How Duration and Frequency of Online Messaging Affects Engagement Considering the Attitude Towards Pro-Environmentalism

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Abstract

Online messages can be sent in different frequencies and can either be long or short, but how do these affect engagement in pro-environmentalism? This paper studies the effect of duration and frequency in online messaging on engagement the topic of sustainability. The general pro-environmental attitude was investigated as a possible moderator. Participants (N = 69) were gathered through several social media channels and the data for this study was gathered via the online platforms MailChimp and Qualtrics. The variables frequency and duration of the online messages were manipulated. Results of the two-way ANOVA showed no main effects of message frequency and message duration on engagement. Furthermore, no significant results for moderation effects of pro-environmental attitude on the relation of message frequency on engagement, and message duration on engagement. Nonetheless, a mixed-repeated measures ANOVA showed a significant result (p = .020) for unique openings of the messages between the first and last measuring moment. Furthermore, a strong pro-environmental attitude showed a significant result (p = .031) in predicting participants engagement. In conclusion, duration and frequency in online messaging are non-significant predictors of engagement for pro-environmentalism. In addition, pro-environmental attitude did show to be a significant predictor for engagement, as well as unique openings of messages showed a downwards trend over time. Theoretical and practical limitations and suggestions for future research are being discussed.

Introduction

Chances are that you have seen your mailbox flooded with emails from dozens of different companies all trying to convince you of their mission. Whether they are trying to sell, congratulate or inform you does not matter, simply because the underlying goal of these message is clear. The goal of these messages is for you to engage with them. Because only if you engage with these companies they will have a shot of convincing you of their cause. But how do you get people to engage with you in an online environment, and how do you keep them engaged? Between the information overload people receive it might be desirable for certain causes, like sustainable energy corporations or charities to engage with potential consumers and keep them engaged. Sustainability can be interpreted differently from many angles: economically, socially, environmentally (Goodland, 1995); their common ground is the preservation of the environment. Based on the research of Moore et al. (2017), sustainability is defined as: a period of time in which an intervention is used to influence individual behavior change that evolves while this behavior continues to produce benefits for the environment, in other words a person is willing to change his behavior to do less harm to or to positively affect the environment.

Even though the scientific evidence of climate change is abundant, there is still a number of people to be convinced. Research has shown that awareness of the potentially grave impact climate change can have, still varies widely in people (Lee et al., 2015; Lorenzoni, & Pidgeon, 2006; McCright et al., 2016). Moreover, even when people are aware of the impact of climate change, they are still unclear about the role they themselves can play as part of the solution (e.g., Vlek & Steg, 2007). Research has already shown effectiveness of some underlying personal factors that predict change in behavior, like intentions, self-efficacy, perceived-behavioral control, motivation, spill-over effects (Ajzen, 2002; Bandura, & Cervone, 1986; Bandura, & Wessels, 1994; Lauren et al., 2016; Lee, 2011). Even though,

underlying factors like attitudes and intentions generally seem to predict actual sustainable behavior (Ajzen, 1991), and although awareness and knowledge about sustainability is on the rise, it is still unsure when people will act accordingly. However, the larger issue is in fact that even people whose attitudes and intentions show signs of pro-environmentalism still take too little action (Kaiser, Wölfing et al., 1999). Steg and Vlek (2009) discuss a striking example of a person who labels himself as 'sustainable' because he cycles to work while overlooking the fact that he leaves all electronics on while at work. Existing literature already shows a couple practical implications for communication about sustainability. For instance, framing a message about sustainability in a positive manner where consumers are told what is possible instead of what is not, is more likely to be adopted (Van de Velde et al., 2010). Also, if the message is congruent with the reader's perception it is shown that this will lead to a more positive attitude towards the sender of the message (Line et al., 2016).

One could argue that sustaining the environment is mainly a responsibility of larger companies, since they produce the most greenhouse gasses. However, research has shown that the impact of individuals has on empowering environmental manager within these companies through subjective norms, values, motivation, attitudes, and mindset towards pro-environmentalism (e.g. Brust, & Liston-Heyes, 2010; Cordano, & Frieze, 2000; Stoughton, & Ludema, 2012; Papagiannakis, & Lioukas, 2012).

Thus far, it seems that individuals are aware of the need for pro-environmental actions, are capable of having impact, but still hold back to show sustainable behavior. A possible explanation for the lack of pro-environmental intentions turning into actual behavior could be the lack of engagement (e.g. Lauren et al., 2016; Steg & Vlek, 2009; Wang, 2006). Engagement could be described as a state of feeling involved, committed, or passionate (Macey & Schneider, 2008) and being physically, emotionally or cognitively able to express yourself in what you are doing (Kahn, 1990). Hence, to achieve sustainable behavior it is

presumed that the more the engagement of the individual is triggered, the more likely it will be that they show the intended behavior.

It is very likely that the vast majority of people acquire information online, as the internet is easily accessible, cheap and leads to quick searching results. This infers that it is also very easy for people to interact and engage with the information they gather in an online environment. It seems interesting to study how engagement could be influenced in an online messaging environment since this is one of the firsthand interactions companies can have with consumers. The question is, however, even when someone is aware of environmental issues, what other factors apply besides the content of messages? What factors influence the engagement of the receiver, and when does this actually increase the chance of people showing environment friendly behavior?

This paper investigates whether the level of engagement can be influenced by either the composition of a message or through other factors involved in the process of sending a message. This paper presumes that message frequency, i.e., how often will they receive a message, could have a positive effect on engagement. Frequent exposure to messages has been shown to have a positive effect on engagement (e.g., Cacioppo & Petty, 1979; 1980; 1989, Schmidt, & Eisend, 2015), although too many exposures can result in a downturn, for instance caused by annoyance, depending on the way of processing (Nordhielm, 2002). In addition to that, it is also presumed that an increase in message duration, i.e., time it takes to react to a message whether that is reading time or filling in a survey, has a negative effect on engagement (Blumenberg et al., 2019; Cacioppo & Petty, 1979; 1989; Galesic & Bosnjak, 2009; Guin et al., 2012; Koitsalu et al., 2018). These studies have shown that the lengthier a certain message is, the less likely someone will start engaging with it, and even finishing it at the same engagement level at the end of the message as at the beginning. There seems to be evidence for message frequency and message length to be influential on the engagement of

people, but the usage for these variables within the pro-environmental sector via online messaging is yet to be found, thereby, this paper contributes theoretical information to existing literature. Hence, this paper investigates how duration and message frequency influences individual engagement via online messaging when the subject is related to sustainability. This would benefit environmental institutions, like energy corporations, government, charities or any other environmentally related institutions, since they could improve their strategy to get more engagement with consumers. This holds the potential to ultimately increase knowledge, donations, or investments for sustainability related issues.

Theoretical Background

Engagement and Pro-environmentalism

One underlying factor that increases the chance of people turning their intentions into sustainable behavior is engagement with online messages (Lauren et al., 2016; Steg & Vlek, 2009; Wang, 2006). Previous studies have pointed out that less engagement can lead to less recall, involvement and believability of certain messages, which results in less likelihood that behavioral actions will follow. Whilst the other way around also seems to be true, the more engaged someone is, the less likely they will view something as unachievable or too difficult to perform, and thus the more likely they will show the desired behavior (Kaiser et al., 1999). This paper uses the following definition of engagement: Engagement is a state of feeling involved, committed, or passionate (Macey & Schneider, 2008) and being physically, emotionally or cognitively able to express yourself in what you are doing (Kahn, 1990). Their claim is that people can experience higher feelings of capability through engagement because they learn to see it as a form of self-expression, which ultimately may lead to a larger likelihood of people staying intrinsically motivated to reach a certain goal (Zhang & Bartol, 2010). It also seems that triggering the intrinsic motivation of people has a longer lasting effect for reaching goals than triggering external motivation through tangible rewards and incentives (Deci et al., 2001). This longer lasting effect comes from the psychological needs for self-determination and competence, which are susceptible to change through the offering of rewards, evaluations or other motivational inputs. Consequently, aiming for engagement in people renders a different lasting motivation to reach a certain goal.

Studies have shown that engaged people are capable of reaching a higher potential, whether this is pro-social or work related (e.g., Zhang & Bartol, 2010), and are more than twice as productive as satisfied people (Garton & Mankins, 2015). Additionally, findings indicate that engaged people are able to think more positive about difficult goals, feel more

meaningful at work, and experience a better fit between their self-concept and their current role at work, which leads to a higher ability to express themselves compared to non-engaged people (May et al., 2004). People also show more involvement, motivation, dedication, enthusiasm, and loyalty towards the task at hand when engaged (Attridge, 2009; Kahn, 1990; Macey & Schneider, 2008; Markos & Sridevi, 2010; Wolf & Moser, 2011).

Duration and Frequency of the Message

This paper states engagement as a state of feeling involved, committed or passionate (Macey & Schneider, 2008), meaning that it is likely that engagement fluctuates whenever one is working on a task. For instance, you are at work and start working on a project in the morning when you feel energized and engaged. After a couple hours you get distracted more easily and you feel more fatigued, this could partly be explained by the sustained cognitive workload. This translates to a time-on-task effect, where performance gets worse the longer you are busy with a task at hand (Lim et al., 2010). In other words, this time-on-task effect could be interpreted as a decrease in engagement with the task and therefore leads to a decrease in performance. Moreover, looking at short non-compulsory tasks, that might not be fun, like filling in a questionnaire or filling in a feedback form could also lead to a decrease in engagement since spare time is likely limited. Ultimately, this could lead to half compliance with the task or even no compliance at all (Herzog & Bachman, 1981).

Moreover, empirical evidence shows support for this reasoning, and shows that time consuming tasks, like questionnaires can lead to a smaller pool of questionnaire takers and even decreasingly qualitative answers the further into the questionnaire, which could be understood as a decrease in engagement (Edwards et al., 2009; Galesic & Bosnjak, 2009; Guo et al., 2016; Sahlqvist et al., 2011). For example, Sahlqvist et al. (2011) found that reducing a lengthy message from seven sections to six sections (i.e. reduction of 37.5 percent), led to a

significant increase of response rate by approximately 50 percent. This response rate could be seen as an increase in engagement with the received message. However, other studies have shown results that questionnaire length does not negatively influence the response rates (i.e., affects a person their level of engagement; Blumenberg et al., 2019; Koitsalu et al., 2018). On the other hand, these studies used questionnaires that dealt with people's health-related issues, therefore, this effect might be explained by underlying self-interest of the questionnaire taker.

Another feasible explanation is that questionnaire takers find their desired information halfway through and consequently lose interest in filling out the remaining part of the questionnaire. On the contrary, reading time and text length could also positively affect people's engagement, but only when the text is of interest for the reader (Fulmer et al., 2015). Although one could argue that a longer text could lead to more engagement since one is paying more attention and trying to get into a flow of reading, it is unlikely for short non-compulsory tasks. Furthermore, this would be more feasible with long stories like books or articles which are also likely to be at the interest of the reader. Moreover, longer texts are more difficult than easier ones because of the potential to have longer sentences, word frequency, referential cohesion, syntax complexity, and narrativity (Klare, 1974), which all contribute to an increase in reading time. Following this reasoning, a longer text would require more involvement and more cognitive load to comprehend the text (i.e. more engagement), and since attention declines over time it would seem more likely that people are more engaged with shorter text than longer texts. Concluding, based on former reasoning it seems that text length has a negative effect on engagement in a negative way and therefore it is expected that a more time consuming task is expected to decrease people's engagement. Hence, the following hypothesis is stated below:

H1: The amount of time needed to read (= duration) negatively influences the level of engagement.

Not only the duration of the message but also the frequency of messages sent could be a factor that influences the degree of engagement of people. One explanation for the next hypothesis is built on the theory of mere-exposure effect from Zajonc (1968), which states that repetition of exposures to the same object enhances the positive attitude one has towards this object. Although this seems like a linear effect in some cases, there is a limit to the number of messages someone can receive until the effect starts to wear off or even reverse, due to feelings of agitation, annoyance, or boredom within the receiver (Bornstein et al., 1990). Based on previous named studies and the meta-analysis of Montoya et al. (2017), it seems likely that the effect of message frequency on the individual level of engagement shows an inverted U-shape.

Interestingly, results from Sahlqvist et al. (2011) show a total increase in response rate of 64.4 percent when one reminder was sent to people that did not respond to the first request of filling in a survey. The fact that one- be it an elaborate personalized - follow-up message has the potential of getting people engaged enough to respond, leaves the question why a second reminder would not lead to yet another slight increase. Although Sahlqvist et al. (2011) used an expensive method to send the reminder, a cheaper alternative such as a personalized reminder by email, which can be done very frequently and is more cost-effective, would possibly generate some increase in engagement as well. Moreover, previous studies also show significant results whenever cheap electronic reminders were sent to people, which showed that reminders lead to a stronger tendency to respond (Armstrong et al., 2009; Svensson et al., 2011). Nevertheless, these results are limited in their extent, because too many reminders can be frustrating for receivers and consequently may lead to a decrease in response (Muñoz-Leiva et al., 2010; Svensson et al., 2011).

Two underlying factors make this issue more complicated: personalization (Sánchez-Fernández, Muñoz-Leiva, Montoro-Ríos, 2012) in messages, and the means of reception of

the stimulus, more specifically whether the message is truly read or not, one could have opened the message but not read it all, which could lead to a different perceived perception of the message. Then there is the question of when the effect of more exposure wears off because of boredom. Following the results of these studies it can be expected that additional exposure to a message can positively influence people's attitude towards the message and therefore, to a certain extent, their degree of engagement in the form of increased response to a higher frequency.

H2: A higher message frequency will lead to higher message engagement than a lower message frequency does.

The Role of Attitude towards Pro-environmentalism

Individual attitude may be described as a personal affective evaluation that someone uses to define their thoughts about a certain subject (Fishbein, 1963). This attitude is different for every person and for every subject, and is susceptible to change. For instance, when someone powers their house with sustainable energy, recycles all their waste, and has a vegetarian diet, it is quite likely that they have a favorable attitude towards the environment. Therefore, when someone holds a positive attitude towards a subject, this will likely affect people's degree of engagement in a positive way. Although, admitted that a positive attitude does not necessarily mean that someone will act sustainable (Pickett-Baker, & Ozaki, 2008), the literature in fact seems concise about the fact that a favorable attitude towards a subject does lead to favorable intentions to show intended behavior (e.g. Ajzen, 1991; Ajzen, & Fishbein, 2005). In line with this, research shows that attitudes can influence intended behavior and can also be changed to attain either a positive attitude or negative attitude towards a subject (Ajzen, 1991; Ajzen, & Fishbein, 2005; Mitchell & Olson, 1981; Parker et al., 1995; Thøgersen & Ölander, 2006). To change these pro-environmental attitudes it could be suggested, based on the prior stated research, to create vivid representations of the

behavior that is wanted, and the impact it has. For example, large advertising campaigns for environmental friendly foods and transportations ways. This would represent a new norm which could lead to people re-evaluating their attitudes about the environmental subject, and potentially lead to attitude change and even pro-environmental behavior. Furthermore, other studies show that attitude can explain a great part of explainable variance in intended ecofriendly behavior (Chen & Chai, 2010; Kaiser, & Ranney et al., 1999).

Consider the following person who has a negative attitude towards pro-environmentalism. One could imagine that someone who has a negative attitude towards pro-environmentalism will most likely not participate in waste separation, invest in solar panels, or eat a sustainable diet. Because this person has this negative affective evaluation towards pro-environmentalism he thinks negatively of pro-environmental actions. Since engagement is a state in which you feel that you can emotionally, cognitively or physically express yourself (Kahn, 1990), and feel involved, passionate, and committed towards a subject (Macey & Schneider, 2008), it is therefore reasoned that someone who has a negative attitude towards pro-environmentalism is very unlikely to get engaged with pro-environmental actions. Following the premised reasoning, if a person does hold positive pro-environmental attitudes, chances are that this positive affective reasoning could lead to a state in which the person gets more involved and able to express himself, (i.e. feels engaged). The results of the studies mentioned above indicate that positive pro-environmental attitudes will have a positive effect on a person's degree of engagement towards the environment, which has led to the following hypothesis:

> H3: Attitude towards pro-environmentalism shows a positive relation with the degree of engagement in pro-environmentalism.

Since individual attitude is predefined as a personal affective evaluation, it goes without saying that this will be different for everyone and so will be the adaptation of sustainable behavior, which is influenced by different underlying factors like feelings of control over the situation, moral obligations, ease of adaptation and personal relevance (Gadenne et al., 2011). These underlying factors are contributing to the strength of a person's attitude, and therefore also the way information is processed and the resistance to change this attitude (Petty & Krosnick, 2014). For instance, one person with a strong negative attitude towards pro-environmentalism will probably show more resistance against receiving frequent messages and processing long messages about pro-environment subjects. Therefore, it seems reasonable that these feelings towards a message could partly be explained by a person their attitude towards the message. Moreover, the mere-exposure effect (Zajonc, 1968) states that more exposures to the same object enhances someone' attitude towards that object, but this effect could wear off due to agitation and boredom (Bornstein, 1989). Following this reasoning, it seems likely that someone who has a strong positive pro-environmental attitude will be less likely to experience feelings of boredom or agitation when encountered with high frequency messages.

Furthermore, previous research from Koitsalu et al. (2018) and Blumenberg et al. (2019) concluded that questionnaire length does not significantly affect the response rate. It is argued that the absence of this effect could be explained by the fact that the subject of the questionnaires were in the applicants' own interests. The applicants of the questionnaires were either people that were a high risk group of the subject or the questions were health-related, making the completion of the questionnaire of individual importance. On the contrary, other research did show effect of message length on engagement (Edwards et al., 2009; Galesic & Bosnjak, 2009; Guo et al., 2016; Sahlqvist et al., 2011). Arguably, this would hint that the effect of message duration could fluctuate depending on one's attitude toward that message.

In other words, this could be interpreted that attitude moderates the effect of message duration in such way that the influence of message duration would be less strong.

To substantiate the reasoning for this moderation effect it is presumed that whenever someone has a strong pro-environmental attitude, they will be highly motivated to behave according to their attitudes (Petty & Cacioppo, 1986; Petty et al., 1995). Meaning, if someone receives a message that takes a long time to read or is sent frequently, that it is less likely to affect their motivation and thus will keep behaving according to their attitudes. On the contrary, when someone has a weak pro-environmental attitude, chances are that the individual will be more likely to be influenced by the long message or the high frequency, and therefore stop behaving according to their attitudes since they are less motivated. It therefore only seems logical that a person with a stronger attitude towards the environment is probably less likely to be negatively affected by the duration and/or frequency of a message. Hence, the following sub hypothesis are proposed:

> H4a: A pro-environmental attitude moderates the effect of the message frequency on engagement: the more positive the attitude the lesser the effect of message frequency on engagement.
>
> H4b: A pro-environmental attitude moderates the effect of message duration on engagement: the more positive the attitude the lesser the effect of message duration on engagement..

Method

Participants and Design

The sample size consisted of 69 people, but after the first message, four addresses were invalid, therefore, these participants were dropped from the study and it continued with 65 people. No exact measures for gender and age were done, however, since social media was mostly used to gather participants it is more than likely that most of the participants are young adults who just finished studying and working adults.

In order to gain participants for this study there were put out several social media posts on the following channels: LinkedIn, Facebook, Instagram. The advertisement is to be found in the appendix. The social media post focused on getting participants through offering them free advice for people that might think about sustainability in regards to their residence.

Participants were randomly allocated to one of the four conditions of a 2x2 between-subjects design. The four conditions were based on the two variables of message frequency and message duration.

Manipulations

The independent variables message frequency and message duration were manipulated so that the conditions could be measured as either being high or low. The manipulations were done as follows. Participants in the low frequency condition received one message each week whilst the participants in the high frequency condition received three messages each week. The low duration condition was manipulated in such way that these participants received one sustainable message each time, and the high duration condition received two sustainable messages each time. Each sustainable message contained approximately 40 words.

Measures

The measurement of the dependent variable engagement was measured as a dichotomous variable, therefore participants were either engaged or not. This was measured in such way that participants were considered engaged if they filled in the questionnaire that was sent after the experiment had ended. Likewise, not filling in the form meant someone was considered as not engaged. It should be noted that the percentage of partaking participants was measured.

The measurement for the variable individual attitude was measured by asking participants before and after the experiment the following question: “To what extent do you think climate change is a serious problem?”. This question was answered in Dutch on a 5-point Likert Scale, ranging from 1 (*totally unimportant*) to 5 (*very important*). Furthermore, extra information like unique openings of the message was also gathered through the help of the program Mailchimp.

Procedure

Before the experiment was conducted, it was necessary to write the information that were to be sent to the participants. All sustainable information was gathered from *Energie besparen*, z.d. after which the gist from everything was taken and rewritten into small tips, which were approximately 40 words each. In total this came out to 49 unique tips. To gather participants there were put out several social media posts containing a uniquely made picture and asking people to leave their mail address to receive free information about sustainability within and around their home. On the forehand participants were informed about the length of the study, the noncommittal of it, and the fact that it was part of a master thesis completion of Leiden University.

After the admittance time for the experiment was surpassed, participants were randomly allocated to one of the four conditions mentioned above. Regardless of the condition, every participant was asked a question to measure participants their vision about climate change, which is stated in the measures section. Subsequently, the experiment began and people started to receive sustainable tips according to their condition allocation. The data was gathered through the help of a program called Mailchimp, this program made it possible to send specified messages to all participants in a certain condition, and gather information about unique openings of the messages that were sent. After five weeks of data gathering or participants receiving every unique tip, that would mean the end of the experiment. This means that some people would not have received every unique tip and they were compromised by sending all tips together in one file at the end of the experiment.

After the data was gathered, participants were once again asked to state their vision about climate change with the same question and answer scale as they did before the experiment started. After the climate change question participants were sent one more mail which told them that the experiment had finished and asked them to fill in a questionnaire that took around 5 minutes to complete. After two weeks there was one last mail contact in which participants were sent an informed consent about the experiment and they were explained the purpose of the study. Also, the mail contained all the sustainable tips that were shared.

The study was ethically approved by Leiden University .

Results

Hypotheses 1 states that the amount of time needed to read a message (= duration) negatively influences the individual level of engagement, which was operationalized as a proportion of participating survey takers. After analyzing the data from the independent variable duration through a two-way ANOVA ($F(1, 67) = .005$, $p = .943$, $\eta^2 < .001$) there was no indication to support H1, meaning there was no significant difference between the people in the high duration condition versus the low duration condition.

Hypotheses 2 states that message frequency has a positive influence on the individual level of engagement. After analyzing the data through a two-way ANOVA ($F(1, 67) = .005$, $p = .943$, $\eta^2 < .001$) there was again no indication to support H2, meaning that there was no difference between the people in the high frequency condition versus the low frequency condition. The conducted two-way ANOVA also showed the results of the interaction effect of message duration and message frequency ($F(1,67) = .176$, $p = .676$, $\eta^2 < .001$) which was also non-significant for the effect on people their engagement.

Nevertheless, data that was gathered regarding unique openings of every message sent showed contradictive results with the above. The measure moments were tested at the beginning ($M = 11.00$, $SD = 2.16$), middle ($M = 9.00$, $SD = 1.41$), and last ($M = 6.75$, $SD = 2.22$) message for each of the conditions. A mixed repeated-measures analysis of variance was conducted to test whether there were differences within the three different points in time regarding the effects of message frequency and duration on engagement. Mauchly's Test of Sphericity indicated that the assumption of sphericity had not been violated, $\chi^2(2) = 1.695$, $p = .429$. Therefore, results from the mixed repeated-measures ANOVA showed that there was a significant difference between the three time measures, $F(2,6) = 6.58$, $p = .031$, $\eta_p^2 = .687$. The post-hoc test of pairwise comparisons revealed that the differences in unique openings

significantly changed, after using a Bonferroni adjustment, from the first message) sent, compared to the last message (p = .020) that was sent. But there was no significant effect between the first unique openings moment and the second unique openings moment (p = .802) or the second unique openings moment compared to the third unique openings moment (p = .509). This would imply that the participants in each condition experienced some form of degradation in their engagement. In conclusion, this would mean that there is no support for H1 and H2.

Hypotheses 3 states that attitude towards pro-environmentalism shows a positive relation with the degree of engagement in pro-environmentalism. A binary logistic regression analysis was conducted to test if there is a positive relation between attitude and the degree of engagement for pro-environmentalism. The variable attitude in the logistic regression analysis was found to contribute significantly $\chi^2(4, N = 37) = 9.647$, p = .047 to the model. The model explained between 23% (Cox & Snell R square) and 32.6% (Nagelkerke R square) of the variance in the dependent variable of engagement, furthermore, the model would correctly predict 78.4% of the cases. As shown in Table 1 below, only people in the strongest positive category of attitude made for a significant contribution to the model. The highest category of attitude odds ratio of 8.67 suggest that for every increase of attitude in units towards pro-environmentalism participants are 8.67 times more likely to be engaged. This would mean that there is data that supports H3.

Table 1.

Logistic Regression Predicting the Likelihood of Engagement based on Attitude.

	B	*S.E.*	Wald	*df*	*p*	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
MeanAttC			4.25	4	.374			
MeanAttC(1)	23.08	40192.97	0.00	1	1.000	1.050E+10	0.00	
MeanAttC(2)	23.08	40192.97	0.00	1	1.000	1.050E+10	0.00	
MeanAttC(3)	0.67	1.01	0.44	1	.506	1.95	0.27	13.98
MeanAttC(4)	2.16	1.08	4.02	1	.045	8.67	1.05	71.57
Constant	-1.87	0.76	6.07	1	.014	0.15		

Hypotheses H4a states that individual attitude towards pro-environmentalism moderates the effect of the message frequency on engagement. This was analyzed through the usage of PROCESS 4.0 extension for SPSS by Hayes (2012). The results from testing for H4a showed no significant result for the interaction term (B = -86.98, SE = 130.68, p = .506, bootstrap = 5000). Next to that there is a 95% chance that the mean score of the population lies somewhere between CI = [-343.119, 161.150]. Since results showed no significance this would mean that the effect of message frequency on engagement is not significantly moderated by a person's attitude. This means that there is no support for the hypothesis H4a.

Hypotheses H4b states that individual attitude towards pro-environmentalism moderates the effect of duration on engagement. The results from testing for H4b showed no significant result for the interaction term (B = 2.89, SE = 3.12, p = .355, bootstrap = 5000). Next to that there is a 95% chance that the mean score of the population lies somewhere between CI = [-3.226, 9.001]. Since results showed no significance this would mean that the effect of message frequency on engagement is not significantly moderated by a person's attitude. This means that there is no support for the hypothesis H4b.

Discussion

The main goal of this research paper was to advance the theoretical understanding of message frequency and message duration by investigating the effect of these variables in online setting and studying the effect on people's engagement towards pro-environmentalism, while controlling for their individual attitude towards pro-environmentalism. This study did not find significant results from the analyzed data that would support H1 and H2 of the direct effects of message duration and frequency on engagement for pro-environmentalism. However, when conducting a mixed-repeated measures ANOVA for unique openings of the messages at three different points results did show a significant drop with Sphericity assumed. Furthermore, there was no indication from the data to support H4a and H4b for a moderating effect of individual attitude on the relation between message duration and message frequency on engagement. Although most hypotheses have been rejected, there were results that showed indication for support for H3, which indicated a significant results for a positive relation between individual attitude and engagement towards pro-environmentalism. Hence, it can be concluded that this study found no effect of online message frequency and online message duration on people's engagement. Thereby, there is no effect of individual attitude having a moderating effect on either message duration or message frequency. At last, it can be stated that the degree of attitude might contribute to someone's engagement if the attitude is extreme enough.

Implications

This study provided more insights for the literature to be broadened with theoretical knowledge which will be valuable for existing theory and further research about the effects of online message frequency and online message duration on engagement in pro-environmentalism. At first, this paper hypothesized that message frequency has a positive relation with the degree of engagement for pro-environmentalism. Although no significant main effect was found, the mixed repeated-measures ANOVA to test for unique openings of the messages showed a significant result which implies that the amount of people that opened the messages showed a downward trend. Thus meaning that whilst message frequency increased the total exposures did not increase at the same rate. Based on the mere-exposure effect (Zajonc, 1968) this could be interpreted that increasing message frequency might rather lead to feelings of agitation, annoyance or boredom (Bornstein et al., 1990) than a more positive attitude towards the object.

Moreover, this provides some food for thought about increasing message frequency, because sending reminders mostly leads to more responses (Armstrong et al., 2009; Sahlqvist et al., 2011; Svensson et al., 2011) which could be seen as a positive effect on engagement, but, and not surprisingly, these reminders can also be annoying for receivers (Muñoz-Leiva et al., 2010; Svensson et al., 2011). Hence, it is at least interesting to say that message frequency might follow different relations with engagement depending on the subject or context of the message, and the receiver itself. To conclude, increasing the message frequency might detract from the content of your message whenever you have multiple topics to tell, since unique openings of online messages follow a downwards trend.

Secondly, this study proposed a theoretical negative relation between the message duration and someone's degree of engagement, and although no main effect was found in this study, it is important to discuss the theoretical implications of it. This paper tested duration as

reading time of the online message that participants received. Whilst studies have pointed out that more time consuming tasks can lead to a decrease in engagement through lower qualitative answers or half compliances (e.g. Edwards et al., 2009; Galesic & Bosnjak, 2009; Guo et al., 2016; Herzog & Bachman, 1981; Sahlqvist et al., 2011), this might not hold up with reading tasks and might explain the no result in this study.

A possible explanation for the no result of duration on engagement could be explained by a too small difference between the manipulation of short and long, or even because the participants had a positive attitude towards pro-environmentalism which lowers the effect of text length (Fulmer et al., 2015). Since this paper also acknowledges the reasoning of more time consuming tasks lead to more engagement it should be noted that the relation between message duration and engagement follows a reversed route in an online setting. For instance, it might be reasoned that participants joined this study simply because they were already engaged with pro-environmental actions and wanted to learn more about it, hence, the effect of duration is not present. This provides the literature with insights that online message duration is something to consider thoroughly before testing its effect on engagement, because it might follow a positive relation from engagement to duration instead.

Thirdly, for individual attitude the data showed a significant effect on engagement but only for participants that scored the highest on attitude. This would be in line with existing theory about attitudes (e.g. Ajzen, 1991, 2002; Parker et al., 1995; Mitchell & Olson, 1981; Thøgersen & Ölander, 2006; Chen & Chai, 2010; Kaiser, & Ranney et al., 1999), since stronger attitudes are better predictors for persistence and predicting behavior (e.g. Petty & Cacioppo, 1986; Holland et al., 2002). In this study it would be about filling in the questionnaire or not, and stating that as being engaged or not whereas for theoretical purposes it might be interesting to test how stronger attitudes and weaker attitudes influence each other levels on engagement within groups.

A couple of practical implications that can be taken away from this study might be one of the following. For example, organizations that send online messages in which they ask people to fill in their survey could try this approach in which they first acquire the consumer's attitude toward the content of the message. After the organization knows if the consumer holds a strong positive attitude they could ask those consumers to fill in a longer survey than someone who holds a less strong attitude towards them. Based on the results of attitude on engagement in this study and further research from Holland et al. (2002), it is assumed that these stronger attitudes are more likely to engage with the message and therefore are more likely to fill in the survey.

A second practical implication was already briefly mentioned about the decline in unique openings of online messages. Based on these results it might be advisable to question yourself if an increase in message frequency would be beneficial. For instance, if an organization is only sending out reminder-like-messages, it seems plausible that an increase in the message frequency would be beneficial. Reason being that this increases the chance of more exposures, which could positively affect consumers' attitudes (Zajonc, 1968), provided the increase in frequency remains within limits. Further substantiating this reasoning for this implication might be that once a consumer opened the message and find out it is a 'reminder', they would simply not have open the message again. To prevent agitation among consumers one could implement a button to unsubscribe for this specific contextual message.

Limitations & Future Research

A first limitation of this research paper is the way that it measures engagement within participants. This study tested engagement as a dichotomous variable within participants where they were either labeled as engaged or not depending on whether filled out a questionnaire. Choosing to compute a categorical variable, which in fact is a continuous variable, has a couple downsides like the loss of statistical power (Cohen, 1983), simply because it eliminates information that sits in between the two points that were computed for this variable. This loss of information can lead to the risk of making a Type-I error (Austin & Brunner, 2004), which means that the null-hypothesis would have been falsely rejected and therefore a significant difference might have been concluded where there might not be a difference. Granted that these arguments are reasonable and studies like McClelland et al. (2015) show why this should be taken seriously, especially when drawing conclusions, it should also be noted that the usage of dichotomous measurement of engagement is most likely to be the most feasible one for analysis. One could argue that is it highly unrealistic to measure participants engagement in regards to the whole experiment, in which case it would probably fluctuate most of the time. To get a grasp of engagement it seems logical to pick a cut-off point in which one would be engaged or not, so that some form of logical conclusion could be drawn.

A second limitation of this study, apart from the sample size, could be the way participants were found. All participants knew in advance what the subject of the study was: sustainability of a home. One could state that only people with at least a slightly favorable attitude towards the subject would be willing to participate, which would increase the chance of having a sample size of participants who are more engaged with pro-environmentalism than the general public, which was likely to be the case. A monetary reward for participating could solve this issue, or expansion of the sample size, although a monetary reward could be

influential on intrinsic motivation (Deci et al., 2001) which could make it more difficult to draw conclusions about the engagement of participants.

To contribute to future research some suggestions are stated below. This study used messages that contain information about sustainable housing, for future research it might be interesting to focus on different goals of the message. In other words, how do different variables in online messaging effect participants their degree of engagement when the goal of the message is to convince them of donating to a charity, or activate participants to do sustainable. This could be interesting because people might have different expectations for different textual goals. One could expect a longer text when the goal is to inform whilst people might expect a short strong text when the goal is to convince them.

Another suggestions for future research could be to test how different online messages influence engagement for pro-environmentalism. For example, how engaged do people feel when they receive a text to read about pro-environmentalism versus an online game about pro-environmental actions or an entertaining short video. These different formats have endless possibilities and could challenge existing habits to just send textual messages to get people engaged with pro-environmentalism.

At last, this study has shown that a strong attitude towards pro-environmentalism is a good predictor for the degree of engagement and that the length or frequency of the message does not have enough impact to change the degree of engagement of a person. Furthermore, it should be noted that the possibilities within online messaging about pro-environmental subjects are endless and that future research could help contributing to improving online message effects to create a more sustainable environment.

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Appendix

The picture that was used for the social media post to gather participants for the study.