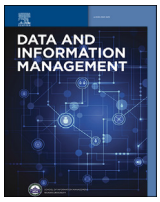
Data and Information Management 6 (2022) 100008

Contents lists available at ScienceDirect

Data and Information Management

journal homepage: www.journals.elsevier.com/data-and-information-management



Which message? Which channel? Which customer? Exploring response rates in multi-channel marketing using short-form advertising

Omar Marzouk [b], Joni Salminen [c,a], Pengyi Zhang [d], Bernard J. Jansen [a,*]

[a] Qatar Computing Research Institute, Hamad Bin Khalifa University, Doha, Qatar
[b] Department of Computer Science, Ain Shams University, Cairo, Egypt
[c] Turku School of Economics, University of Turku, Finland
[d] Department of Information Management, Peking University, China

ARTICLE INFO

Keywords:
Persuasive strategies
Communication channels
Direct marketing
Multichannel marketing

ABSTRACT

Formulating short form advertising messages with little ad content that work and choosing high-performing channels to disseminate them are persistent challenges in multichannel marketing. Drawing on the persuasive systems design model, we conducted an experiment with 33,848 actual customers of an international telecom company. In a real-life setting, we compared the effectiveness of three persuasion strategies (rational, emotional, and social) tested in three marketing channels (short message service, social media advertising, and mobile application), evaluating their effect on influencing customers to purchase international mobile phone credits. Results suggest that companies should send rational messages when using short form advertising messages regardless of the channel to achieve higher response rates. Findings further show that certain customer characteristics are predictive of positive responses and differ by channel but not by message type. Findings from crowdsourced evaluations also indicate that people noticeably disagree on what persuasive strategy was applied to these short messages, which might indicate that consumers are not well-equipped to identify persuasive strategies or that what advertisers see as a 'pure' strategy actually involves elements from multiple strategies as interpreted by consumers. The results have implications for the theoretical understanding of persuasive short form commercial messaging in multichannel marketing and practical insights for advertising within limited amount of space and attention afforded by many digital channels.

1. Introduction

Message formulation to persuade customers and encourage purchase behaviors has been noted as a persistent challenge in multichannel marketing (C.-W. Chen, Liu, Chen, Hsu, & Tang, 2021; Sinisalo, Salo, Karjaluoto, & Leppäniemi, 2007). To this end, persuasive technologies can be of assistance. Persuasive technologies are defined as "interactive technologies that change a person's attitudes or behaviors" (Fogg, 1998, p. 225); they are widely used in various contexts in users' everyday interactions with computers and mobile phones (Fogg, Grudin, Nielsen, & Card, 2003). In commercial communication, persuasion can take the forms of notifications and messages aimed at leveraging consumer emotional responses to motivate action; such notifications and messages can be used in branding management and brand promotion (Mingli Zhang, Hu, Guo, & Liu, 2017). Persuasive technologies are used in many application areas, including advertising and marketing (Edwards, McDonald, Zhao, & Humphries, 2014; Kimura & Nakajima, 2011; King, Lazard, & White, 2020; Orji, Reilly, Oyibo, & Orji, 2019; Paay et al., 2020; Ruijten, 2020).

In the multichannel context, where users' attention is both fragmented and sporadic (Nakano & Kondo, 2018), it is crucial that each message surpasses the communicative noise online users face (Jiang, Liu, & Chi, 2015) and persuade the users to take action (Saleem & Mustafa, 2020) with only a marginal share of their overall attention (Bawden & Robinson, 2009). Persuasive messages have been important communicative means for promoting desired effects on customers. Messages can be disseminated on a variety of platforms, including interactive applications, mobile applications, hand-held devices, and electronic games (C.-H. Chen, Lee, & Hwang, 2018; Khaled, Biddle, Noble, Barr, & Fischer, 2006). These platforms or channels are pathways by which persuasive messages reach customers to change their attitudes and behaviors (Rosenbloom, 2012). Channel selection, therefore, is another core

* Corresponding author.
E-mail address: jjansen@acm.org (B.J. Jansen).

https://doi.org/10.1016/j.dim.2022.100008
Received 15 April 2021; Received in revised form 23 June 2021; Accepted 30 July 2021

element of online marketing success (Kollmann, Kuckertz, & Kayser, 2012).

Persuasive communication (Dillard & Nabi, 2006; Kwon, King, Nyilasy, & Reid, 2019; C. Y.; Li, 2013) is commonly viewed as composed of elements within which the interaction occurs, including the sender, message, channel, receiver, effect, and context (Lasswell, 1948; McQuail & Windahl, 2015; Shannon, Weaver, & Burks, 1951). The persuasive systems design (PSD) model identifies three basic elements of persuasion: *intent*, *event*, and *strategy* (Oinas-Kukkonen & Harjumaa, 2009). This research interprets advertising and marketing communication concepts using the PSD framework, as the research is directly composed of the three basics elements of the PSD model. Therefore, we deem it ideally suited for this research.

A systematic review of the literature under this framework suggests that tailoring, tunneling, reduction, and social comparison have been the most studied methods for persuasion (Torning & Oinas-Kukkonen, 2009). Prior research shows that (a) *message effectiveness* includes source credibility and argument impact on affective, cognitive, and behavioral responses (C. Y. Li, 2013; S. Teng, Khong, Goh, & Chong, 2014; Yu, 2012); (b) *communication channel effectiveness* includes factors such as type and characteristics of the communication pathway (Fogg, 1998; Fogg et al., 2003); and (c) *audience-related factors* affect effectiveness include personality traits (Hirsh, Kang, & Bodenhausen, 2012). To develop persuasive content, copywriters use strategies to elicit responses from users, including direct requests, flattery, and social norms (Eckles et al., 2009).

With the rapid change of technological communication and the shift in behaviors of people employing these technologies, the effectiveness of persuasive messages in the multichannel context is unclear. Prior research suggests rational and emotional persuasion techniques each have benefits. Still, it is unclear which strategy works better with one-way messages on different online channels, as previous results are mixed (Kwon et al., 2019). Instant messaging (Tseng & Hsieh, 2019), social media, and mobile application notifications are popular channels for interpersonal and mass communication of persuasive messages (Mubin, Wijayarathne, Ahmad, Ginige, & Hewapathirana, 2016; Sohn & Lee, 2007; Westermann, Wechsung, & Möller, 2016). However, prior research has not fully understood the effectiveness of messages via these emerging channels, especially when the effect is mixed with different message types and customer characteristics within an organizational setting. This last aspect is most compelling for our study, which focuses on an actual organization implementation rather than a survey or lab study.

Additionally, there is limited research investigating the possible effects of online communication technology on consumers' receptiveness to advertising messages. Studies have discussed customers' responsiveness to different persuasive strategies and communication channels (Caples, 1974; Danaher & Rossiter, 2011; Nelson, 2008; Shimp, 1997). These responses have been in various domains (e.g., healthcare, exercise, gaming); however, the authors could locate no previous research that evaluated messages and channels in a direct marketing experiment or examined the effectiveness of such messaging from the interplay of individual differences on message receptiveness. Also, especially with social media and many other online messaging, a crucial aspect is the shortness of the communication – many online channels are highly competitive and only get a small piece of consumers' attention and a small amount of screen real-estate. We refer to this type of advertising as '*short form advertising*' (i.e., advertising message that is short, simple, and without much substance).

Therefore, the research gap is how do the known persuasion strategies work in current digital channels characterized by short attention spans and limitations of length and scope of the ad content? That is, in the current media environment, in the best scenario, an advertiser can hope for only a glimpse of the consumer's time. This situation creates a lot of pressure on the selection of persuasion strategies. As a step towards understanding the effects of persuasive techniques in the online short form advertising communication environment, this research poses the following research questions (RQs):

RQ1 (focus: message): Do customer response rates vary based on persuasive message types in short form advertising?
RQ2 (focus: channel): Do customer response rates vary based on communication channels in short form advertising?
RQ3 (focus: receiver): Do customer response rates vary based on customer characteristics in short form advertising?

We conducted a large-scale experiment with 39,000 customers of a major international telecom company to persuade the customers to purchase a mobile phone recharge for international calls. Messages were sent using three persuasion strategies (rational, emotional, and social) via three channels (short message service, social media advertising, and a mobile application), and the response rate of all customers exposed to the messages on all channels was calculated to determine the effectiveness of the multichannel marketing campaign.

The research contributions include evaluating three communication channels: social media advertising and mobile application notifications. Also, the experiment was implemented with a real product on real communication channels with real customers that directly impact the revenue of a real company. The authors also highlight the challenges of implementing an experiment in a real-life context as it has hurdles not present in controlled laboratory settings or other data collection methods, such as surveys.

2. Literature review and development of hypotheses

This section reviews marketing communication from a persuasive technology perspective to develop the research hypotheses.

2.1. The message formulation

2.1.1. Emotion and persuasion

Marketers use emotions as sources of leverage in persuasion (DeSteno, Petty, Rucker, Wegener, & Braverman, 2004), with advertising communication persuasive techniques often focusing on sex, greed, or fear (Caples, 1974). Research in marketing communication has examined several persuasion techniques to understand the effect of messages on customer behavior (Nelson, 2008; Shahbaznezhad, Dolan, & Rashidirad, 2021; Shimp, 1997). Wilson (2003) finds that emotional strategies are rated poorly in online communications due to the absence of non-verbal emotional cues; however, both emotional and rational strategies seem to work well in face-to-face communications. Studies have found that emotional strategies are more frequent than rational strategies, and positive emotional messages are the most persuasive (Adler, Iacobelli, & Gutstein, 2016; Mazzotta & De Rosis, 2006).

Research in psychology suggests that negative emotions, such as fear, disgust, and threat, can be very compelling (Nabi, 1999; Poong, Yamaguchi, & Takada, 2014; Tomkins, 1984). Prior work shows that commerce message has unique trust elements relative to non-commerce content (Wu, Zhao, Zhu, Tan, & Zheng, 2011), which makes brand advertising possibly effect in short form advertising (Mimi Zhang, Jansen, & Chowdhury, 2011). Fear-inducing messages can generate psychologically threatening situations and manipulate customers into less careful message processing (Nabi, 1999). Also, marketing campaigns have attempted to evoke disgust to convince customers of the need to purchase insecticides (DeSteno et al., 2004). Conversely, some prior research shows that rational messages lead to higher purchase intention (De Pelsmacker, Geuens, & Maison, 2002), and a positive word-of-mouth message has a greater effect on customers' willingness to use a service (Sweeney, Soutar, & Mazzarol, 2014).

However, other research indicates that both emotional (G. Li, Lin, Yu, & Guo, 2020) and rational messaging (i.e., message based on reason, logic, or facts without emotional embellishment) have an impactful role,

with the emotional component appearing preeminent (Nicolini, Cassia, & Bellotto, 2017). Several factors are found to be relevant to the effects of persuasive messages (Dutta, Das, & Chakraborty, 2020). Individual differences exist in reactivity to emotion-inducing messages. Certain types of messages may produce persuasive or counter-persuasive effects depending on the characteristics of the customer receiving the messages (Dillard & Nabi, 2006). Other factors, such as what mood or emotional state the customer is in prior to getting the message (DeSteno et al., 2004; Kahn & Isen, 1993), add levels of complexity to the persuasiveness of messages (Sarma, Singh, & Goswami, 2019). Message-relevant emotions are found to be more likely to influence engagement in message processing than message-irrelevant emotions (Nabi, 1999). However, real-world evaluation of emotional versus rational messaging is lacking in short form advertising; therefore, it is an open question about which is more persuasive.

This research focuses on message-relevant emotions from the baseline of a rational message, as prior work seems to lean more toward the use of emotion than toward rationality for persuasive messaging. Therefore, the hypotheses are:

H1. *Emotional messages result in a higher response rate than rational messages in short form advertising.*

H1a. *Positive emotional messages result in a higher response rate than negative emotional and rational messages in short form advertising.*

H1b. *Negative emotional messages result in a higher response rate than rational messages in short form advertising.*

2.1.2. Social psychology

Research in social psychology demonstrates that individual judgments are subject to *social influence* (Deutsch & Gerard, 1955). Prior research recognizes the importance of social psychology theories to provide systematic analysis and design methods that can help develop persuasive system solutions (Oinas-Kukkonen & Harjumaa, 2009). Sometimes appearing in the form of peer pressure, social influence seems to play a role in encouraging certain behavior (Midden, Kimura, Ham, Nakajima, & Kleppe, 2011). For instance, previous research finds that persuasive messaging that uses normative social influence by suggesting social approval or disapproval has stronger persuasive effects than rational feedback (Vossen, Ham, & Midden, 2009), with negative social feedback, in particular, having the strongest effect (Vossen et al., 2009).

Research also finds that personal recognition, facilitation of group activity, feedback, and less intrusive alerts are all effective ways to promote social influence through instant messaging systems (Sohn & Lee, 2007). Social messages reportedly generate more favorable outcomes than rational messaging (Z. Li & Li, 2014). However, social influence may be culturally sensitive (Sheldon, Herzfeldt, & Rauschnabel, 2020). Research finds that positive feedback at both the individual and group level is effective for people from a collectivistic society; for people from an individualistic society, only positive individual feedback appears effective (Earley, Gibson, & Chen, 1999; L.; Teng, Zhao, Wu, Fu, & Wang, 2019). However, there are several under investigated areas concerning *social influence* in short form advertising.

In order to control for possible cultural differences, this research selects customers of one nationality (Egyptian) as the research population (Heba, 2021) for evaluating the effect of social messaging relative to rational messaging, with the hypothesis:

H2. *Social messages result in a higher response rate than rational messages in short form advertising.*

2.2. The channel selection

Marketing researchers have studied influence strategies using various communication channels (Boyle, Dwyer, Robicheaux, & Simpson, 1992; Frazier & Rody, 1991; Frazier & Summers, 1984). Communication strategies need to consider channel conditions, including channel structure, climate, and power (Mohr & Nevin, 1990). Prior research shows that the strength of the seller-customer relationship, trust, and dependence factors influence satisfaction and commitment to the channels (Andaleeb, 1996; Boyle et al., 1992) and the frequency of recommendations, promises, and information. This indicates that channels where the consumer opts-in might be fruitful communication channels (Ming, Chen, & Tu, 2020).

Previous research reports that customers have distinct channel preferences to receive certain types of messages (Flanagin & Metzger, 2001; Westmyer, DiCioccio, & Rubin, 1998). The channel seems to affect the receptiveness of the messaging (Nicolini et al., 2017), and customers leverage social media channels for finding product information (Phua, 2019). Meanwhile, companies often have their own preferences communication channels based on accessibility, cost, and other factors (Rice, D'Ambra, & More, 1998).

Marketing communications are more effective when companies transmit their message via channels that the customers prefer (Danaher & Rossiter, 2011; Rice et al., 1998), and the more communications a customer receives from a channel, the less likely the customer is to respond to an offer made in that channel (Danaher & Rossiter, 2011). The research argues that coordination of various communication channels is needed for effective communication to happen (Holm, 2006). A comparison of eleven channels suggests customers use of social media and short message service (SMS or text messaging) extensively (Danaher & Rossiter, 2011). Also, the rapid penetration of smartphone app technology (Panova, Carbonell, Chamarro, & Puerta-Cortés, 2020; Renner et al., 2020) and extensive use of social network sites (Jin Jeong, Suh, & Gweon, 2020) highlight the need to focus on communication channels through mobile phones.

This research focuses on three online communication channels for short form advertising: text messaging using SMS, social media using Facebook advertisements, and notifications using a company mobile app. Based on prior work on channels and interaction with messaging, the researchers hypothesize:

H3. *Mobile app notification has a higher response rate than Facebook advertisement and text messaging in short form advertising.*

H3a. *Mobile app notification has a higher response rate for emotional and rational messages than other channels in short form advertising.*

H3b. *A Facebook advertisement has a higher response rate for social messages than other channels in short form advertising.*

2.3. The customer segmentation

Market segmentation strategies disaggregate the total market into segments of distinct demands (Dickson & Ginter, 1987). Customer characteristics such as age, education, mobility, income, and attitudes toward technology are used in a latent class analysis to estimate the likelihood that those customers will adopt a telecommunication service (Green, Carmone, & Wachspress, 1976). Researchers have further realized that customers should not be viewed as members of a homogeneous market segment but rather as individuals seeking personalized experiences and communications (Fuat Firat & Shultz, 1997; Pires, Stanton, & Rita, 2006). Consumer personality attributes (Y. Zhang, Sun, & Kim, 2017) have been reported to impact e-commerce behavior with a moderating effect (Leong, Jaafar, & Sulaiman, 2017).

The rapid development of Web and mobile communications has introduced a new transaction channel and unique abilities for increased communication among consumers of the product (Peterson, Balasubramanian, & Bronnenberg, 1997; Pires et al., 2006). These abilities allow tailored offerings to suit individual needs within market segments (Simmons, 2008). Demographic, social characteristics, information exposure, and customer preferences to different channels (H. Kim, Lee, & Oh, 2020) are said to be related to communication effectiveness (Scott, Schmidt, Aunger, Garbrah-Aidoo, & Animashaun, 2008). Therefore, it is

essential to identify individual customers to target persuasive communications.

Research has studied techniques that identify correct customers to target in direct marketing campaigns (Gutierrez & Gérardy, 2017). This type of modeling helps for understanding and predicting the communication impact on each customer. It also enables the campaign manager, for example, to divide the customers according to their responses and push the offer to those customers who will most likely react positively to messaging. The effects of customer characteristics on response rates to short form advertising is an under researched area.

For this research, based on the prior work of the effect of both demographic and behavioral individual differences on reactions to persuasive messaging, the hypotheses are:

H4. *There are customer characteristics that indicate response rates in short form advertising.*

H4a. *There are customer characteristics that indicate response rates based on the message type in short form advertising.*

H4b. *There are customer characteristics that indicate response rates based on the channel in short form advertising.*

For H04a and H04b, we specifically investigate the following customer characteristics, which are normal collected by the company:

- Demographic variables (customer gender, age on network, customer value, smartphone flag (y/n), smartphone technology)
- Behavioral variables (average recharge internal, average data balance, total interval minutes, data usage)

3. Methodology

To test these hypotheses, the authors conducted a between-subjects experiment, as part of a marketing campaign of a large telecom company, measuring the response rate of persuasive messages across channels.

The persuasive messages were sent via three communication channels: (a) *text message* (SMS), (b) *Facebook advertising* (FB), and (c) a *mobile app* notification. The messages were sent to mutually exclusive segments of a targeted customer population. The customers, who were all of the same nationality, were stratified into experimental segments that were as demographically similar as possible in terms of gender, age, length of time with the company, and so on.

The dependent variable was the response rate, which refers to the number of people who positively respond to a message divided by the number of those to whom the message was sent. Customers were given a limited time to respond to the offer or discard it, as required by the company's guidelines.

The authors designed the messages with three persuasion techniques, based on the literature review, and each had the same offer of free international minutes to buy a specific mobile credit recharge option[1]:

- **Rational**: contain factual statements and descriptions of the offer.
- **Emotional**: contain elements evoking affective responses. (***Positive***: causing a nostalgic feeling of missing home.) (***Negative***: causing fear of losing the limited offer.)
- **Social**: causing peer pressure to conform to social norms and expectations of others.

Since the experiment was conducted in a telecommunications company, where such message crafting and advertising occur nearly daily, the company has its own internal ethical review process. First, the experiment was run as a normal course of business operation that sought to enhance methods of communicating with customers and improve the contexts and content of messages. Second, the authors involved expert team members in formatting the content of the messages to ensure it abided by the company's policies. Third, the company ensured that proper communication was delivered to the customers involved in the experiment without unnecessary disturbance to service. In addition, the extracted customer data were anonymized before being supplied to the researchers.

3.1. Data collection

The experiment involved 39,000 customers of the telecommunications company and focused on the Egyptian customer population. The offer was 15 free international calling minutes to Egypt with a data recharge equivalent to $27 USD. The choice of Egyptian customers was based on both a sufficiently large segment of customers to run the experiment and low-cost consideration for the free value given in the communicated offer in the host country of the telecom company. The host country has a substantial Egyptian expatriate population, and this customer segment are users of international calling minutes to reach families, friends, and others in their home country.

The customers were representatively split into equally sized combinations of communication channels and persuasive strategies. A total of twelve groups were formed, each containing approximately 3,000 customers. The experiment also designated a control group of approximately 3,000 customers for benchmarking the experimental effects. This control was sent no message, a common benchmarking in the industry to see the effect of any advertising.

A common process in telecom and other companies, called *contact strategy*, was performed before sending any customer campaigns. The contact strategy process determines whether each customer is eligible for receiving an offer. This contact strategy includes the exclusion of blacklisted customers, do-not-disturb customers, and customers who have already received the maximum number of offers in a given period. Hence, after the contact strategy exclusion process, the number of contacted customers in the experiment was reduced to approximately 2,600 customers in each group, resulting in a total of 33,848 customers, including the control group, as shown in Table 1.

3.2. Construction and manipulation check of the messages

With the assistance of marketing communication experts within the telecom company and prior work (Sohn & Lee, 2007), the rational message was tweaked and modified to produce the required message text for the other techniques. The message texts, translated from Arabic into English, of the offer to the customers using the different persuasive techniques are shown in Table 2. The rational message is the simplest and shortest form of the message that delivers the offer in the minimum number of words with the minimum triggered sentiments.

Table 1
Number of customers in each group by persuasive techniques and communication channels. There is a control group of 2,997 receiving no message.

Channel	Rational	Emotional (pos.)	Emotional (neg.)	Social	Total
Facebook ads	2,579	2,534	2,563	2,550	10,226
Text messaging	2,578	2,562	2,565	2,588	10,293
Mobile app	2,587	2,573	2,559	2,613	10,332
Total	**7,744**	**7,669**	**7,687**	**7,751**	**30,851**
	No message				
Control	2,997				**33,848**

[1] Mobile prepaid lines count on different type of recharges where customers can buy a specific benefit (credit, calling minutes, or data allowance) in advance.

Table 2
Text used for the persuasive techniques.

Persuasive strategy	Message text (translated from Arabic to English)	Number of Words and Characters
Rational	Recharge with Internet 100 card and get FREE 15 min for 7 days to call Egypt. Offer valid till DD/MM/YYYY	No. words: 20 No. characters: 90
Emotional (positive)	Missing home? Talk more with your family and friends in Egypt. Recharge with Internet 100 card and get FREE 15 min for 7 days to call Egypt. Offer valid till DD/MM/YYYY	No. words: 31 No. characters: 142
Emotional (negative)	Do not miss the limited time amazing offer to call Egypt. Recharge with Internet 100 card and get FREE 15 min for 7 days to call Egypt. Offer valid till DD/MM/YYYY	No. words: 31 No. characters: 137
Social	Are your friends calling Egypt more than you? Here is your chance to join them and call more to Egypt. Recharge with Internet 100 card and get FREE 15 min for 7 days to call Egypt. Offer valid till DD/MM/YYYY	No. words: 40 No. characters: 173

Although we would ideally select explicitly positive emotion, negative emotion, or social terms for each message, organizational guidelines prohibit the messages from appearing 'too spammy'. So, none of the explicit messages were deemed appropriate. In the end, these were the messages that passed organizational quality control. Additionally, each message contained a reward asset, which is a component of the PSD model (Oinas-Kukkonen & Harjumaa, 2009).

To validate the sentiment triggered by each of the text messages, the researchers conducted a manipulation check on each message on 50 Egyptian crowd workers for each message using Appen, a crowdsourcing platform that enables the collection of user responses according to a constructed message format. The text was presented to each crowdworker, who was asked to choose the sentiment that best corresponded to the text. Table 3 presents the number and percentage of crowdworkers who had a certain sentiment triggered as a result of each message.

As shown in Table 3, the majority of votes generally aligns with the intended persuasive technique. The crowdworker findings were in line with the chosen sentiment, and the telecom marketing experts also considered the messages on target with the intended strategies. The persuasive messages were then sent to customers in each group. Fig. 1 shows the snapshots of how customers received the message on each communication channel.

The authors collected a variety of anonymized data for each customer, including the dependent metric of interest, response to the offer, and a variety of additional data, as shown in Table 4.

4. Findings

4.1. Persuasive messaging techniques

Addressing RQ1 (message effect), Table 5 shows the results of the response rate of the different persuasive techniques. Each cell includes the number of customers who accepted the offer and the percentage of customers who accepted the offer through all channels.

Table 3
Sentiment votes collected by each strategy, with the highest category bolded.

Strategy	Sentiment Votes (%)			
	Rational	Emotional (pos.)	Emotional (neg.)	Social
Rational	**16 (32%)**	8 (16%)	**17 (34%)**	9 (18%)
Emotional (positive)	4 (8%)	**25 (50%)**	14 (28%)	7 (14%)
Emotional (negative)	7 (14%)	7 (14%)	**24 (48%)**	12 (24%)
Social	9 (18%)	11 (22%)	12 (24%)	**18 (36%)**

Given the overall response rate of the campaign (0.49%) compared to the control group (0.40%), the overall effectiveness of the messaging in the various channels is, at first glance, minor. In a comparison of the persuasive strategies, the rational message yielded the highest response rate (0.58%). Also, the positive emotional message resulted in the second-highest response rate (0.57%). The lowest response rates were found for the negative emotional message (0.39%) and peer pressure (0.40%) messages. The response rate of the SMS channel was the lowest overall, even lower than for the control group. It is not clear why, as one would expect the response rate to at least match the control group. This aspect would require further investigation. Results of logistic regression analysis indicate that there was no significant association between the message types and response rates. Therefore, **H1a, H1b, and H2 are not** supported. Positive emotional, negative emotional, or social messages do not result in higher response rates relative to rational messages in short form advertising.

4.2. Communication channels

Moving to RQ2, Table 5 (last row) shows the response rates of the different channels. FB and mobile app channels had better response rates (0.60% for FB and 0.48% for the mobile app) compared to the SMS channel (0.38%). The response rate of the SMS channel was below 0.47% of the control group. Results of the binary logistic regression indicate that there was a significant association between the channel type and response rate ($b = 1.39$, OR = 4.02, CI: 0.24–2.87, $p = 0.03$ for FB and $b = 1.31$, OR = 3.69, CI: 0.14–2.79, $p = 0.05$ for the mobile app). Therefore, **H3 is fully** supported. The mobile app platform has a higher response rate than FB and SMS channels, and FB also has a significantly higher response rate than the SMS channel for short form advertising.

We explored the interaction effect between the message type and the communication channel. Results of the logistic regression indicated that there was a significant interaction effect between FB and all message types ($\chi2(7) = 1.3906$, $p = 0.0314$) and the mobile app and all message types ($\chi2(7) = 1.3048$, $p = 0.0453$). Interestingly, there is a significant but negative interaction effect between the social message and the mobile app ($\chi2(7) = -2.0095$, $p = 0.0183$). Therefore, **H3a is** supported. The mobile app's response rate is higher than the responses of the other channels. **H3b is partially** supported as FB has a higher response rate for social messages in short form advertising that is significantly higher than that of SMS but not significantly different from that of the mobile app.

As shown in Table 5, most persuasive communication worked well on FB and the mobile app channel. Interestingly, negative emotional techniques did not work well on any channel, and the response rates of the negative emotional message and social pressure messages were lower than that of the control group. The SMS response rate was lower than that of the control group, indicating that commercial messages via this channel had an overall negative effect (i.e., it would be better not to advertise than to use SMS advertising).

4.3. Customer characteristics

Addressing RQ3 regarding customer characteristics, the authors used separate Kruskal-Wallis tests on each continuous variable to test for differences among the groups to determine if customer characteristics influenced the response rates. The authors first examined the impact of customer attributes on each message type's response rate and found that there were no significant differences that depended on the persuasive message type among customers. Therefore, **H4a is not** supported. There is no indication that customer characteristics influence response rates based on the message type in short form advertising.

Examining channel, there was a significant difference among communication channels for one of the customer behavioral characteristics, *average data recharge interval* (χ^2 (3) = 7.32, $p = 0.05$). *The average*

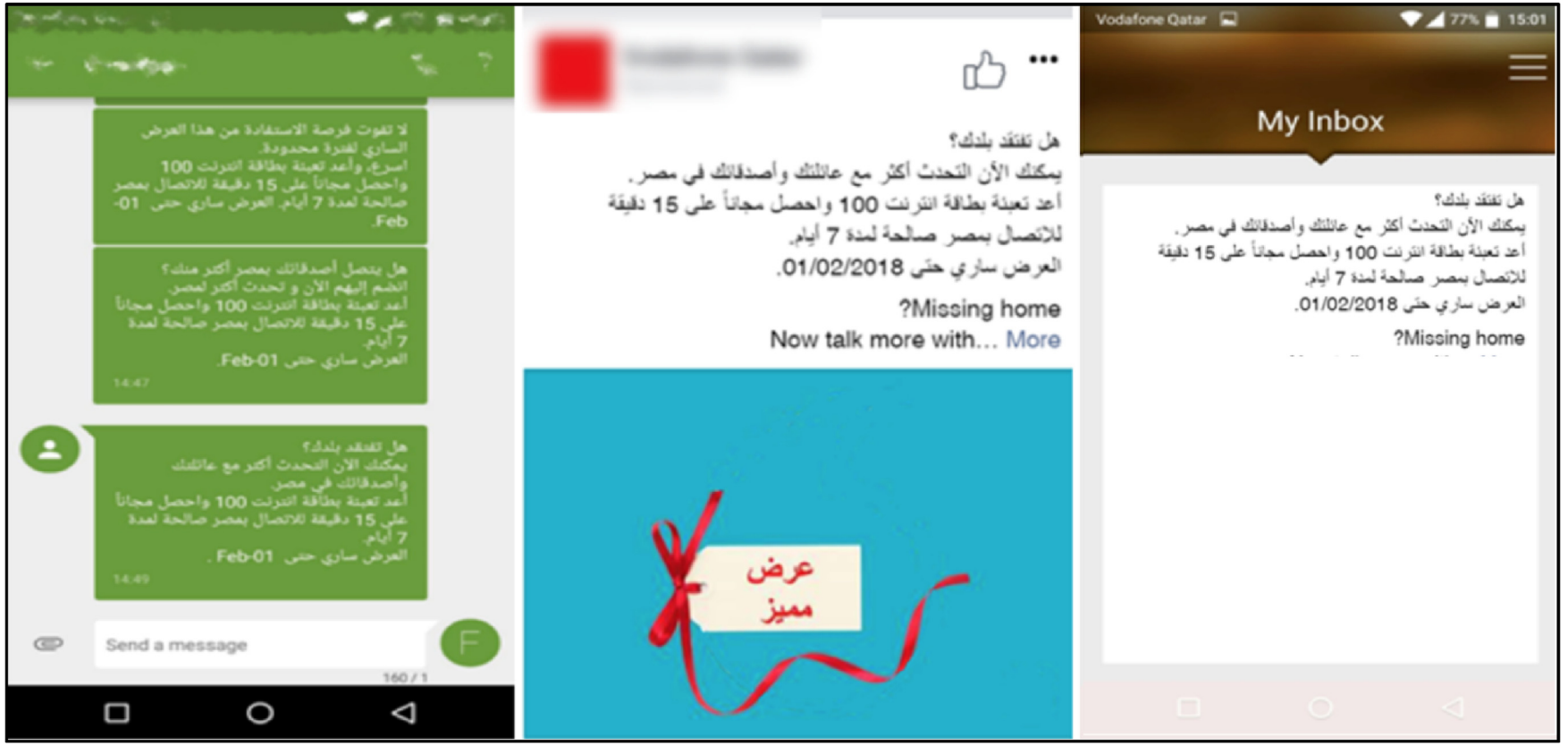


Fig. 1. Snapshots of the persuasive messages sent via SMS, Facebook Ads, and mobile app notification (see Table 2 for the English translations).

Table 4
Demographic and behavioral variables of the customers.

Demographic Variable	Definition	Reason for Inclusion
Customer gender	Male/Female	Common demographic attribute for segmentation
Age on network	How long with the company	Expected impactful demographic attribute based on discussions with domain experts
Customer value	Revenue rating of High, Medium, or Low value	Expected impactful demographic attribute based on discussions with domain experts
Smartphone flag	Yes/No	Expected impactful demographic attribute based on discussions with domain experts
Smartphone technology	2G/3G/4G technology supported by the handset	Expected impactful demographic attribute based on discussions with domain experts
Behavioral Variable	**Definition**	**Reason for Inclusion**
Average recharge internal	Average interval in days between the recharges	Expected impactful behavior attribute based on discussions with domain experts
Average data balance	Average data balance in megabytes	Expected impactful behavior attribute based on discussions with domain experts
Total interval minutes	Total minutes calling Egypt in the last 30 days	Expected impactful behavior attribute based on discussions with domain experts
Data usage	Total data usage, megabytes, last 30 days	Expected impactful behavior attribute based on discussions with domain experts
Maximum recharge	The highest recharge by the customer	Expected impactful behavior attribute based on discussions with domain experts

data recharge interval indicates when a customer purchased a data recharge. Multiple comparisons were carried out with a Dunn test showing a significant positive difference between the FB and SMS groups, $z = 2.24$, $p = 0.03$, as well as between the FB and the control groups, $z = -1.99$, $p = 0.05$. So, **H4b is partially** supported. There is at least one customer characteristic that indicated response rates based on the channel.

5. Discussion and implications

5.1. Theoretical implication of the research

In terms of specific findings, positive emotional and emotionally neutral ('rational') messages work better than negative emotional and socially oriented messages. Theoretically, the contribution of this research is a comprehensive analysis for optimizing persuasive online communication with customers in direct marketing by identifying **how**, **where**, and **who** to target, which is conceptually shown in Fig. 2.

However, fear of losing an opportunity and social messages did not result in a higher response rate than rational messages, suggesting negative and social messages have an adverse effect on response rates in this context (i.e., negative emotional messages on FB and social pressure on SMS), similar to the negative effects of persuasive messages found in other channels (Wang & Zhang, 2016).

Results show that nonfactual persuasive messaging in the online context may not be an effective form of advertising communication relative to a factual approach for short form advertising. Rational messages had a higher response rate than emotional messaging and social messaging. Although rational messaging works well, other strategies such as positive emotional messages can also be effective in channels that users trusted (Andaleeb, 1996), such as mobile applications (Renner et al., 2020). Contrary to findings from prior research, which studied social and emotional cues sent in more sophisticated contexts, our findings suggest that in a limited communication platform constrained by message length, emotional (especially negative emotional) messages and social messages may have adverse effects in convincing customers to buy a product.

Interestingly, our crowdsourced evaluations of the short form advertising messages indicated a mixed perception of persuasive strategies. Therefore, even though an advertiser may believe they are applying, for example, an emotional strategy, the customers may perceive this strategy differently than intended. This discrepancy between planned and realized effects should be explored in future work. We surmise several potential explanations for this finding. First, consumers may not be able to detect and identify persuasive strategies all too well, which results in confusion when the consumer is trying to interpret a given ad message. Second, it may be that persuasion is perceived differently altogether, meaning that what the advertiser perceives as a rational message may evoke an emotional reaction, and vice versa. It is, therefore, interesting to contemplate the idea that there may not be purely emotional or purely rational messages, but in reality, all short form advertising messages may include components of each when interpreted by consumers.

Continuing this line of thought, from a theoretical point of view, the constraint in the number of characters of short form advertising may negate portions of prior research on persuasive messaging (Adler et al., 2016; Dillard & Nabi, 2006), as customers may be more receptive toward simple, factual communication than to sophisticated peripheral cues, which are effective in communication channels with less constrained length. These findings add to prior research pointing to social media as an effective communication channel for companies. The factual aspect may be due to the character limitations in these forms of customer contact, a limitation that is not prevalent in some other forms of commercial advertising communications. From a practical perspective, this length restriction has become more common in online commercial communication.

Concerning communication channels, FB (with a 38 million user base in Egypt at the time of the study) advertising and the mobile app had higher response rates. This finding is most likely due to the greater degree of trust, opt-in, and loyalty aspects of these platforms, as customers, to some extent, accept commercial messaging via these channels. The interaction between message and channel appears to show that the latter has the most impact on the response rate, regardless of the message type. This, again, is most likely due to the contextual limitations on content with these channels. Increasingly considered a potentially spamming channel (Cloudmark, 2012), SMS underperformed the control group regarding the response rate.

Table 5
The response rates by message type and channel.

Strategy		Control	FB	SMS	Mobile app	Overall by message
Rational			15 (0.58%)	15 (0.58%)	15 (0.58%)	45 (0.58%)
Emotional	Positive		**19 (0.75%)**	9 (0.35%)	**16 (0.62%)**	44 (0.57%)
	Negative		13 (0.51%)	5 (0.19%)	12 (0.47%)	30 (0.39%)
Social (peer pressure)			14 (0.55%)	7 (0.27%)	10 (0.37%)	31 (0.40%)
Control response rate		12 (0.40%)				**Overall by Platforms**
Target response rate by platform			**61 (0.60%)**	36 (0.35%)	53 (0.51%)	150 (0.49%)

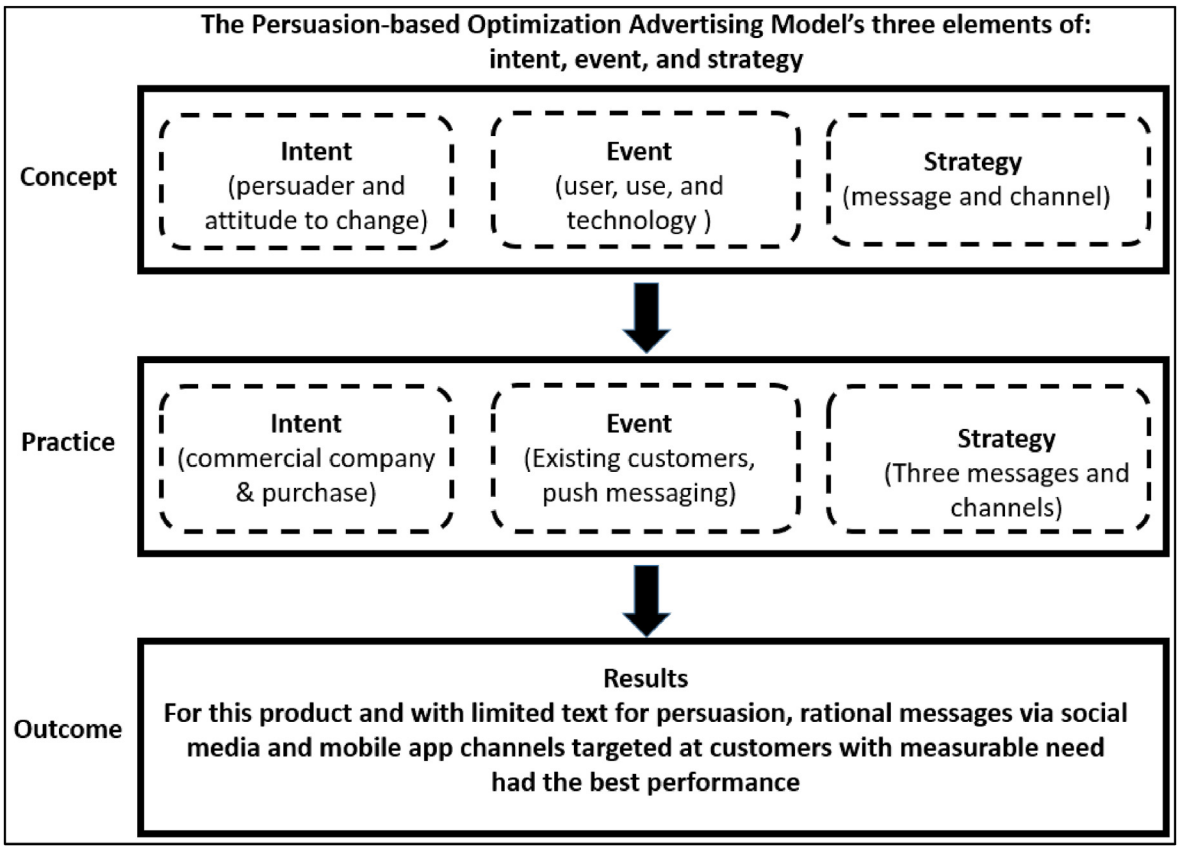


Fig. 2. Persuasion-based Optimization Advertising Model of message, channel, and customer for short form advertising.

The findings point to the value of organizational mobile apps, as the apps may indicate an acceptance of commercial and other communication from an organization by users based on the users' perceived trustworthiness, relationship, and dependency toward these channels (Andaleeb, 1996; Danaher & Rossiter, 2011; Mohr & Nevin, 1990).

Finally, customer characteristics differences were limited (there were no demographic differences), and only one behavioral characteristic (interval from the last recharge) affected the response rate. This finding indicates that behavioral features and perceived usefulness of the offer are more important than demographics in predicting the response rate to persuasive messaging on these channels. This confirms earlier research that postulates a shift in marketing communications from demographic to intent-based targeting and the importance of a customer's historical behavioral data for communication effectiveness (Jansen & Booth, 2010; Salminen, Seitz, Jansen, & Salenius, 2017).

5.2. *Practical implication for commercial organizations*

From our study, there are three core takeaways for organizations aiming to sell services or products via short online message targeting, which are:

- **Persuasive Messages:** Given the results, it seems that the short form advertising message must contain some factual information, and, at least for this product, rational information is the most effective in generating high response rates relative to the other forms of messaging evaluated.
- **Communication Channels:** Opt-in channels may be beneficial for companies using the short form advertising messaging format. The fact that the company mobile app as a channel has high response rates indicates that customers using these mobile apps may be more receptive to such marketing approaches. As such, the mobile app may be an effective communication channel for companies and worth the effort to recruit customers.
- **Consumer Characteristics:** In the end, it is the customer needs that matters. The needs and wants of consumers appear to outdo other advertising efforts of short form advertising messaging content and channel selection, and, despite leveraging a variety of consumer attributes, only one behavioral attribute (the need to recharge) was directly associated with the product seems to affect consumer response rate.

5.3. *Limitations, strengths, and future work*

Regarding the limitations of this research, the study was confined to one industry and one product, international mobile phone credit. The finding that rational messages had higher response rates may be a factor of the nature of the product; perhaps employing a different product might lead to other message types performing higher. It remains to be seen if the findings hold in other contexts and for other types of commercial products. Also, the researchers tested a limited set of messaging and channels. Similarly, the implementation of the research in a real customer environment limited the options concerning messaging and making each message distinct. However, this is a limitation of working in a real environment with real customers. Finally, the experiment should be replicated with other nationalities for generalizability across cultural contexts.

As for strengths, the researchers evaluate three types of messaging across three different and popular communication channels using a sample in the tens of thousands of actual customers. Therefore, limitations asides, the authors believe the research provides important findings for online advertising and marketing domain concerning the transmission of pervasive communication across these channels for short form advertising.

6. Conclusion and future research

In this research, we present a conceptual framework of the message, channel, and customer within our Persuasion-based Optimization Advertising Model for short form advertising. We based on a conceptual framework on implications from our empirical research that examined the influence of the interplay among messages, channels, and customers on the response rates of a commercial offer sent to more than 30,000 customers of a major telecom company. Findings showed that a rational message and trusted channels, such as mobile apps, work best, although there is an interplay between the two. There does appear to be an interplay among these three (i.e., message, channel, and customer) although, at least for this product, customers prefer just the facts over a trusted communication channel (the mobile app).

Concerning further work, examining more behavioral features may lead to improved response rate prediction. Also, expanding the experiment to other industries and contexts, such as product reviews, that can accommodate more persuasive techniques (S. G. Kim & Kang, 2018) would determine the generalizability of the findings to other domains other than telecommunications. It would also be insightful to investigate context aspect of the message receiver (Peng, Qian, & Liu, 2020). An obvious area of future research would be investigating other product and service offerings via the same channels and using the same message formats. Finally, a fruitful area of future research would be to investigate the effects of richer message content and multimedia messages (Alamäki, Pesonen, & Dirin, 2019).

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Adler, R. F., Iacobelli, F., & Gutstein, Y. (2016). Are you convinced? A wizard of oz study to test emotional vs. rational persuasion strategies in dialogues. *Computers in Human Behavior, 57*, 75–81.

Alamäki, A., Pesonen, J., & Dirin, A. (2019). Triggering effects of mobile video marketing in nature tourism: Media richness perspective. *Information Processing & Management, 56*(3), 756–770.

Andaleeb, S. S. (1996). An experimental investigation of satisfaction and commitment in marketing channels: The role of trust and dependence. *Journal of Retailing, 72*(1), 77–93.

Bawden, D., & Robinson, L. (2009). The dark side of information: Overload, anxiety and other paradoxes and pathologies. *Journal of Information Science, 35*(2), 180–191.

Boyle, B., Dwyer, F. R., Robicheaux, R. A., & Simpson, J. T. (1992). Influence strategies in marketing channels: Measures and use in different relationship structures. *Journal of Marketing Research, 29*(4), 462–473. https://doi.org/10.2307/3172712

Caples, J. (1974). *Tested advertising methods*. Prentice Hall.

Chen, C.-H., Lee, W.-P., & Hwang, J.-Y. (2018). Tracking and recognizing emotions in short text messages from online chatting services. *Information Processing & Management, 54*(6), 1325–1344.

Chen, C.-W., Liu, W.-S., Chen, W.-K., Hsu, P.-Y., & Tang, Y.-T. (2021). Exploring consumers' purchase intention to social media advertising: The role of advertising clicks. In *Paper presented at the 2021 12th international conference on E-education, E-business, E-management, and E-learning, tokyo, Japan*. https://doi.org/10.1145/3450148.3450174

Danaher, P. J., & Rossiter, J. R. (2011). Comparing perceptions of marketing communication channels. *European Journal of Marketing, 45*(1/2), 6–42.

De Pelsmacker, P., Geuens, M., & Maison, D. (2002). *Emotional and rational advertising messages in positive and negative polish media contexts New Directions in International Advertising Research* (pp. 121–135).

DeSteno, D., Petty, R. E., Rucker, D. D., Wegener, D. T., & Braverman, J. (2004). Discrete emotions and persuasion: The role of emotion-induced expectancies. *Journal of Personality and Social Psychology, 86*(1), 43.

Deutsch, M., & Gerard, H. B. (1955). A study of normative and informational social influences upon individual judgment. *Journal of Abnormal and Social Psychology, 51*(3), 629.

Dickson, P. R., & Ginter, J. L. (1987). Market segmentation, product differentiation, and marketing strategy. *Journal of Marketing, 51*(2), 1–10. https://doi.org/10.2307/1251125

Dillard, J. P., & Nabi, R. L. (2006). The persuasive influence of emotion in cancer prevention and detection messages. *Journal of Communication, 56*(suppl_1), S123–S139. https://doi.org/10.1111/j.1460-2466.2006.00286.x

Dutta, S., Das, D., & Chakraborty, T. (2020). Changing views: Persuasion modeling and argument extraction from online discussions. *Information Processing & Management, 57*(2), Article 10208.

Earley, P. C., Gibson, C. B., & Chen, C. C. (1999). "How did I do?" versus "How did we do?" Cultural contrasts of performance feedback use and self-efficacy. *Journal of Cross-Cultural Psychology, 30*(5), 594–619.

Eckles, D., Wightman, D., Carlson, C., Thamrongrattanarit, A., Bastea-Forte, M., & Fogg, B. J. (2009). Social responses in mobile messaging: Influence strategies, self-disclosure, and source orientation. In *Paper presented at the proceedings of the SIGCHI conference on human factors in computing systems, boston, MA, USA*.

Edwards, H. M., McDonald, S., Zhao, T., & Humphries, L. (2014). Design requirements for persuasive technologies to motivate physical activity in adolescents: A field study. *Behaviour & Information Technology, 33*(9), 968–986. https://doi.org/10.1080/0144929X.2013.841755

Flanagin, A. J., & Metzger, M. J. (2001). Internet use in the contemporary media environment. *Human Communication Research, 27*(1), 153–181.

Fogg, B. J. (1998). Persuasive computers: Perspectives and research directions. In *Paper presented at the proceedings of the SIGCHI conference on human factors in computing systems, los angeles, California, USA*.

Fogg, B. J., Grudin, J., Nielsen, J., & Card, S. (2003). Persuasive technology: Using computers to change what we think and do. *Journal of Business and Technical Communication, 3*(12), 1168–1170.

Frazier, G. L., & Rody, R. C. (1991). The use of influence strategies in interfirm relationships in industrial product channels. *Journal of Marketing*, 52–69.

Frazier, G. L., & Summers, J. O. (1984). Interfirm influence strategies and their application within distribution channels. *Journal of Marketing*, 43–55.

Fuat Firat, A., & Shultz, C. J. (1997). From segmentation to fragmentation: Markets and marketing strategy in the postmodern era. *European Journal of Marketing, 31*(3/4), 183–207. https://doi.org/10.1108/EUM0000000004321

Green, P. E., Carmone, F. J., & Wachspress, D. P. (1976). Consumer segmentation via latent class Analysis. *Journal of Consumer Research, 3*(3), 170–174.

Gutierrez, P., & Gérardy, J.-Y. (2017). Causal inference and uplift modelling: A review of the literature. In *Paper presented at the international conference on predictive applications and APIs*.

Heba, S. (2021). Social media advertising influence on users' responses: Egypt. *International Journal of Online Marketing, 11*(1), 1–13. https://doi.org/10.4018/IJOM.2021010101

Hirsh, J. B., Kang, S. K., & Bodenhausen, G. V. (2012). Personalized persuasion:Tailoring persuasive appeals to recipients' personality traits. *Psychological Science, 23*(6), 578–581. https://doi.org/10.1177/0956797611436349

Holm, O. (2006). Integrated marketing communication: From tactics to strategy. *Corporate Communications: An International Journal, 11*(1), 23–33. https://doi.org/10.1108/13563280610643525

Jansen, B. J., & Booth, D. (2010). Classifying web queries by topic and user intent. In *Paper presented at the CHI'10 extended abstracts on human factors in computing systems*.

Jiang, T., Liu, F., & Chi, Y. (2015). Online information encountering: Modeling the process and influencing factors. *Journal of Documentation, 71*(6), 1135–1157. https://doi.org/10.1108/JD-07-2014-0100

Jin Jeong, Y., Suh, B., & Gweon, G. (2020). Is smartphone addiction different from internet addiction? Comparison of addiction-risk factors among adolescents. *Behaviour & Information Technology, 39*(5), 578–593. https://doi.org/10.1080/0144929X.2019.1604805

Kahn, B. E., & Isen, A. M. (1993). The influence of positive affect on variety seeking among safe, enjoyable products. *Journal of Consumer Research, 20*(2), 257–270.

Khaled, R., Biddle, R., Noble, J., Barr, P., & Fischer, R. (2006). Persuasive interaction for collectivist cultures. In *Paper presented at the proceedings of the 7th australasian user interface conference, hobart, Australia*.

Kim, S. G., & Kang, J. (2018). Analyzing the discriminative attributes of products using text mining focused on cosmetic reviews. *Information Processing & Management, 54*(6), 938–957.

Kim, H., Lee, J., & Oh, S. E. (2020). Individual characteristics influencing the sharing of knowledge on social networking services: Online identity, self-efficacy, and knowledge sharing intentions. *Behaviour & Information Technology, 39*(4), 379–390. https://doi.org/10.1080/0144929X.2019.1598494

Kimura, H., & Nakajima, T. (2011). Designing persuasive applications to motivate sustainable behavior in collectivist cultures. *PsychNology Journal, 9*(1), 7–28.

King, A. J., Lazard, A. J., & White, S. R. (2020). The influence of visual complexity on initial user impressions: Testing the persuasive model of web design. *Behaviour & Information Technology, 39*(5), 497–510. https://doi.org/10.1080/0144929X.2019.1602167

Kollmann, T., Kuckertz, A., & Kayser, I. (2012). Cannibalization or synergy? Consumers' channel selection in online–offline multichannel systems. *Journal of Retailing and Consumer Services, 19*(2), 186–194. https://doi.org/10.1016/j.jretconser.2011.11.008

Kwon, E. S., King, K. W., Nyilasy, G., & Reid, L. N. (2019). Impact of media context on advertising memory: A meta-analysis of advertising effectiveness. *Journal of Advertising Research, 59*(1), 99–128.

Lasswell, H. D. (1948). The structure and function of communication in society. *The communication of ideas, 37*, 215–228.

Leong, L.-Y., Jaafar, N. I., & Sulaiman, A. (2017). Understanding impulse purchase in Facebook commerce: Does big five matter? *Internet Research, 27*(4), 786–818. https://doi.org/10.1108/IntR-04-2016-0107

Li, C. Y. (2013). Persuasive messages on information system acceptance: A theoretical extension of elaboration likelihood model and social influence theory. *Computers in Human Behavior, 29*(1), 264–275.

Li, Z., & Li, C. (2014). Tweet or "re-tweet"? An experiment of message strategy and interactivity on twitter. *Internet Research, 24*(5), 648–667. https://doi.org/10.1108/IntR-11-2013-0233

Li, G., Lin, S., Yu, W., & Guo, S. (2020). An empirical study on the cueing effect of the emotional post title in a virtual community. *Data and Information Management, 5*(1), 208–227. https://doi.org/10.2478/dim-2020-0024

Mazzotta, I., & De Rosis, F. (2006). Artifices for persuading to improve eating habits. In *Paper presented at the AAAI spring symposium - technical report*.

McQuail, D., & Windahl, S. (2015). *Communication models for the study of mass communications*. Routledge.

Midden, C., Kimura, H., Ham, J., Nakajima, T., & Kleppe, M. (2011). Persuasive power in groups: The influence of group feedback and individual comparison feedback on energy consumption behavior. In *Paper presented at the proceedings of the 6th international conference on persuasive technology: Persuasive technology and design: Enhancing sustainability and health, columbus, Ohio, USA*.

Ming, J., Chen, R., & Tu, R. (2020). Factors influencing user behavior intention to use mobile library application: A theoretical and empirical research based on grounded theory. *Data and Information Management, 5*(1), 131–146. https://doi.org/10.2478/dim-2020-0037

Mohr, J., & Nevin, J. R. (1990). Communication strategies in marketing channels: A theoretical perspective. *Journal of Marketing, 54*(4), 36–51. https://doi.org/10.2307/1251758

Mubin, O., Wijayarathne, J., Ahmad, M. I., Ginige, A., & Hewapathirana, R. (2016). Using persuasive mobile apps to enhance children's health and well being: A Sri Lankan experience. In *Paper presented at the proceedings of the 2016 CHI conference extended abstracts on human factors in computing systems, san jose, California, USA*.

Nabi, R. L. (1999). A cognitive-functional model for the effects of discrete negative emotions on information processing, attitude change, and recall. *Communication Theory, 9*(3), 292–320. https://doi.org/10.1111/j.1468-2885.1999.tb00172.x

Nakano, S., & Kondo, F. N. (2018). Customer segmentation with purchase channels and media touchpoints using single source panel data. *Journal of Retailing and Consumer Services, 41*, 142–152. https://doi.org/10.1016/j.jretconser.2017.11.012

Nelson, M. R. (2008). The hidden persuaders: Then and now. *Journal of Advertising, 37*(1), 113–126.

Nicolini, V., Cassia, F., & Bellotto, M. (2017). Children perceptions of emotional and rational appeals in social advertisements. *Young Consumers, 18*(3), 261–277. https://doi.org/10.1108/YC-02-2017-00665

Oinas-Kukkonen, H., & Harjumaa, M. (2009). *Persuasive systems design: Key issues, process model and system features routledge Handbook of policy design* (pp. 105–123). Routledge.

Orji, R., Reilly, D., Oyibo, K., & Orji, F. A. (2019). Deconstructing persuasiveness of strategies in behaviour change systems using the ARCS model of motivation. *Behaviour & Information Technology, 38*(4), 319–335. https://doi.org/10.1080/0144929X.2018.1520302

Paay, J., Kjeldskov, J., Papachristos, E., Hansen, K. M., Jørgensen, T., & Overgaard, K. L. (2020). Can digital personal assistants persuade people to exercise? *Behaviour & Information Technology*, 1–17. https://doi.org/10.1080/0144929X.2020.1814412

Panova, T., Carbonell, X., Chamarro, A., & Puerta-Cortés, D. X. (2020). Specific smartphone uses and how they relate to anxiety and depression in university students: A cross-cultural perspective. *Behaviour & Information Technology, 39*(9), 944–956. https://doi.org/10.1080/0144929X.2019.1633405

Peng, H., Qian, Y., & Liu, C. (2020). Examination of effects of time constraint and task type on users' query typing behaviors. *Data and Information Management, 5*(1), 48–55. https://doi.org/10.2478/dim-2020-0034

Peterson, R. A., Balasubramanian, S., & Bronnenberg, B. J. (1997). Exploring the implications of the internet for consumer marketing. *Journal of the Academy of Marketing Science, 25*(4), 329. https://doi.org/10.1177/0092070397254005

Phua, J. (2019). E-cigarette marketing on social networking sites: Effects on attitudes, behavioral control, intention to quit, and self-efficacy. *Journal of Advertising Research, 59*(2), 242–254.

Pires, G. D., Stanton, J., & Rita, P. (2006). The internet, consumer empowerment and marketing strategies. *European Journal of Marketing, 40*(9/10), 936–949. https://doi.org/10.1108/03090560610680943

Poong, Y. S., Yamaguchi, S., & Takada, J.-i. (2014). Persuasive content development: Application of protection motivation theory in promoting heritage site preservation awareness. In *Paper presented at the CHI '14 extended abstracts on human factors in computing systems, toronto, ontario, Canada*.

Renner, B., Wesiak, G., Pammer-Schindler, V., Prilla, M., Müller, L., Morosini, D., … Cress, U. (2020). Computer-supported reflective learning: How apps can foster reflection at work. *Behaviour & Information Technology, 39*(2), 167–187. https://doi.org/10.1080/0144929X.2019.1595726

Rice, R. E., D'Ambra, J., & More, E. (1998). Cross-cultural comparison of organizational media evaluation and choice. *Journal of Communication, 48*(3), 3–26.

Rosenbloom, B. (2012). *Marketing channels: Cengage learning*.

Ruijten, P. A. M. (2020). The similarity-attraction paradigm in persuasive technology: Effects of system and user personality on evaluations and persuasiveness of an interactive system. *Behaviour & Information Technology*, 1–13. https://doi.org/10.1080/0144929X.2020.1723701

Saleem, M., & Mustafa, M. B. (2020). The role of unsolicited SMS marketing in driving consumers' buying behavior through consumer perception. *Academic Journal of Social Sciences, 4*(3), 724–740.

Salminen, J., Seitz, S., Jansen, B. J., & Salenius, T. (2017). Gender effect on E-commerce sales of experience gifts: Preliminary empirical findings. In *Paper presented at the proceedings of the international conference on electronic business (ICEB2017)*.

Sarma, N., Singh, S. R., & Goswami, D. (2019). Influence of social conversational features on language identification in highly multilingual online conversations. *Information Processing & Management, 56*(1), 151–166.

Scott, B. E., Schmidt, W. P., Aunger, R., Garbrah-Aidoo, N., & Animashaun, R. (2008). Marketing hygiene behaviours: The impact of different communication channels on reported handwashing behaviour of women in Ghana. *Health Education Research, 23*(3), 392–401. https://doi.org/10.1093/her/cym056

Shahbaznezhad, H., Dolan, R., & Rashidirad, M. (2021). The role of social media content format and platform in users' engagement behavior. *Journal of Interactive Marketing, 53*, 47–65. https://doi.org/10.1016/j.intmar.2020.05.001

Shannon, C. E., Weaver, W., & Burks, A. W. (1951). *The mathematical theory of communication*.

Sheldon, P., Herzfeldt, E., & Rauschnabel, P. A. (2020). Culture and social media: The relationship between cultural values and hashtagging styles. *Behaviour & Information Technology, 39*(7), 758–770. https://doi.org/10.1080/0144929X.2019.1611923

Shimp, T. A. (1997). *Advertising, promotion, and supplemental aspects of integrated marketing communications*. Harcourt Brace College Publishers.

Simmons, G. (2008). Marketing to postmodern consumers: Introducing the internet chameleon. *European Journal of Marketing, 42*(3/4), 299–310. https://doi.org/10.1108/03090560810852940

Sinisalo, J., Salo, J., Karjaluoto, H., & Leppäniemi, M. (2007). Mobile customer relationship management: Underlying issues and challenges. *Business Process Management Journal, 13*(6), 771–787. https://doi.org/10.1108/14637150710834541

Sohn, M., & Lee, J. (2007). UP health: Ubiquitously persuasive health promotion with an instant messaging system. In *Paper presented at the CHI '07 extended abstracts on human factors in computing systems, san jose, CA, USA*.

Sweeney, J., Soutar, G., & Mazzarol, T. (2014). Factors enhancing word-of-mouth influence: Positive and negative service-related messages. *European Journal of Marketing, 48*(1/2), 336–359. https://doi.org/10.1108/EJM-06-2012-0336

Teng, S., Khong, K. W., Goh, W. W., & Chong, A. Y. L. (2014). Examining the antecedents of persuasive eWOM messages in social media. *Online Information Review, 38*(6), 746–768.

Teng, L., Zhao, G., Wu, Y., Fu, H., & Wang, J. (2019). Positive versus negative messaging in discouraging drunken driving: Matching behavior consequences with target groups. *Journal of Advertising Research, 59*(2), 185–195.

Tomkins, S. S. (1984). Affect theory. In K. R. Scherer, & P. Ekman (Eds.), *Approaches to emotion. NJ: Erlbaum: Hillsdale*.

Torning, K., & Oinas-Kukkonen, H. (2009). Persuasive system design: State of the art and future directions. In *Paper presented at the proceedings of the 4th international conference on persuasive technology, claremont, California, USA*.

Tseng, T. H., & Hsieh, S. H. (2019). Determinants of emoticon usage in mobile instant messaging: A construal level theory perspective. *Behaviour & Information Technology, 38*(3), 289–301. https://doi.org/10.1080/0144929X.2018.1531927

Vossen, S., Ham, J., & Midden, C. (2009). Social influence of a persuasive agent: The role of agent embodiment and evaluative feedback. In *Paper presented at the proceedings of the 4th international conference on persuasive technology, claremont, California, USA*.

Wang, Z., & Zhang, P. (2016). Stop sending me messages!: The negative impact of persuasive messages on green transportation. In *Paper presented at the IConference 2016 proceedings, philadelphia, Pennsylvania*.

Westermann, T., Wechsung, I., & Möller, S. (2016). Smartphone notifications in context: A case study on receptivity by the example of an advertising service. In *Paper presented at the proceedings of the 2016 CHI conference extended abstracts on human factors in computing systems, san jose, California, USA*.

Westmyer, S. A., DiCioccio, R. L., & Rubin, R. B. (1998). Appropriateness and effectiveness of communication channels in competent interpersonal communication. *Journal of Communication, 48*(3), 27–48.

Wilson, E. V. (2003). Perceived effectiveness of interpersonal persuasion strategies in computer-mediated communication. *Computers in Human Behavior, 19*(5), 537–552. https://doi.org/10.1016/S0747-5632(03)00006-2

Wu, K., Zhao, Y., Zhu, Q., Tan, X., & Zheng, H. (2011). A meta-analysis of the impact of trust on technology acceptance model: Investigation of moderating influence of subject and context type. *International Journal of Information Management, 31*(6), 572–581. https://doi.org/10.1016/j.ijinfomgt.2011.03.004

Yu, H. (2012). Producing more persuasive antiviolence messages for college students: testing the effects of framing, information sources, and positive/negative fact appeal. *Journal of Interpersonal Violence, 27*(9), 1631–1654. https://doi.org/10.1177/0886260511423248

Zhang, M., Hu, M., Guo, L., & Liu, W. (2017). Understanding relationships among customer experience, engagement, and word-of-mouth intention on online brand communities: The perspective of service ecosystem. *Internet Research, 27*(4), 839–857.

Zhang, M., Jansen, B. J., & Chowdhury, A. (2011). Business engagement on twitter: A path analysis. *Electronic Markets, 21*(3), 161. https://doi.org/10.1007/s12525-011-0065-z

Zhang, Y., Sun, Y., & Kim, Y. (2017). The influence of individual differences on consumer's selection of online sources for health information. *Computers in Human Behavior, 67*, 303–312. https://doi.org/10.1016/j.chb.2016.11.008