DEMATEL method to examine the determinants of memory encoding and the interrelationships among these factors. Three causal factors, namely personal interest, emotional appeal, and personal experience, were identified. On the other hand, three effect factors, namely outcome desirability to self, outcome desirability to others, and argument quality, were identified. Personal interest was established to affect argument quality, source expertise, interpersonal information, social proof, outcome desirability to others, homophily, and atmosphere. Personal experience was found to have causal effects on source expertise, trust, interpersonal communication, and social proof. On the other hand, emotional appeal was found to have causal effects on argument quality, source expertise, outcome desirability to self, and outcome desirability to others. Non-profit organizations must address the causal factors, as this would ensure that altruistic values are communicated effectively, particularly via the medium of television.

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