



Designed Emotive and Logic Messages in Minimising the Challenges Associated with Healthful Eating: Perspectives of Nursing Students

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Abstract

Nutrition related illnesses remain a challenge for healthcare providers. Unhealthy eating habits have been cited to be one of the leading causes of noncommunicable diseases globally, with reports indicating that noncommunicable diseases are one of the ten threats to global health in 2019. This study investigated participants' ratings and responses to designed nutritional messages. The instrument contained nutritional messages and participants had to read the messages and rate them on the basis of 6 items: ability, usefulness, open-minded, accuracy, convincingness, and research. Ratings for the three sets of messages (emotive, logic and combination of emotive and logic) were averagely rated as good. Results were presented as descriptive statistics as well as a six-stage thematic content analysis was used to analyze participants' comments. Themes developed from the responses indicated that education, socioeconomic status, and credible messages were vital in making informed nutritional choices. This study concludes that message elaboration is an important component of nutritional message designs and it is vital for health practitioners and nutrition counselors to understand their clients' ability and levels of understanding when designing nutritional messages. This could enable clients to attend to the appeal and subsequently develop an overall appraisal of the design message content for them to make informed diet and nutrition decisions.

Keywords: Nutrition; Message Design; Elaboration Likelihood Model; Tools Of Persuasion; Noncommunicable Diseases

Abbreviations

NCD: Noncommunicable Disease; ELM: Elaboration Likelihood Model; WHO: World Health Organisation

Introduction

Various methods have been employed to propagate persuasive messages for attitude change. Persuasive message encompasses the source of the information and the content of the message [1]. The four basic components that are vital in persuasion are the 1) source, 2) message, 3) channel and, 4) receiver [2]. Message framing as a strategy has been reported to be employed to promote human health [3, 4]. The application of messages content and credulity to promote healthy eating has received some prominence over the years [5, 6]. In a study that employed an experimental approach to test the influence of message framing and credibility on participants' attitude and intention toward following the guidelines for healthy eating and preventing cancer, it was reported that the influence of credibility had an effect on attitude as well as intention [7]. In another study to compare two different computer-tailored bulletins (expert oriented bulletin [EXP] and spiritual and pastor-oriented bulletin [SPIR]) to promote fruit and vegetable

consumption among members of a rural African-American church and, determine the effect of message source on message recall and perceived credibility, it was reported in this randomized study that, both bulletin groups increased fruit and vegetable consumption significantly compared to the control group [8]. This research also reported that the EXP group had higher trust of health and nutrition information coming from scientific research, and the SPIR group, higher trust of information coming from the pastor [8]. Furthermore, the diverse nutritional choices that people make depend on how the nutrition message is framed [9].

Nutrition-related illnesses continue to pose a challenge for health providers in this twenty-first century [10-11]. Unhealthy eating habits has been cited to be one of the leading causes of noncommunicable diseases globally [12,13]. Report indicates that noncommunicable diseases (NCDs), such as cardiovascular diseases, cancer, and diabetes account for 70% of deaths globally [13]. Such is the seriousness of noncommunicable diseases as it has been likened to global warming [14]. Prominent among the ten NCDs progress monitoring indicators set for World Health Organisation (WHO) Member State targeted for 2025 is the implementation of the following four measures to reduce unhealthy diets:

1. Adopt national policies to reduce population salt/sodium consumption.
2. Adopt national policies that limit saturated fatty acids and virtually eliminate industrially produced trans fatty acids in the food supply.
3. WHO set of recommendations on the marketing of foods and non-alcoholic beverages to children.
4. Legislation/regulations fully implementing the International Code of Marketing of Breast-milk Substitutes [13,9].

Even though these 4 measures are well outlined, achieving them remain a daunting task as a result of Member States policies when it comes to food industries. Countries all over continue to try diverse ways to minimize poor nutrition related illnesses [15-16] yet, through all these efforts little has been achieved and the threat to human life as a result of unhealthy diet or habits cannot be overstated [17]. It is reported that noncommunicable diseases was one of the ten threats to global health in 2019 and the five major risk factors that have contributed to the rise of these diseases are tobacco use, physical inactivity, the harmful use of alcohol, unhealthy diets and air pollution [17]. These risk factors further compound mental health issues [17].

With the recent call for proper diet and nutrition as a result of poor diet and nutrition on an individual's overall health, the credibility of a message containing diet and nutrition information is vital in promoting good eating habits. Most notably among health conditions that results from poor dietary habits are overweight and obesity [18]. It is reported that more than a third of U.S. adults and 17% of youth are obese [19]. Health related cost continue to soar since 2006 [20] and to compound issues, obese children are more likely to become obese adults [21].

To help minimize the obesity epidemic, especially among children, various interventions have been sought to increase the physical activity levels during physical education (PE) lessons [22] and through national school breakfast and lunch programs [23]. With all these measures in place and with minimal outcomes, question may be raised about the forms in which diet and nutrition information are delivered for better lifestyle interventions and counseling.

There is no doubt the role human attitudes play when it comes to minimizing nutrition related illnesses. As a result of the complexity of human attitudes [24] directing effort into designing programs for attitude change must go beyond Government policies and legislations. Extra mile should be directed towards persuasive framed messages through elaboration. According to [25] "persuasion may be defined as the formation or change of attributes through information processing in response to a message about the attitude object" (403). Therefore, designing nutrition intervention with its foundation based on the elaboration cannot be over-emphasized. To this end, the main purpose of this study was to indicate how important source credibility and content of messages are, when designing nutrition counselling and intervention.

Literature Review

Elaboration likelihood model of persuasion (ELM)

Report by [26] indicates that "in the ELM, arguments are viewed as bits of information contained in a communication that are relevant to a person's subjective determination of the true merits of an advocated position" (133). Persuasion which sometimes results in attitude change entails exposure to information from others [27]. The exposure normally occurs through written or spoken messages delivered by a source to a receiver [27]. ELM of persuasion involves the formations and changes in attitude [28]. To accomplish elaboration likelihood, the following are likely about people: a) attend to the appeal; b) endeavor to access relevant relations, images, and experiences from memory; c) inspect and elaborate upon the externally delivered message arguments in light of the relations accessible from memory; d) come to conclusions about the virtues of the arguments for a commendation relaying on their analyses of the data gotten from the appeal and accessed from memory; and e) subsequently develop an overall appraisal of, or attitude to, the commendation [29]. These conditions nurture an individual's motivation and ability to involve in issue-relevant thinking [29]. According to [30] "the more motivated and able people are to assess the central merits of an issue or position, the more likely they are to effortful scrutinize all available issue relevant information" [9].

Two routes to persuasion are mentioned; the central and peripheral routes [26]. The central route is elicited when elaboration likelihood is high (involves the cautious and considerate valuation of arguments) and the peripheral route is when elaboration likelihood is low (involves reactions based on the valuation of the cognitive, affective or behavioral hints in the messages) [31]. Receivers who process through the central route are more attentive to the arguments that are delivered in messages while the peripheral route simply involves argument without complex cognitive processing [32]. While peripheral route mainly focuses on such factors as the attractiveness of the source, source credibility, and the number of sources certifying a position [33], design topographies like layout or colors [34], affect like mood or fear [35], central route processing depends on the quality of the message [36]. Accordingly, to [37], "attitudes formed through the central route, therefore, are relatively persistent, resistant to counter-persuasion, and predictive of behavior" (266). It is asserted that while new attitudes attained as a result of employing the central routes are relatively lasting, attitudes attained as a result of peripheral routes due to numerous persuasion cues are likely to be existent only as long as the cues continue to be salient [38]. For a receiver of a message to be persuaded, motivation and the ability of the receiver are vital in determining whether or not an individual will put thoughts into a persuasive message [38]. While there are many variables that can affect an individual's motivation to elaborate upon the content of the message, motivation alone is not adequate enough for message elaboration; but the individual must have the ability to process the message. Thus, in the presence of both motivation and ability, message elaboration will take place [38].

The central route model which indicates that of an individual is motivated and able to ponder over an argument in a message, subsequent sequences of the event (attention, comprehension, elaboration, integration, then enduring attitude change) will take place [38]. In situations where an individual is unmotivated or do not understand the argument or there is no argument, then elaboration of the arguments cannot take place [38], indicating that attention and comprehension of the arguments are prerequisites for argument elaboration. Nevertheless, it is stated that in this situation, a person might still think about the issue at hand but the individual will be directed by his/her previous attitude on the issue [38].

The difficulty associated with the central route has resulted in the frequent use of peripheral route [38]. The central route explains attitude change as culminating from a diligent thoughtfulness of issue-relevant arguments [39]. This is evaluated through such factors as the comprehension, learning, and retention of message arguments, the self-generation of arguments, and the combination and integration of issue-relevant arguments [39]. On the other hand, the peripheral route explains attitude change as a result of the attitude object being linked with either positive or negative 'cues' [39]. The methods that fall within the peripheral route have accentuated linking the advocated position with such basic cues as good and pain or more secondary cues such as credible, attractive, and powerful sources [39]. Petty RE., et al. [39] reported that "these cues may shape attitudes or allow a person to decide what attitudinal position to adopt without the need for engaging in any extensive issue-relevant thinking" (847). It further suggested that although the message content may be the most important determinant of persuasion under some circumstances, in other circumstances such non-content manipulations as source credibility, attractiveness, and so forth, may be even more important [39].

Tools of persuasion

"Persuasion is achieved by the speaker's personal character when the speech is so spoken as to make us think him credible... his character may almost be called the most effective means of persuasion he possesses" [40] (191). Rhetoric, an art of influence, friendship, and eloquence, of ready wit and irrefutable logic forms the basis of argument [41]. The strength of deliberative argument lies in what [24] reported as Aristotle's three most powerful tools of persuasion: argument by character, argument by logic and argument by emotion. Aristotle called the argument by character, argument by logic, and argument by emotion ethos, logos and pathos respectively [41]. Heinrichs J [41] described the relationship between the ethos, pathos and logos as follow: Together they form the three basic tools of rhetoric...Logos, ethos, and pathos appeal to the brain, gut, and heart of the audience. While our brain tries to sort the facts, our guts tells us whether we can trust the other person, and our heart makes us want to do something about it [39-40].

Argument by character (Ethos)

Ethos could be considered as the charisma and credibility of the orator [40]. Ethos is considered the most important appeal

among the three [41,42]. Ethos entails the persuader's personality, reputation, and ability to look trustworthy. In a study to determine the nature of the ethos construct and its measurement, five dimension to ethos were discovered: sociability, competence, extroversion, composure, and character [42]. In this study, a sample of 726 college students enrolled in basic communication classes were asked to provide adjectives to describe 1) "the person you would be most likely to believe" and "the person you would be least likely to believe;" 2) the theoretical literature concerning ethos and source credibility was surveyed to find adjectives most frequently employed to describe credible and non-credible sources; and 3) previous research concerning the measurement of source credibility and ethos was reviewed to determine the adjectives most commonly found to appear in the various studies [42]. Each subject responded on the 41 scales with regard to a particular source. This study concluded that amongst the five constructs, competence and character defines ethos the most [42]. While competence encompasses qualification, expertness, intelligence, and authoritativeness; character, sagacity, safety, and honesty are derivatives of trustworthiness [42]. In another study that sought to examine the comparative importance of the ethos dimension, the researchers reported goodwill as a component of ethos construct and a meaningful predictor of believability and likeability [43]. While competence encompasses qualification, expertness, intelligence, and authoritativeness; character, sagacity, safety, and honesty are derivatives of trustworthiness [43].

Argument by emotion (Pathos)

Pathos is propelled from psychological appeals. Pathos is elicited through the receiver's emotions. Before employing the psychological appeals, persuaders have to assess the emotional state of their audience [40,41]. The tools of pathos that play an integral part of persuasion are sympathy, generosity, gentleness, courage and sharing your audience mood. The appearance of struggling for self-control plays an integral part of pathos as it affects an audience judgment [41]. Cicero was quoted as saying "a genuine emotion persuades more than a fake one" [41]. Emotions are derived from experience and expectation, in that what an audience believes has taken place or can take place in the future can arouse a sensation of an experience and a greater emotion can be aroused from the audience [24]. Apart from employing pathos through what the audience has experienced, the following are the suggested tools of pathos:

1. Storytelling - it should be centered on the audiences past experience and it should be told in the first person. This help give the audience a virtual experience.
2. Volume control - beginning a speech in a subtle manner and turning it up to portray an apparent difficulty in controlling an emotional struggle.
3. Simple speech - avoid fancy words when faced with emotion. These are reserved for logos and ethos.

4. Anger - directing an audience fury to a situation of lack of commitment to their problems or concerns.
5. Patriotism - attaches a choice or action to the audience's sense of group identity. You can stir it by comparing the audience with a successful rival.
6. Emulation - responding emotionally to a role model.
7. Passive voice - directing unwanted attention from others, implying that the action happened on its own.
8. Comfort - creating an easy, docile and instinct state environment. These attributes do not only help persuasion go down more easily but helps counter or prevent anger. It is achieved through keeping things simple, empowering the audience and trying to get them to smile.
9. Humor - if used properly it is a wonderful calming technique [41] (95).

In a study to manipulating discrete negative emotional states and message frames, the authors indicated that persuasion was more successful when messages were framed with emotional overtones matching the emotional state of the receiver [44]. According to the authors, these changes were mediated by emotion-induced biases involving expectancies attached to arguments contained in the messages, indicating that specific emotions can alter the persuasive impact of messages as a function of the emotional framing of persuasive appeals [44]. In an investigation into the influence of positive emotions on the processing of persuasive messages by using different methods to induce emotions and assess processing, it was ascertained that the positive emotions of anticipatory enthusiasm, amusement, and attachment love tended to facilitate greater acceptance of weak persuasive messages, whereas, the positive emotions of awe and nurturant love reduced persuasion by weak message [45].

Argument by logic (Logos)

Logos is portrayed as "using array of tools to persuade others to do its bidding..." [46] (276). This assertion was further buttressed by the following statement: Logos is the argument the speaker is advancing; that meant appeals to the intellect or to reason. It is dependent on the audience's ability to process information in logical ways; in order to appeal to the rational side of the audience, the persuader has to assess their information-processing patterns [40] (192).

Logos is not just not centered on following rules of logic but a set of techniques that use what the audience is thinking and it is a strong determinant of a presenter's ethos [40]. Once the logos are in doubt by the audience, the presenter's ethos suffers [40].

The following good practices associated with employing logos during argumentation:

1. Avoid false comparison - the examples should hold up. It

should be slotted into the right category.

2. Avoid bad examples - there should not be a disconnection between the examples and the choice. In some instance, while the example might be true and relevant, they do not actually support the choice.
3. Avoid ignorance as proof - there should not be a disconnection between the proof and the choice. Never conclude what cannot be proven, cannot exist.
4. Avoid tautology - making the proof the choice. The proof does not support the choice because the proof is the choice.
5. Avoid false choices - there should not be a break down between the proof and the conclusion as a result of either the proof itself does not hold up, or because it fails to lead to the conclusion. There may be nothing wrong with the proof, and the proof may lead to a choice, but the problem is that the audiences are given the wrong number of choices.
6. Avoid red herring - irrelevant issues should be avoided. The problem may not be with the proof or the conclusion at all. The problem is that the wrong argument is presented to create a diversion from the real one.
7. Avoid wrong ending - pay attention to your conclusion and refrain from bad conclusion. The proof may be okay, but it leads to the wrong conclusion [41](147 - 163).

The importance of pathos, ethos and logos in argumentation cannot be overstated.

For an effective persuasion to be realized, the persona (ethos or credibility) of the persuader coupled with the content of message (pathos and logos) are vital [32].

Designing persuasive messages

"Persuasive messages can be viewed as an example of a basic communication in which a source presents a message through a channel to a receiver... any step might be differentially affected by any variation in the source, message, channel or receiver" [47] (286). A complexity bemoaned by Bednar A and Levie WH [47].

The source

A receiver's perception of a source is vital in accepting the conclusions advocated by the source. In other words, they proposed that "whether designing a persuasive message or developing a lesson based on modeling, the likelihood that a receiver will accept the conclusions advocated in a given lesson is in part a function of the receiver's perception of the source's or model's credibility" [47] (286). Even though the concepts of credibility overlay, and are multidimensional [48], the importance of the source credibility for a diet and nutrition attitude change in an online environment cannot be overstated [5,8]. The following features of the source of the persuasive message outlined: a) High-credibility sources exert more persuasive influence than a low-credibility source; b) Source perceived by the receiver as attractive are more influential; and c) The quality and structure of the arguments in a persuasive message are

more critical for credible sources than for attractive sources [47]. Two characteristics associated with a high-credibility source are source expertise and source trustworthiness with expertise encompassing the credentials of the communicator and it is content-specific [47]. Furthermore “the effectiveness of source credibility lies in the receiver’s belief that the source has the ability to know the proper stand on an issue and the objectivity to communicate that stand truthfully” [47] (288).

Messages

MMessage is the second main constituent of a persuasive communication and one means of determining the most effective messages is to pretest alternative messages [47]. Among the constituents of a persuasive message for attitude change are: a) arguments are more effective if they are relevant to the receiver’s needs; b) generally two-sided arguments are slightly more effective than one-sided messages; c) it is almost always advisable to state the conclusion explicitly rather than to allow receivers to draw their own conclusions and; d) repetition helps, but only one or two repetitions are likely to have additional effects. The strength of arguments that promote attitude change are those that enriches the receiver’s perception that the object can enhance need satisfaction and increases the significance of the needs [47]. When a receiver has the following characteristics; familiarity of the issue, initially opposes the source’s position, is highly intellectual, the receiver may look out for contrasting view points, and is likely to hear contrasting perspective later [47]. In an experiment conducted to determine the view if the number of arguments in a message could affect agreement, it was reported that when the issue was of low relevance, participants showed more agreement in response to a message containing six arguments (3 strong and 3 weak) than messages containing either three strong or three weak arguments [31]. This study also revealed that the number of arguments in a message serves as a peripheral cue under low involvement [31]. Further suggesting that features of persuasive messages may also function as peripheral cue in that, the number of arguments, message factors such as length of the arguments and the complexity of the language used in the message might also inform as simple cues as the validity of the message [31]. The importance of message framing as a strategy for health messages by emphasizing the gains or losses connected with certain behaviors cannot be overstated [6,9]. In a meta-analysis that focused on the specific outcomes used to assess the persuasive impact of framed health messages (attitudes, intentions, or actual behaviour), it was reported that not only do gain-framed messages exhibit significant effect on making proper behavioural choices than loss-framed messages but also promotes the prevention of illnesses such as skin cancer prevention, smoking cessation, and physical activity behaviour in particular [49]. Results from this study was supported by other studies using the same message delivery methods [3,6].

For the purposes of this study, persuasive messages was designed based on the following constituent: a) arguments are more effective if they are relevant to the receiver’s needs and b) generally two-sided arguments are slightly more effective than one-

sided messages. Therefore, the current study sought to determine participants’ ratings and responses to nutritional messages. The following research questions guided the study:

1. What are the participants’ ratings of the nutritional messages for the three sects of groups’ nutritional messages?
2. What themes were derived from participants’ responses to the three sects of groups’ nutritional messages?

Materials and Methods

Study design and sample

Prior to data collection, an institutional review board approved the project and appropriate consent procedures were followed during and after data collection. An exploratory cross-sectional study was conducted among undergraduate nursing students who had enrolled in an online class in a Midwestern University in the United States. This method was employed to achieve a deep and rich understanding of this research participants’ experiences and thoughts. The online context was a cost-effective method for recruitment, data collection, and analysis [50] and also allowed flexibility for student participation [51]. The course site was located in the Blackboard Learning Management System of the Midwestern University. Furthermore, the link to the questionnaire was situated on the large Midwestern University Qualtrics websites (Version - 3092224). Nonparticipants in the class were given an alternative assignment. Students were offered extra credit for their participation. The instrument used for data collection was developed by the author.

Instrument and data collection

This study used a combination of quantitative and qualitative data. Parallel data gathered was employed in this integrated design. The instrument contained nutritional messages and participants had to read the nutrition messages and rate the messages on the basis of 6 items: ability, usefulness, open-minded, accuracy, convincingness, and research on a scale of 1 to 10. The items were chosen from an earlier study that was indicative of credibility [5]. The six concepts were chosen from a list of 64 items associated with credibility and were based on 36 studies that reported the persuasive impact of source credibility [5]. The six items were chosen from the list because they were more related to nutrition and for that matter this study. The messages for the study was based on 10 messages per group because the Introduction to Nutrition course was developed on 10 modules. All of the messages were developed from the course module, government websites articles, and peer-reviewed articles. These 10 developed modules were deemed by the author to address virtually all issues related with nutrition and good health. The messages developed by the author were reviewed by the instructor of record for the class to validate whether the content of the messages was in tune with the class modules. The researcher was a facilitator in the class. The researcher had facilitated the course for more than 6 years and had worked with more than 600 students over this period. The author determined which message was deemed emotive or logic. Messages with the majority of their content supported with figures were deemed logic by the

researcher. The emotive messages were based on the outcomes of unhealthy dietary habits, that is, what will happen to an individual if certain dietary measures are not taken. Participants were randomly assigned to 3 groups (emotion-focused messages [Group 1], logic-focused messages [Group 2], and combined emotion and logic- focused messages [Group 3]). Data was collected in 2 ways. First, students read a nutritional message and rated it on the basis of the six items. The second part had participants provide comments on the presented messages.

Of the 245 students that enrolled for the class, 207 attempted the survey. After data cleaning, 192 students responses were deemed useful for analysis. Of the 192 participants, 66 belonged to group 1, 62 belonged to group 2 and 64 were in group 3. All the 192 participants rated the messages and provided comments to the messages. However, after purposively going through 153 participants' comments (51 for each group), the author noticed three salient themes within the comments and as a result, deemed that point a saturation level based on the research question 2. Tabulated comments were based on themes developed from the 153 participants' comments. The remaining could not be considered for analyses based on data saturation or comments were not completed or written in a manner in which the author could not make meaning out of. Comments to messages were solicited to capture expressive information of this research participants' beliefs, values, feelings, and motivations that underlie the ratings of the messages. This could have provided the context necessary to understand the overall ratings and to identify variables that necessitate unhealthy food choices and ways nutrition counsellors can understand these choices.

Data analysis

The statements were validated through a pilot study (Cronbach $\alpha = 0.89$). The analysis informed the researcher how reliable the items within each component were, as well as for the whole scale. The questionnaire was scored using standardized methods for each measure [52]. All data related to research questions 1 were tabulated and analyzed using the IBM SPSS Statistics version 23.0. Results were presented as descriptive statistics. For research 2, a six-stage thematic content analysis was used to analyze the comments. The comments by the students were coded and themes developed with the aid of Nvivo software (Versions 10). Themes with associated comments were presented as tables.

Results and Discussions

The result of the factor analysis not only showed a correlation between the items on the message credibility component but also loaded together with an explained variance of 67% (Table 1). This indicated that the items loaded well and appear to measure the true construct for which it was intended. The determinant readings from the Factor Analysis yielded .032 which was greater than .001, indicating that the items in the message credibility component are related. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy yielded .875 which is deemed by the author as meritorious. Bartlets test of sphericity was significant ($p = .001$). This led the

author to conclude that there are correlations in the data set that were suitable for the factor analysis. The six items were retained since each had an Eigenvalue greater than 1, suggesting that each item is a linear contributor of the observed variables. For groups 1, 2, and 3, the credibility of the messages as measured or rated by the credibility item are summarised in table 2. Results from table 2 indicated that the credibility rating associated with the three sets of messages was acceptable and rated high by the participants. Themes were developed from comments made by participants for the emotive, logic and the combination messages. The frequency of

Total Variance Explained Extraction Sums of Square						
Component	Initial Eigen values			Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.999	66.644	66.644	3.999	66.644	66.544
2	.588	9.803	76.446			
3	.471	7.843	84.289			
4	.407	6.781	91.070			
5	.287	4.779	95.849			
6	.249	4.151	100.000			

Extracted Method: Principal Component Analysis

Table 1: Factor loading, eigenvalues, and variance for the six credibility items presented to participants for rating of the messages.

Credibility Item	M	SD	Meaning on Rating Scale
Group 1			
Usefulness of the message	4.15	0.734	Very Good
Message being open-minded	3.69	1.074	Good
Message ability to change eating habits	3.40	1.129	Good
Accuracy of the message	4.11	0.945	Very Good
Message convincingness	3.92	0.907	Good
Message founded on Research	3.71	1.366	Good
Group 2			
Usefulness of the message	3.89	0.799	Good
Message being open-minded	3.72	0.951	Good
Message ability to change eating habits	3.55	0.991	Good
Accuracy of the message	3.95	0.999	Good
Message convincingness	3.56	0.957	Good
Message founded on Research	3.67	1.027	Good
Group 3			
Usefulness of the message	3.97	0.908	Good
Message being open-minded	3.63	1.076	Good
Message ability to change eating habits	3.28	1.161	Good
Accuracy of the message	4.05	0.906	Very Good
Message convincingness	3.94	0.852	Good
Message founded on Research	3.73	1.116	Good

Table 2: Group distribution of the averagely rated messages using the six credibility items.

Group	Themes	Frequency
1	Socioeconomic Status	19
	Education	14
	Evidence	11
	Helplessness	4
	Role Models	3
2	Socioeconomic Status	22
	Education	12
	Evidence	11
	Insightful	7
	Severe	3
3	Socioeconomic Status	20
	Education	16
	Evidence	7
	Initiative	5
	Choices	3

Table 3: The frequency of occurrence of themes.

occurrence for each theme are presented in table 3 and the comments associated with the themes are presented in table 4-6 respectively.

Comments made by the research participants provided some useful information on the thoughts they had on the messages they rated. While the three groups were assigned different messages (emotive messages, logic messages and, a combination of emotive and logic messages) there were some salient commonalities in their comments. Most noticeable common themes generated from the comments made by participants in the three groups were education, socioeconomic status, and message credibility issues. The participants were in agreement that for effective attitudinal change to occur, there is a need for education not only for children but most importantly adults (as in parents and guardian) and, school authorities. The following statements further amplify the partici-

Themes	Comments
Socioeconomic status	“Fact remains fact...foods that are less healthy are cheaper and healthy foods are considerably more costly. Families will have to choose what remains within their budget. Seniors are living on fixed incomes. Healthy foods need to be made more affordable so that people can afford to choose more healthy options”.
	“It says what consumers do when prices are high, that won’t change. We can only afford so much. A table showing the breakdown of the lower price high sugar foods vs the more nutritional foods would be helpful. Maybe when prices are high they can still afford some fruits and see the value”.
	“I think this message is very informative and evidence-based. It is very true that healthy foods are more expensive. Some choose not to be healthy due to a low income. We need to help find ways to eat healthy in a less expensive way”.
Education	“I like the topic; how can we introduce this into homes to help better the family’s lives?”
	“I don’t know whether this comment will “improve” this message, but I strongly believe that decisions made regarding children’s nutrition should be made at home. I don’t believe that a teacher (or a bureaucrat for that matter) should decide whether the snake sent to school is nutritious or appropriate. When children are taught about nutrition at home, they will make smarter decisions in school. So yes, adult education is key”.
	“I agree that it needs to start with adult education. If you are giving your child junk food at home, they are more likely to only want junk food at school as well. I wonder does income status have any role in which children are eating the junk food?”
	“I think the author supported the argument well. The message could improve by providing suggestions that could increase parental support for this initiative. For example, schools could communicate the importance of the initiative and encourage them to send healthy snacks with them to school. Suggestions for healthy snacks should also be included”.
	“It is funny to read about these myths. Now I can educate my friends on the facts. I was one of those who thought that just “eat another steak” was a good way to get more protein into your body. Good information”.
Evidence	“I am not sure where these facts were taken from, but I do think that this message gets the point across well using vague information”.
	“There is no research cited in this message. While it seems logical and appropriate, it could just be a strongly worded opinion. I am certain that I believe that eating fresh is cheaper than buying processed food - if not just for the longevity of the foods. But I don’t really buy processed foods, so this is merely an educated guess”
	“Again, perhaps citing the source of the information would cause people to trust the information. However, I thought it was very informative and easy to understand. I have a better grasp on protein from reading this paragraph”.
	“This message is written in a very simplified manner, but if the message is for adults it may be too simple. Adding more facts to support the message would definitely be needed. Where were the statistics found? Need reference info to know if message founded on research”.
Helplessness	“Statistics are true and factual, but the message doesn’t tell how to change this situation or what can be done to make this change. I believe people are aware of this fact in a general sense, but what can we do?”
	“It is true overweight is becoming a big problem, there are many fast food and many families who are always at work and do not have time to cook. We need to provide health education”
	“Other than the statistic from 1986, there is nothing here to motivate the obese person to lose weight. Truthfully, there are obese people that are unsuccessful at losing weight because all of his or her efforts fail. This message definitely sends the message that weight loss is work but it lacks how one could become successful”.
	“Might be helpful to mention a few disorders that are affecting our youth such as elevated cholesterol. Paediatricians have begun testing children for a health issue that was once limited to older adults”

Role Models	"I absolutely agree. If parents are sitting home watching TV and never getting exercise, their children will tend to follow in their footsteps".
	"Again, this is all true, but how will this be accomplished. This is something that is large and many parents are already set in his or her ways of eating habits. Unless parents change his or her own eating habits, their example will be what the children see and copy".
	"This message hit home hard. As a nurse, I teach about nutrition on a daily basis, and there are also days that I drive through McDonalds. We must practice what we preach".
	"It was an interesting thought, in order to accomplish our goal we all have to work hard nothing comes easy. Losing weight takes time and it is very hard".

Table 4: Group one (emotive messages) participants' comments and the corresponding themes developed.

Themes	Comments
Socioeconomic status	"It seemed to pointed at socioeconomic status. I don't know why the lower socio-economic choose more expensive protein. That does not make sense to me. Maybe it's just lack of knowledge"
	"In actual fact, it is not expensive to eat healthfully." does not seem like a true statement. For example, recently I talked with a client who says that when she watches her sister's children and hers there are 10 kids. I asked, what do you feed them? She replied macaroni & cheese, hot dogs, which is less expensive than purchasing foods from all the categories above".
	"It is true most healthy foods are very expensive, so people turn to unhealthy food".
	"Educate on ways to be more physically active in a challenging socio-economic environment. I know that exercise is important every week, it is a struggle to do it. It becomes quite frustrating for me".
Education	"Examples of portion sizes and cost. Most people believe that eating healthy is expensive, so a comparison would be helpful".
	"Changing eating habits for most people is not about being an expert in the science of nutrition. It is most important that they learn balance, moderation and knowing the importance of whole foods".
	"I do think that schools should improve their food. Oftentimes, it is very unhealthy food that our children have to choose from and this makes for bad habits, especially when the children get older".
	"In order for people to change, I believe it is helpful for them to see reason behind the change or the need for change".
	"Provide options for healthful choices to counter these lifestyle difficulties. Perhaps provide examples of diet choices, both bad and good, to illustrate how these mechanisms work in lay terms. The percentages of what you actually need of total fat, saturated fat, trans fat, and cholesterol would've been helpful in this message".
Evidence	"The comment could be improved by including where the facts were derived from. It is not clear to the reader that this statement is founded on research"
	"References always help the reader identify where the information came from and how accurate it may be".
	"I believe that statistical data to back up the information given in the article would be great advice for whoever is writing it".
Insightful	"I knew water was important to the body, but did not realize all it did. I need to drink more water myself. I am terrible at drinking water".
	"I would share this with others because I like that it conveys the message that exercise can play, it doesn't always have to be scheduled time at the gym".
	"I liked the examples in this message. I will use them with my children".
	"I always knew that vitamins were important to the body, but I did not realize just how essential they are. There are often many complications when vitamin levels are too low or too high".
	"I did not realize there was so much obesity in the country. I found this to be very interesting".
Severe	"The message may be true, but it is conveyed in a harsh manner. People might be resistant to learning from it, and be dismissive of it, because of the way it is presented".
	"I think we are using a stereotype. I think our society is getting lazier and therefore more obese".
	"It more of an attack on the low socioeconomic. This message comes across as harsh ("you will die") and doesn't seem to contain any researched fact.

Table 5: Group two (logic messages) participants' comments and the corresponding themes developed.

Themes	Comments
Socioeconomic Status	"I feel there are other factors that contribute to obesity in addition to eating too much. Socioeconomic status, lack of exercise, leading a sedentary life, and poor nutrition are some examples".
	"More information. Is poor nutrition because of the poor economic status or is their poor nutrition and economic status a result of lack of ambition, education, and poor upbringing?"
	"I agree with the message stated above. As someone who purchases healthy food regularly, it does tend to cost more. This may suggest that people with limited incomes may choose unhealthy and cheaper food choices due to their budget".
Education	"I believe this is a more eye-opening direct statement. I feel this message could be on a brochure for those pending a serious lifestyle change or life or death situation regarding their obesity. As well, those teenagers who are at a plateau and need some quick information".
	"This message was great and it thoroughly explained all of the necessary elements of what fuels one's body. I feel there needs to be more education on general health science for people to realize and understand the cause and effect of what they eat and do during their life".
	"Even if the healthiest meals could be served, kids will not always eat them. Kids do not care about healthy, they want it to taste good. It has been found that schools throw more food away now than ever before since they instituted Michelle Obama's plan".
	"This discussion has more to do with an establishment, meaning schools taking a lead and actually serving healthy choices to our children."
	"I think the detrimental relationship and employment outcomes are more due to societal conditioning that bigger people are lazier and incompetent than obesity actually being a health risk."
	"I think the information is accurate and correct according to The World Health Organization, but I do not think information is enough without some sort of recommendation as to what someone reading this information can do to change their own habits."
	"I enjoyed the reading. As a mother of four, I'm constantly struggling to get enough protein in their bodies and mine. I do use a lot of protein mixes. This is the troubling part of the article. I'm presented with a possible problem with absorption, but no solution."
Evidence	"Citing more research would give more credibility to the statement".
	"It would be nice to see where the writer is getting the information, which I should have written on all the articles thus far, so that the person reading it could look into the information in more depth if they chose to".
	"No references are listed so although I assume this information to be true, I cannot be 100% sure. If I were sure the statistics were fact-based, I would change my ratings. I can only rate its accuracy on what I already have knowledge on".
Initiative	"I wish more fast food chains offered better menu choices. I'm happy that McDonald's has yogurt and cuties now but all of them need to do better".
	"The message almost scares people into eating better and changing their lifestyle. Many people need this tactic though. The message is very straight forward and full of information. I would not change anything about it."
	"I think that fast food should be taken out of school altogether. Schools state that they give a healthy option, but they also still have fast food. Which do you think our children will pick if the choice is left up to them? An example, schools put pizza on the menu, and on the menu, it is not counted as a carbohydrate or fat, it is counted as a vegetable because of the sauce. That is just crazy".
Choices	"So sad that even though people know all of this to be true, and can be educated in such matters....they remain unable or unwilling to change their habits".
	"Again I come back to the fact that unless a person is within the stages of change. Although the information is accurate, change will not occur".
	"McDonald's and Burger King offer healthier meal options. How many individuals choose healthy options as opposed to unhealthy"?

Table 6: Group three (emotive +logic messages) participants' comments and the corresponding themes developed.

pants' concern: While it is true that children are limited to what their parents supply, I still believe that educating them while in school and offering them healthier options is imperative. It may give them the opportunity to try different food they do not get at home and they could potentially share what they learn with caregivers who may not be aware of the information.

A participant also elucidated this point: I do think that schools should improve their food. Oftentimes, it is very unhealthy food

that our children have to choose from and this makes for bad habits, especially when the children get older.

Another participant also had this view; People are mostly aware of how bad fast food is and the health implications of eating it. I think people are desensitized to the shock value of how bad fast food is, or how many calories are in a fast food meal. To change eating habits about fast food I think that there would have to be a comparison or something to help people understand how insane it is to have one food item with 710 calories.

While the blame may be shifted between parents, schools and fast food outlets, the researcher is of the view that parents' involvement in healthy nutrition (either among their children or themselves) is paramount, even though various interventions have sought to increase the physical activity levels during Physical Education (PE) lessons [16,22] and other programs such as National school lunch and breakfast programs, Fight BAC, Eat Smart, Play Hard, Nibbles for Health, and Power of Choice, just to mention a few are in place. The United States Department of Agriculture (USDA) continues to contribute to the wellbeing of children [28]. Parents involvement can help complement the above-mentioned efforts. The family is the main environment for children to learn and develop food choices and practices. That is, decisions on what type and quantity of foods, times these foods are consumed, and physical activities are made by adults or caregivers [53].

Children eat what they are given at home. Parents are much aware of the toll unhealthy diets can have on their children (physical and psychological) and a majority of them will do their best to avert these situations if they receive the right nutritional messages or guidance. Self-efficacy has been cited to be associated with healthier food preparation and less unhealthy food acquisition [54]. The right messages could provide parents with nutritional information as well as the consequences of bad nutrition. Parents can, therefore, educate their children to make the right nutritional choices. As pointed out by [55] adults who are motivated to learn as the need arises, are able to relate to issues, and have a deep need to be self-directing. Thus, eliciting behavioral change through encouraging individuals to willingly make healthful, economical food choices could be attained through adult education. It is reported that education levels are positively associated with health knowledge and leisure time physical activity [56].

It was the view of this research participants that while there is a willingness to eat healthfully, the current economic situation makes it impossible. That is, low socioeconomic status places individuals in situations which they have no choice but to consume unhealthy foods on daily basis, as indicated by this participant: I agree with the message stated above. As someone who purchases healthy food regularly, it does tend to cost more. This may suggest that people with limited incomes may choose unhealthy and cheaper food choices due to their budget.

Another participant is of this view: In actual fact, it is not expensive to eat healthfully does not seem like a true statement. For example, recently I talked with a client who says that when she watches her sister's children and hers there are 10 kids. I asked, what do you feed them? She replied macaroni and cheese, hot dogs, which is less expensive than purchasing foods from all the categories above.

Socioeconomic status was reported to be positively associated with healthy food preparation and food acquisition behaviours. It is reported that low socioeconomic status is linked with obesity [57]. Also, food insecurity and the absence of a safe place for

physical activities as a result of low socioeconomic status has also been linked to obesity in children [58]. Furthermore, a number of studies have indicated the link between participating in Supplementary Nutrition Assistance Program (SNAP, formerly known as Food Stamps) and obesity [15,16,22,23]. With low socioeconomic status, impoverished homes may be faced with challenges of eating healthful as already indicated by the current research participants. Research has also shown that food purchases are influenced by food costs [59] and diet costs has been reported to be a barrier to dietary change, especially individuals in low-income homes [60]. Hence to attain a healthy diet, it may be required to spend more money [59]. While the debate on the cost of eating healthy may linger, recent research indicates that healthier food-based diet patterns cost \$1.54 more than less healthy options [61]. This study conducted a systematic review and meta-analysis of prices of healthier versus less healthy foods/diet patterns among 27 studies from 10 countries while accounting for key sources of heterogeneity. With this new development, the suggested method of minimizing nutrition-related illnesses is through education and budgeting.

Another developed theme was participants' questioning the authenticity of the messages presented to them. This was the case because each message presented to participants for rating had no references hence, questioning the credibility of the messages. As participants indicated below: There is no research cited in this message. While it seems logical and appropriate, it could just be a strongly worded opinion. I am certain and believe that eating fresh is cheaper than buying processed food - if not just for the longevity of the foods. But I don't really buy processed foods so this is merely an educated guess.

Participants also sort for evidence through references to help them identify where the information came from and how accurate it was. As amplified by this participant: The 400,000 deaths? Obesity is not the primary cause. I feel it is inappropriate to make that claim. Obesity is the leading risk factor for many of the leading causes of death. Or obesity can be linked to 400,000 deaths. No citations to back up statements so would not share.

It is reported that knowledge is associated with acquiring healthy foods [54]. For participants to question the credibility of the messages by indicating the absence of references after each message suggested that the central route was employed to be able to question the authenticity of the messages by requesting for evidence-based messages. Employing the central route indicates that the research participants were motivated and able to ponder over the messages that is, there was attention, comprehension, elaboration, integration and this might lead to enduring attitude change [38]. The difficulty associated with employing the central route [38] further suggested that the participants were motivated.

In addition to the three familiar themes derived for the three groups (education, socioeconomic status and credibility), two other themes were developed for each group. The two themes developed

for the emotion groups were “Helplessness” and “Role model”. The two themes developed further reiterates participants’ emotional concern to the rise of NCDs. These two themes encompasses participants view on the fact that even though people are aware of the outcomes of bad nutrition, circumstances are beyond them even if they wanted to change. As such it is paramount for people who are in decision making position to act as role model for dietary change to occur. While others hold the notion that parents should serve as role models for their children, others are of the view that it is easier said than done, that is, people are just not motivated enough to change especially in a country where it is the norm to say big people are lazy. With group 2 (logic group), participants acknowledge their lack of information on some of the data presented thus indicating how “insightful” the information presented was to them. However, there were those who commented that the information presented was harsh, thus pointing to the “severances” of the nutritional message. A participant was of the view that the message seemed like an attack on individuals who are of low socioeconomic status. The staggering nature of some of the data presented within low socioeconomic families might have elicited this response. An assertion the researcher believed could have been averted if references or citation were provided. Finally, additional themes developed for group 3 were “Choices” and Initiative”. Content to these times were made in relation to, while diverse foods are available for consumption, the choices an individual makes is vital for healthful diet.

Conclusion

The main purpose of this study was to determine participants’ ratings and responses to nutritional messages. Ratings for the three sects of messages (emotive, logic and combination of emotive and logic) were averagely rated as good with education, socioeconomic status, and credulity being the major themes developed from the responses from the three sects of messages. Also, elaboration of the messages by participants were rated based on the central route. Furthermore, comments from participants support other studies that have reported that socioeconomic status continue to be a leading cause of obesity and its related illnesses [26,56,57] and that education remains the strongest tool that can be employed to minimize obesity epidemic and its related illnesses [4,22,54].

Result from this study not only confirms the numerous studies that mentioned the importance of credibility on attitudinal change [27,40-43] but also reiterates other studies that have equally proven the significance of message framing (message content) on attitudinal change [6,9,31,47]. It is the opinion of the author that the majority of the participants used central route to rate the credibility of the messages. Central route was employed because participants were motivated as a result of the messages reflecting their course and, examination was part of the course requirement. This assertion is supported by the comments and subsequent themes developed. Comments made meant participants elaborated on the

messages by not only questioning the authenticity of the messages but also providing their views on some factors that contribute to unhealthy eating habits. As a result, participants in this study could have a more enduring attitudinal change per the content of the messages they rated. Enduring attitude change is likely to be dependent on the likelihood that an issue or argument will be thought about further and the individual may put in additional thought because he/she views the message to consist of strong and compelling arguments [38]. The significance of credibility and how messages are framed or delivered to persuade individuals in attitudinal change cannot be overstated. Whether people are faced with challenges like lack of nutritional education or low socioeconomic status, it is paramount for individuals delivering nutrition intervention and counseling to motivate, recommend, and place emphases on the benefits of healthful eating.

The sample size was dependent on the number of students who enrolled for the Introduction to Nutrition class and volunteered to participate in the project. The participants were in nursing and might have known some of the nutritional information and outcomes of unhealthy eating habits before taking the survey and this prior knowledge may have swayed their ratings. Participants chose to be part of the study and this may reflect a personal interest in the subject matter. The author was a facilitator in the Introduction to Nutrition class, and the links to the research site and the informed consent for the study were made available by the researcher, and this might have influenced the ratings of the message by the participants.

Implication for Nutrition Counsellors and Dieticians

While it vital for nutrition counsellors or dieticians to be vested in how to employ the tools of persuasion, it befalls on them to have their clients motivated for elaboration of delivered messages. Comments made by the participants are in the researcher’s view reflections of what people fear and hope for when it comes to nutrition. As counselors and dietician it behooves us to recognize these as we conceal or plan or develop nutritional messages. The ultimate goal as counselors is for us to bring the individuals to an understanding that they have heard of the health risk related with a particular behavior, knowing that the risk behavior is widespread and finally that they are engaging in the risk behaviors themselves [62], so they can make informed decisions. Education in the researcher’s opinion remains fundamental for successful nutrition intervention and counseling, that is, if an individual is educated the concerns (low socioeconomic status, bad choices, lack of initiatives etc.) raised by the participants could be minimized as it has been reported that the highest obesity rates were linked to the lowest income and low educational levels [63].

Author’s Reflection

As an advocate for proper nutrition, results from this study has been humbling. While there were diverse views on the onset of

bad eating habits, the author completely agrees that the solution lies in education. Message content remains a vital instrument in achieving proper nutrition. While dietician and other providers of nutrition intervention continue to help minimize unhealthy eating, they cannot rest on their oars. For a healthy future, the foundation has to start with children. Children learn from their environment and their current environment encompasses their school and home. Literature shows that schools are doing their part in this regard and parents' involvement in physical and proper nutrition are minimal. While efforts are made at schools, it is paramount to note that the solution lies in incorporate parents in the endeavor to

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