



UvA-DARE (Digital Academic Repository)

Communicating about concerns in oncology

Brandes, K.

Publication date

2017

Document Version

Other version

License

Other

[Link to publication](#)

Citation for published version (APA):

Brandes, K. (2017). *Communicating about concerns in oncology*. [Thesis, fully internal, Universiteit van Amsterdam].

General rights

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: <https://uba.uva.nl/en/contact>, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

CHAPTER 4:
THE EFFECTS OF PERSUASIVE MESSAGES
ON CANCER PATIENTS' ATTITUDES, NORMS
AND INTENTION TO EXPRESS CONCERNS

This paper is currently under review as Brandes, K., Linn, A.J., van Weert, J.C.M., Verdam, M.G.E., & Smit, E.G. The effects of persuasive messages on cancer patients' attitudes, norms and intention to express concerns.

Abstract

Cancer patients often do not intend to express their concerns during their consultations. This can be problematic because concern expression is associated with positive outcomes for patients such as better well-being. In this study we developed persuasive messages that are based on determinants that underlie patients' intention to express concerns. The aim of this study is to examine the effectiveness of these persuasive messages on cancer patients' attitudes, perceived social norm and intention to express concerns in consultations. We systematically tested the effects of the messages by using single targets (i.e., targeting one determinant), combined targets (i.e., targeting multiple determinants at once) and no targets. An experiment with 4 conditions (attitudes message, social norm message, combined message, control message) was used with pre-test and post-test measurements. The results showed small positive changes for patients who could potentially change, but there were no differences in effects between the messages. A second study was conducted to determine whether these effects could be attributed to exposure to the message or to the pre-test questionnaire. There were no differences between the group who received the message and the group who only received the pre-test questionnaire. This indicates that paying attention to concern expression might already increase patients' intention to express concerns.

Introduction

Expressing concerns during cancer consultations has been associated with many positive outcomes for patients such as reduced levels of anxiety and better well-being (de Haes & Bensing, 2009; Street, Makoul, Arora, & Epstein, 2009). Concern expression is an affective behavior and has been defined as clearly and explicitly verbalizing recent emotions during consultations (Bensing & Verhaak, 2004; Zimmermann et al., 2011). Although concern expression seems beneficial, cancer patients often do not express their concerns during consultations or do not express them in a direct and clear matter (e.g., 'I am worried') but rather as indirect cues (i.e., unclear verbal or non-verbal hints of concerns; Grimsbø, Ruland, & Finset, 2012; Heyn, Ruland, & Finset, 2012). Healthcare providers often find it difficult to notice and adequately respond to these indirect cues (Butow, Brown, Cogar, Tattersall, & Dunn, 2002). Patients might therefore benefit from interventions that support their concern expression.

The interventions that have been developed in the concern expression area consist of consultation preparation tools in the form of concern lists (e.g., Farrell, Heaven, Beaver, & Maguire, 2005; Ghazali, Roe, Lowe, & Rogers, 2015; Heaven & Maguire, 1998; Heyn et al., 2012; Hill, Amir, Muers, Connolly, & Round, 2003; Tuinman, Gazendam-Donofrio, & Hoekstra-Weebers, 2008). Concern lists are lists with topics that patients might be concerned about (e.g., side-effects or treatment). Patients receive a concern list prior to their consultation and they can select the topics that are relevant to them. Most of these intervention studies assessed what topics patients select from concern lists (e.g., Ghazali et al., 2015) and/or the extent to which patients report to have discussed these topics with their provider (e.g., Hill et al., 2003). One study assessed the effects of a concern list on actual concern expression in a consultation (Heyn et al., 2012). These authors found that patients who received a concern list expressed more cues and concerns than patients in the control group. However, the vast majority of patients' expressions were cues, and, as indicated before, providers might not pick up on those cues which may result in inadequate discussion of concerns. More research is therefore needed into how concern expression can be supported via interventions.

One promising avenue to explore in developing concern expression interventions, is to use a behavioral theory such as the integrative model of behavioral prediction (IMBP; Fishbein, 2000) or the theory of planned behavior (TPB; Ajzen, 1991) as a basis for identifying relevant intervention targets (Fishbein, 2000; Fishbein & Cappella, 2006). Interventions that are based on behavioral theories are often more effective in changing health behaviors and intentions than interventions that are not (Avery, Donovan, Horwood, & Lane, 2013; Webb, Joseph, Yardley, & Michie, 2010). Both the IMBP and TPB postulate that individuals do or do not perform a behavior (in this case expressing concerns) based on their intention. According to these theories, individuals' intention

is formed on the basis of attitudes, perceived social norm and self-efficacy (Ajzen, 1991; Fishbein, 2000). In a recent empirical study (Brandes, Linn, Smit, & van Weert, 2016) the IMBP was taken as a starting point to examine the determinants of cancer patients' intention to express concerns. A survey was distributed among 236 cancer patients and cancer survivors and the results showed that their intention to express concerns is explained by their attitudes and perceived social norm. The authors concluded that a change in intention could be accomplished by targeting patients' attitudes (more specifically the affective component; *concern expression can be unpleasant*) and perceived social norm (more specifically the injunctive component, *significant others do not want patients to express concerns*) in a message. To examine the most optimal way how these messages can improve attitudes, perceived social norm and intention, it is important to test their single and combined effects (Dijkstra & de Vries, 2001; Michie & Abraham, 2004). Therefore, the aim of this study is to test whether a persuasive message targeting attitudes, perceived social norm or a combination is most effective in improving patients' attitudes, perceived social norm and, consequently, their intention to express concerns.

Persuasive Messages

Persuasive messages are described as communications that are theory-based and have the goal to change or reinforce a behavior or a behavioral intention (Fishbein & Cappella, 2006). Persuasive messages that aim to change intention are based on behavioral determinants that have causal relations with intention (i.e., in the case of intention to express concerns; attitudes and perceived social norm) and therefore give clear insights into which elements lead to a change in intention (i.e., can we attribute a possible change in intention to targeting the affective component of attitudes, the injunctive norm or both; Fishbein & Yzer, 2003; Michie & Prestwich, 2010). Because of these reasons, persuasive messages are often claimed to be more effective in changing intention and behavior than messages that are not based on behavioral determinants (Avery et al., 2013; Webb et al., 2010). Although the claim for the superior effects of these theory driven persuasive messages on intentions has often been proposed, it is difficult to support these claims with evidence because the effects on intentions vary and are inconclusive (Hardeman et al., 2002; Van den Putte & Dhondt, 2005). For example, a systematic review about the effectiveness of interventions based on the TPB (including persuasive messages) showed that only 42% of the interventions had a positive effect on intention and 33% had no effect on intention. Furthermore, the use of theory was unrelated to the direction of effects (i.e., positive, negative or no effects; Hardeman et al., 2002). Thus, the effects of persuasive messages can generate several changes in intention (positive, negative or no effect) and to establish under which circumstances these types of messages are effective, we need to apply them to different behaviors for different populations in different contexts.

In the context of cancer patients' concern expression, to our knowledge, persuasive messages based on behavioral determinants have not been developed and tested (Brandes et al., 2016). Moreover, we lack knowledge about what generates change in patients' communication behavior (Henselmans, de Haes, & Smets, 2012). Systematically testing the effectiveness of persuasive messages that target the determinants of patients' intention to express concerns can be a first step in identifying the utility of the IMBP and TPB as intervention formats for concern expression and in understanding which factors can lead to a change in concern expression.

Overview of Study and Research Questions

We targeted patients' attitudes (i.e., expressing concerns can be unpleasant) and perceived social norm (i.e., significant others do not want patients to express concerns) because these were identified as the most promising intervention targets to change intention (Brandes et al., 2016). To be able to thoroughly investigate the change generating processes of the persuasive messages on patients' attitudes, perceived social norm and intention, it is relevant to test the intervention targets together and separately (Michie & Abraham, 2004). Furthermore, to properly test these messages, a control message needs to be included that does not include these targets (Van den Putte & Dhondt, 2005). In this study we chose a message that just gives information about concerns and cancer. Thus, we included four conditions; (1) attitude message, (2) perceived social norm message, (3) combined message, and (4) control message. Although the importance of testing the single and combined effects of intervention targets has been stressed in various studies, most interventions do not follow this approach (Michie & Abraham, 2004). Therefore, it is unclear whether it is more effective to use a single intervention target or to combine multiple intervention targets. To assess the differences in effects between using single and combined intervention targets in the context of cancer patients' concern expression, we formulate the following research questions:

RQ 1: Which of the messages will be most effective in improving cancer patients' attitudes towards concern expression?

RQ 2: Which of the messages will be most effective in improving cancer patients' perceived social norm of concern expression?

RQ 3: Which of the messages will be most effective in improving cancer patients' intention to express concerns?

Studies have shown that past behavior (i.e., whether patients have expressed concerns in consultations before) can influence intention and should be controlled for to determine the effectiveness of a message (e.g., Fishbein & Cappella, 2006). Furthermore, individuals can also have attitudes towards

the message they are exposed to (e.g., whether they like the message or not). These attitudes can also influence the effects of a message (Van den Putte & Dhondt, 2005). Therefore, both past behavior and attitudes towards the message are taken into account as possible covariates.

Methods Study 1

Participants and Procedure

The participants were recruited in November- December 2014 via two cancer patient panels in the Netherlands (i.e., kanker.nl and PanelCom). Participants were eligible if they (1) were 18 years or older, (2) currently received treatment for cancer or had received treatment for cancer in the past and (3) still had consultations for their cancer (either treatment consultations or follow-up consultations). The experiment consisted of a pre-test measurement (T1) and a post-test measurement after two weeks, immediately after exposure to the message (T2). The ethical committee of the authors' university approved this study (2013-CW-74).

Study Design

This study consisted of an online experiment with 4 conditions (attitudes message, social norm message, combined message and control message) and within- between subject measures. This design was chosen to be able to analyze the results systematically (i.e., to examine the exact differences of using single targets, combined targets or no targets). At T1 participants completed a pre-test questionnaire which included questions about demographic and disease characteristics, past behavior and the dependent variables. At T2 participants were randomized to one of the videos and completed a post-test questionnaire about the dependent variables and their attitudes towards the message.

Materials

Three targeted messages were created in which intervention targets were manipulated; (1) a message targeting attitudes with an emphasis on the affective component of attitudes, namely on the way patients may feel after expressing concerns in a consultation (e.g., feeling relieved), (2) a message targeting perceived social norm with an emphasis on the way patients' significant others can respond after patients express their concerns (e.g., they support the patient) and (3) a combined message in which the targeted messages of 1 and 2 were combined. The control message was an informational message about cancer. All four messages started with the same short introduction about the different concerns patients can experience during cancer (this was approximately 50% of the total message). Appendix 4.1 shows the texts of all the different messages. As a format for the messages video-

testimonials were chosen because previous studies have indicated that messages with affective/emotional components can be best presented with narratives such as testimonials and with visuals (Van den Putte & Dhondt, 2005; Zebregs, van den Putte, Neijens, & de Graaf, 2015). We conducted two pre-tests; one for the scripts of videos and one for the character. Both pre-tests are described in Appendix 4.2.

Sample size

To estimate the required sample size to detect a meaningful difference between and within participants, a power calculation for a repeated measures within-between subject design was conducted with four groups and two measurement time points. The estimated effect size (*Cohen's f*) for the power calculation was set at .10 because meta-analyses in communication science have shown that the effect sizes in studies on the effectiveness of messages are typically small (O'Keefe, 2013). We assumed a correlation among the repeated measures of .70, and the alpha was set at .05. The power calculation showed that we needed 168 participants to achieve a power of 80% to detect an effect.

Measures

Demographic characteristics. Participants had to fill in their gender, age, living situation, whether they had children and their level of education.

Disease characteristics. Participants were asked to specify the date of their cancer diagnoses (which was later recoded into "time since diagnosis"), the type of cancer(s) they had, whether they were still undergoing treatment for their cancer(s), which treatments they currently received, which treatments they received in the past and their treatment goal (palliative or curative).

Attitudes. Participants' attitude towards expressing concerns in consultations was measured at T1 and T2 with six items (*unpleasant- pleasant, bad- good, not helpful- helpful, a disadvantage- an advantage, not stressful- stressful, not useful- useful*) on a 7-point semantic differential scale (Francis et al., 2004; Montano & Kasprzyk, 2008; T1: $\alpha = .91$, $M = 5.75$, $SD = 1.26$, T2: $\alpha = .91$, $M = 5.67$, $SD = 1.24$).

Perceived social norm. Perceived social norm was measured at T1 and T2 with eight items (Francis et al., 2004; Montano & Kasprzyk, 2008). Participants had to specify on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*) to what extent their significant others (i.e., people who are important to them) *expect* or *want* them to express their concerns in a cancer consultation and whether they

complied with this. Furthermore, participants were asked to indicate whether they believed that certain important people in their environment want them to express concerns in a consultation (i.e., if applicable: their partner, their children, their siblings, their friends and other cancer patients; T1: $\alpha = .84$, $M = 5.09$, $SD = 1.15$, T2: $\alpha = .82$, $M = 5.05$, $SD = 1.12$).

Intention. Intention was measured at T1 and T2 with three items in which participants had to indicate on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*) whether they intended to express concerns during their next cancer consultation (T1: $\alpha = .90$, $M = 5.12$, $SD = 1.63$, T2: $\alpha = .91$, $M = 5.17$, $SD = 1.55$; Francis et al., 2004; Montano & Kasprzyk, 2008).

Past behavior. Participants' concern expression in consultations in the past was measured with 1 item in which they had to indicate on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*) whether they expressed their concerns towards their healthcare provider (T1: $M = 5.51$, $SD = 1.49$, T2: $M = 5.28$, $SD = 1.60$; Francis et al., 2004).

Attitude towards the video. Participants' attitude towards the video was measured at T2 after exposure to the video on a 7-point semantic differential scale with the same six items that were used to measure attitude towards concern expression in consultations but then with the focus on the video ($\alpha = .91$, $M = 4.92$, $SD = 1.07$).

Manipulation check. As a manipulation check we asked participants to indicate on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*) whether they perceived that the message was about the character's feelings after expressing concerns or what the significant others of the character think of her expressing concerns in a consultation.

Analyses

To answer the research questions repeated measures ANOVAS were conducted for all the dependent variables with type of message as between-subject factor. If there was a significant difference, post-hoc comparisons with a Bonferroni correction were conducted.

Results Study 1

Response

The pre-test questionnaire was fulfilled by 226 participants. In total 190 participants (84.1%) completed both the pre- and the post-test. A non-response analysis showed that participants who only completed the pre-test did not differ from participants who completed the whole study in gender ($\chi^2 (1) = 1.11, p = .291$), age ($F (1, 224) = 2.87, p = .092$) and level of education ($\chi^2 (2) = 2.33, p = .312$).

Participants

The majority of the participants were female (52.6%), almost half of them were highly educated (45.3%) and they had a mean age just over 60 ($M = 60.61, SD = 9.76$). Most participants were diagnosed with either digestive-gastrointestinal cancer (22.1%) or urological cancer (21.6%) and common received treatments were surgery (35.3%) and chemotherapy (23.6%). Furthermore, 53.7% of the participants still received treatment for their cancer when they completed the study. Table 4.1 shows all the demographic and disease characteristics of the sample.

Randomization

A total of 190 participants were randomized to the four experimental groups; the attitudes group ($n = 50$), the social norm group ($n = 44$), the combined group ($n = 51$) and the control group ($n = 45$). The groups did not differ in gender ($\chi^2 (3) = 1.36, p = .715$), age ($F (3, 186) = .28, p = .837$) and level of education ($\chi^2 (6) = 2.81, p = .832$).

Covariates

Past behavior and attitudes towards the message were identified as possible covariates in previous studies. The conditions did not differ in past behavior ($F (3, 186) = .81, p = .487$) and attitudes towards the message ($F (3, 186) = 2.17, p = .093$). Past behavior and attitude towards the message did have significant correlations with all the dependent variables. We conducted the analyses with and without the covariates and the results remained the same. To retain sufficient power, we chose to present the results from the analyses without covariates.

Manipulation check

Participants who were randomized to the conditions that included an attitude message perceived this message to be more about the way you feel after expressing concerns ($M = 6.05, SD = 1.27$) than participants who did not receive an attitude message ($M = 4.76, SD = 2.11$). This difference was statistically significant ($F (1, 188) = 26.68, p < .001$). Participants who were randomized to

the conditions with a social norm message perceived this message to be more about how significant others think of patients expressing concerns ($M = 6.45$, $SD = 1.25$) than patients who did not receive a social norm message ($M = 3.86$, $SD = 1.79$). This difference was also statistically significant ($F(1, 188) = 133.43$, $p < .001$). Since the attitude and social norm messages were perceived as intended, we consider the manipulation to be successful.

Table 4.1

Demographics and Disease Characteristics of the Sample (N = 190)

Characteristic	N	%
<u>Gender</u>		
Male	90	47.4
Female	100	52.6
<u>Age</u>		
<i>M (SD)</i>	60.61 (9.76)	
Range	35-85	
<u>Educational level</u>		
Low	45	23.7
Middle	59	31.1
High	86	45.3
<u>Living arrangements</u>		
Alone	26	13.7
Partner	115	60.5
Partner and child(ren)	41	21.6
Child(ren)	5	2.6
Other	3	1.6
<u>Children</u>		
Yes	156	82.1
No	34	17.9
<u>Employed</u>		
Yes	74	38.9
No	116	61.1

Characteristic	N	%
<u>Type of cancer</u>		
Breast	39	18.3
Digestive-gastrointestinal	47	22.1
Haematological	29	13.6
Lung	3	1.4
Gynaecological	7	3.3
Urologic	46	21.6
Head and neck	5	2.3
Skin	9	4.2
Other	28	13.1
<u>Time since diagnosis (months)</u>		
<i>M (SD)</i>	52.83 (67.54)	
<u>Undergoing treatment</u>		
Yes	102	53.7
No	88	46.3
<u>Treatment intent</u>		
Curative	124	65.3
Palliative	57	30.0
Unknown	9	4.7
<u>Treatment</u>		
No treatment	5	1.3
Surgery	141	35.3
Chemotherapy	94	23.6
Radiotherapy	81	20.3
Immunotherapy	14	3.5
Hormone replacement therapy	26	6.5
Chemo radiation therapy	5	1.3
Goal directed therapy	10	2.5
Unknown	1	0.3
Other	5	5.5

Note. *n* varies for type of cancer and treatment due to the possibility to give multiple answers

Main analyses

For attitudes (RQ1), we found no significant time effect ($F(1, 182) = 1.37, p = .244$) and no differences in effects between conditions ($F(3, 182) = .30, p = .824$). For perceived social norm (RQ2), there was also no significant time effect ($F(1, 182) = 1.41, p = .236$) and no differences between conditions ($F(3, 182) = 2.26, p = .083$). For intention (RQ3), the analyses did show a significant time effect ($F(1, 182) = 4.49, p = .035$) but no significant differences between conditions ($F(3, 182) = .78, p = .507$).

The analyses only revealed a time effect for intention. To further explore and understand why there were no effects between the conditions, we created a median split between the participants who scored below the median at baseline (i.e., there was a fair possibility to detect a change, thus these participants had room for improvement) and those who scored above the median at baseline (i.e., there was little possibility to detect a change, thus these participants had no room for improvement). These analyses showed that the time effect for attitudes ($F(1, 182) = 29.25, p < .001$), perceived social norm ($F(1, 182) = 17.23, p < .001$) and intention ($F(1, 182) = 22.82, p < .001$) was different for participants who scored below and above the median at baseline across conditions. Participants' attitudes significantly increased in the group that scored below the median at baseline ($M_{\text{difference}} = .338, p = .002$) and significantly decreased in the group that scored above the median at baseline ($M_{\text{difference}} = -.523, p < .001$). This effect did not significantly differ between conditions ($F(3, 182) = .37, p = .772$). Participants' perceived social norm significantly increased in the group that scored below the median at baseline ($M_{\text{difference}} = .193, p = .024$) and significantly decreased in the group that scored above the median at baseline ($M_{\text{difference}} = -.351, p < .001$). This effect did not differ between conditions ($F(3, 182) = 1.89, p = .133$). Participants' intention significantly increased in the group that scored below the median at baseline ($M_{\text{difference}} = .315, p = .020$) and significantly decreased in the group that scored above the median at baseline ($M_{\text{difference}} = -.760, p = .005$). This effect did again not differ between conditions ($F(3, 182) = .10, p = .961$). Tables 4.2, 4.3 and 4.4 show the mean scores of the participants (below and above the median) at T1 and T2 on all the dependent variables.

Table 4.2*Mean Scores and Standard Deviations of the Participants (N = 190) at T1 and T2 on Attitudes*

	n	Attitudes T1	Attitudes T2
<u>Affective attitude message condition</u>			
Below the median at T1	24	4.97 (1.04)	5.44 (1.12)
Above the median at T1	26	6.88 (.19)	6.25 (.96)
Total	50	5.89 (1.22)	5.83 (1.12)
<u>Injunctive norm message condition</u>			
Below the median at T1	21	4.78 (.98)	5.02 (1.32)
Above the median at T1	23	6.78 (.25)	6.10 (1.36)
Total	44	5.82 (1.22)	5.58 (1.44)
<u>Combined message condition</u>			
Below the median at T1	23	4.48 (1.07)	4.86 (1.08)
Above the median at T1	28	6.23 (.30)	6.30 (.81)
Total	51	5.71 (1.35)	5.65 (1.18)
<u>Control message condition</u>			
Below the median at T1	28	4.82 (.92)	5.09 (1.20)
Above the median at T1	17	6.84 (.25)	6.48 (.74)
Total	45	5.59 (1.26)	5.62 (1.25)
<u>Total sample</u>			
Below the median at T1	98	4.77 (1.01)	5.11 (1.18)
Above the median at T1	92	6.80 (.26)	6.27 (1.00)
Total	190	5.75 (1.26)	5.67 (1.24)

Table 4.3

Mean Scores and Standard Deviations of the Participants (N= 190) at T1 and T2 on Perceived Social Norm

	n	Injunctive norm T1	Injunctive norm T2
<u>Affective attitude message condition</u>			
Below the median at T1	28	4.09 (1.09)	4.48 (1.27)
Above the median at T1	22	6.08 (.48)	5.70 (.77)
Total	50	4.97 (1.32)	5.02 (1.23)
<u>Injunctive norm message condition</u>			
Below the median at T1	20	4.26 (.95)	4.31 (1.26)
Above the median at T1	24	5.98 (.43)	5.67 (.67)
Total	44	5.20 (1.11)	5.05 (1.19)
<u>Combined message condition</u>			
Below the median at T1	25	4.47 (.87)	4.22 (1.13)
Above the median at T1	26	6.09 (.43)	5.71 (.77)
Total	51	5.30 (1.06)	4.98 (1.22)
<u>Control message condition</u>			
Below the median at T1	31	4.38 (.80)	4.96 (.82)
Above the median at T1	14	5.95 (.55)	5.64 (.48)
Total	45	4.87 (1.03)	5.17 (.79)
<u>Total sample</u>			
Below the median at T1	104	4.30 (.93)	4.53 (1.14)
Above the median at T1	86	6.03 (.46)	5.67 (.69)
Total	190	5.09 (1.15)	5.05 (1.12)

Table 4.4*Mean Scores and Standard Deviations of the Participants (N= 190) at T1 and T2 on Intention*

	n	Intention T1	Intention T2
<u>Affective attitude message condition</u>			
Below the median at T1	39	4.42 (1.48)	5.00 (1.60)
Above the median at T1	11	6.76 (.30)	6.09 (1.24)
Total	50	4.93 (1.64)	5.24 (1.59)
<u>Injunctive norm message condition</u>			
Below the median at T1	33	4.44 (1.65)	4.83 (1.82)
Above the median at T1	11	6.91 (.22)	6.03 (1.32)
Total	44	5.06 (1.79)	5.13 (1.78)
<u>Combined message condition</u>			
Below the median at T1	37	4.78 (1.45)	4.98 (1.54)
Above the median at T1	14	6.95 (.18)	5.55 (1.67)
Total	51	5.38 (1.57)	5.14 (1.58)
<u>Control message condition</u>			
Below the median at T1	38	4.75 (1.45)	5.11 (1.19)
Above the median at T1	7	6.90 (.25)	5.91 (1.36)
Total	45	5.09 (1.55)	5.24 (1.24)
<u>Total sample</u>			
Below the median at T1	147	4.60 (1.50)	4.99 (1.53)
Above the median at T1	43	6.88 (.24)	5.87 (1.40)
Total	190	5.12 (1.63)	5.19 (1.55)

Discussion Study 1

This study aimed to examine the effects of several persuasive messages (i.e., using single and combined targeting) on cancer patients' attitudes, perceived social norm and intention to express concerns. We had sufficient power to detect meaningful differences. However, we only found positive time effects for participants who scored below the median at pre-test on the outcome measures (i.e., their attitudes, perceived social norm and intention improved at T2 as compared to T1) and no differences in effects between the different messages. These results may imply that it does not matter which message patients with a potential to change receive as long as they receive some form of information about concerns and/or concern expression. As we measured attitudes, perceived social norm and intention at baseline, it could also be possible that we found an effect of our pre-test questionnaire, instead of a message effect. On the basis of the first data collection, we could not attribute our findings to the messages with certainty. Therefore, we performed a second study in which we randomized participants to a message condition or to a no exposure condition. The aim of the second study was to examine whether the time effects we found for participants who scored below the median at baseline in the first study were the result of exposure to a message or a pre-test questionnaire.

Methods Study 2

The method of study 2 was exactly the same as the method of study 1. Only the differences are described below.

Participants and Procedure

Participants were recruited in March and April 2015 from kanker.nl. To assure that we did not include participants from the first study, we only recruited among patients that registered themselves to kanker.nl after the first study was conducted. Furthermore, we also added a question at the beginning of the survey in which we asked participants whether they participated in a similar study in November- December 2014. If the answer to this question was "yes" ($n = 4$) they could not complete the second study.

Study Design

The second study consisted of a 1 factor (message or no message) design. Participants received a pre-test questionnaire online and two weeks later they were randomized to either the condition with a

message or the condition without a message. After exposure to the message, participants received the post-test questionnaire. Participants in the condition without the message only received the post-test questionnaire.

Materials

The message consisted of the intro message from study 1 in which the patient explains the different concerns that she experienced during cancer. The duration of this video message was 1 minute. This intro was also shown in all the conditions in study 1. Therefore, it could be that particularly this part of the message explained the effects that we found in study 1.

Sample Size

Power calculation showed that with an alpha of .05 and a correlation among the repeated measures of .70., we needed 84 participants to achieve a power of 80% to detect an effect (*Cohen's f* = .10) between the two conditions.

Measures

The same measures were used as in Study 1. The reliability and mean scores on the scales are described in Table 4.5.

Table 4.5

Mean Scores, Standard Deviations and Reliability of the Measures of the Second Study

	α T1	α T2	M (SD) T1	M (SD) T2
Attitudes	.88	.88	5.83 (1.08)	5.84 (1.07)
Perceived social norm	.68	.64	5.13 (1.18)	5.26 (1.05)
Intention	.89	.87	5.58 (1.42)	5.36 (1.39)
Past behavior			5.70 (1.48)	5.32 (1.56)
Attitude towards the message		.88		5.07 (1.00)

Note. Only the condition that was exposed to the video received the engagement with video questions.

Results Study 2

Response

The baseline survey was completed by 86 participants. In total 63 participants (73.3%) completed the entire study. A non-response analysis indicated that the participants who did and did not complete the entire study did not differ in gender ($\chi^2(1) = 0.07, p = .790$), age ($F(1, 84) = 3.29, p = .073$) and level of education ($\chi^2(2) = .04, p = .979$).

Participants

Most of the participants were female (68.3%), had a mean age of 56.94 years ($SD = 10.52$) and were highly educated (42.9%). The majority of the participants had breast cancer (24.3%) or digestive-gastrointestinal cancer (20.0%) and were treated with surgery (41.5%) or chemotherapy (22.0%). More than half of the participants (50.8%) was not undergoing treatment at the moment of the study. Table 4.6 shows all the demographic and disease characteristics of the participants.

Randomization

Sixty-three participants were randomized to either the message condition ($n = 33$) or the control condition without a message ($n = 30$). The two conditions did not differ in gender ($\chi^2(1) = 0.07, p = .796$), age ($F(1, 61) = .08, p = .774$) and level of education ($\chi^2(2) = .39, p = .823$).

Covariates

The two conditions did not differ in past behavior ($F(1, 61) = .71, p = .402$). Attitude towards the message was only measured in the message group. Correlations between past behavior, attitude towards the messages and the dependent variables showed significant relations between past behavior and attitudes and intention. Similar to study 1 adding the covariates to the analyses did not yield different results. To retain power, we used the analyses without the covariates.

Table 4.6*Demographics and Disease Characteristics of the Second Sample (N = 63)*

Characteristic	N	%
<u>Gender</u>		
Male	20	68.3
Female	23	21.7
<u>Age</u>		
M (SD)	56.94 (10.52)	
Range	27-76	
<u>Educational level</u>		
Low	15	23.8
Middle	21	33.3
High	27	42.9
<u>Living arrangements</u>		
Alone	10	15.9
Partner	36	57.1
Partner and child(ren)	15	23.8
Child(ren)	1	1.6
Other	1	1.6
<u>Children</u>		
Yes	49	77.8
No	14	22.2
<u>Employed</u>		
Yes	26	41.3
No	37	58.7
<u>Type of cancer</u>		
Breast	17	24.3
Digestive-gastrointestinal	14	20.0
Haematological	3	4.3
Lung	4	5.7
Gynaecological	9	12.9

Table continues on next page

Characteristic	N	%
Urologic	6	8.6
Head and neck	3	4.3
Skin	2	2.9
Other	12	17.1
<u>Time since diagnosis (months)</u>		
<i>M (SD)</i>	33.03 (34.88)	
<u>Undergoing treatment</u>		
Yes	31	49.2
No	32	50.8
<u>Treatment intent</u>		
Curative	48	76.2
Palliative	11	17.5
Unknown	4	6.3
<u>Treatment</u>		
No treatment	2	1.6
Surgery	51	41.5
Chemotherapy	27	22.0
Radiotherapy	23	18.7
Immunotherapy	3	2.4
Hormone replacement therapy	9	7.3
Chemo radiation therapy	1	0.8
Goal directed therapy	0	0.0
Unknown	2	1.6
Other	5	4.1

Note. *n* varies for type of cancer and treatment due to the possibility to give multiple answers

Main analyses

There was no significant time effect for attitudes ($F(1, 59) = .14, p = .712$), perceived social norm ($F(1, 59) = .64, p = .427$) and intention ($F(1, 59) = 1.61, p = .209$). There were also no significant differences between conditions for attitudes ($F(1, 59) = .83, p = .367$), perceived social norm ($F(1, 59) = .01, p = .914$) and intention ($F(1, 59) = 2.05, p = .158$).

Consistently with study 1, we added a median split to the analyses. For attitudes, a significant time effect was found for participants who scored below the median at baseline across conditions ($F(1, 59) = 7.08, p = .010$). Participants' attitudes significantly increased in the group that scored below the median ($M_{\text{difference}} = .402, p = .043$) and did not change in the group that scored above the median ($M_{\text{difference}} = -.303, p = .097$). For perceived social norm we also found a significant time effect for participants who scored below the median at baseline across conditions ($F(1, 59) = 5.97, p = .018$). Participants' perceived social norm significantly increased in the group that scored below the median ($M_{\text{difference}} = .447, p = .022$) and did not change in the group that scored above the median ($M_{\text{difference}} = -.227, p = .261$). For intention the time effect was not found ($F(1, 59) = 2.25, p = .139$). No differences were found between the conditions for attitudes ($F(1, 59) = 2.11, p = .152$), perceived social norm ($F(1, 59) = .03, p = .862$) and intention ($F(1, 59) = .06, p = .803$). Tables 4.7, 4.8 and 4.9 show the mean scores of the participants (below and above the median) at T1 and T2 on all the dependent variables.

Table 4.7*Mean Scores and Standard Deviations of the Second Sample (N = 63) at T1 and T2 on Attitudes*

	n	Attitudes T1	Attitudes T2
<u>Message condition</u>			
Below the median at T1	15	5.07 (.42)	5.16 (1.05)
Above the median at T1	18	6.76 (.29)	6.53 (.65)
Total	33	5.99 (.92)	5.90 (1.09)
<u>Control condition</u>			
Below the median at T1	14	4.60 (.87)	5.31 (1.06)
Above the median at T1	16	6.56 (.49)	6.19 (.90)
Total	30	5.64 (1.21)	5.78 (1.06)
<u>Total sample</u>			
Below the median at T1	29	4.84 (.71)	5.23 (1.04)
Above the median at T1	34	6.67 (.41)	6.37 (.78)
Total	63	5.83 (1.08)	5.84 (1.07)

Table 4.8*Mean Scores and Standard Deviations of the Second Sample (N = 63) at T1 and T2 on Perceived Social Norm*

	n	Perceived social norm T1	Perceived social norm T2
<u>Message condition</u>			
Below the median at T1	17	4.39 (.97)	4.85 (1.10)
Above the median at T1	16	6.02 (.52)	5.75 (.85)
Total	33	5.18 (1.13)	5.28 (1.07)
<u>Control condition</u>			
Below the median at T1	16	4.12 (.84)	4.56 (.70)
Above the median at T1	14	6.18 (.49)	5.99 (.80)
Total	30	5.08 (1.25)	5.23 (1.04)
<u>Total sample</u>			
Below the median at T1	33	4.26 (.91)	4.71 (.93)
Above the median at T1	30	6.09 (.51)	5.86 (.82)
Total	63	5.13 (1.18)	5.26 (1.05)

Table 4.9*Mean Scores and Standard Deviations of the Second Sample (N = 63) at T1 and T2 on Intention*

	n	Intention T1	Intention T2
<u>Message condition</u>			
Below the median at T1	14	4.93 (1.34)	4.55 (1.49)
Above the median at T1	19	6.90 (.22)	5.86 (1.10)
Total	33	6.06 (1.31)	5.30 (1.42)
<u>Control condition</u>			
Below the median at T1	26	4.76 (1.21)	5.26 (1.40)
Above the median at T1	4	6.92 (.17)	6.50 (.58)
Total	30	5.04 (1.35)	5.42 (1.38)
<u>Total sample</u>			
Below the median at T1	40	4.82 (1.25)	5.01 (1.46)
Above the median at T1	23	6.90 (.21)	5.97 (1.04)
Total	63	5.58 (1.42)	5.36 (1.39)

Discussion Study 2

In the second study we aimed to examine whether the time effects for participants who had a potential to change that were found in study 1 were caused by exposure to a message or to a questionnaire. In the second study we found the same time effects in both groups (i.e., the message group and no exposure group) for attitudes and perceived social norm. However, we did not find any effects on intention. In behavioral models intention is always presented after attitudes and perceived social norm. It is therefore more likely that messages will first influence attitudes and perceived social norm rather than intention (Fishbein & Yzer, 2003). As we had less power than we aimed for (i.e., 63 instead of 84 participants), it is possible that we had insufficient power to detect an effect on intention.

General Discussion

The first study aimed to examine whether persuasive messages were effective in improving cancer patients' attitudes, perceived social norm and intention to express concerns. We did not find any main effects from the messages on the dependent variables except for intention (i.e., a time effect across all the different message conditions). Furthermore, we did not find any differences between conditions indicating that it does not matter whether a message was targeting determinants of intention or just gave information. We added a median split to the analyses to further explore what might explain the lack of effects. The results showed a small improvement in all the dependent variables for patients who scored below the median at pre-test and a small decrease in the dependent variables for patients who scored above the median at pre-test. Because all four conditions received a message and a baseline questionnaire, it was unknown whether the effects could be attributed to receiving a message or a questionnaire. The aim of the second study was to answer the latter question. Patients were randomized to either a message condition or a no exposure condition. Again, no main effects were found and no differences between conditions. When we added the median split, similar effects as in study 1 were found for patients who scored below the median on attitudes and perceived social norm (i.e., their attitudes and perceived social norm increased). Contrary to study 1, we did not find a decrease in attitudes and perceived social norm for the patients who scored above the median. Further, we found no effects on intention, possibly due to insufficient power in study 2. Thus, both a pre-test questionnaire and a short message yielded small changes in the dependent variables for patients who scored below or above the median at pre-test (i.e., there was room for improvement in their attitudes, perceived social norm and intention). A possible explanation for the effects of the pre-test questionnaire can be that existing beliefs are activated (Ajzen & Fishbein, 2000; Ajzen, 2001). The questions might have primed participants' attention for their attitudes, norms and intentions and can therefore enhance the accessibility and salience of existing beliefs about concern expression. By increasing the accessibility and salience, individuals' perception of the importance of performing the behavior (i.e., expressing concerns) can increase and, consequently, attitudes, norms and intention can improve (Ajzen, 2001; Zhao et al., 2006)

An alternative explanation could be that the results are caused by a regression to the mean effect. A regression to the mean effect is a statistical phenomenon that can occur when repeated measures are completed by the same individuals. It is caused by random measurement error. When individuals have an extreme high or low score at baseline, it is more likely that their subsequent score will be closer to the "true mean". In the case of, for example, an extreme high mean score at baseline, this means that the subsequent score will decrease because it was not possible that the baseline mean score could

improve (Barnett, van der Pols, & Dobson, 2005; Verkooijen, Stok, & Mollen, 2015). Regression to the mean effects have been demonstrated in other studies that examined the effects of persuasive messages as well (Verkooijen et al., 2015). Although the regression to the mean effect can be an explanation for the results in the group that scored below the median at baseline (a small increase in the scores on the dependent variables at T2 compared to T1) and the group that scored above the median at baseline (a small decrease in the scores on the dependent variables at T2 compared to T1), it is more likely that this effect only exists for the group that scored above the median. Due to the high T1 scores on the dependent variables of this group (most of the times participants scored higher than a 6 on average on a 7-point scale), only a decrease in their scores was possible at T2. The patients in the group that scored below the median did have room to change (most of the times participants scored between 4 and 5 on average on a 7-point scale) and therefore it is more likely that their scores are not the result of a regression to the mean effect.

Overall, we did not find effects for any of the persuasive messages. A possible explanation could be that using persuasive messages based on the IMBP and the TPB is not the most optimal way to stimulate concern expression. We know from a previous study (Brandes et al., 2016) that not all the variance in intention to express concerns was explained by attitudes and perceived social norm and perhaps targeting other determinants than those of the IMBP (e.g., anticipated regret) will yield different results. Furthermore, we did not target underlying beliefs (e.g., beliefs that are elicited via qualitative research with cancer patients and that discriminate intenders from non-intenders), instead we targeted the specific content of patients' attitudes (i.e., feeling unpleasant) and perceived social norm (i.e., the feeling that significant others do not want the patient to express concerns). Underlying beliefs could address more specifically why concern expression is unpleasant or why patients have the feeling that significant others do not want them to express concerns. Perhaps targeting these underlying beliefs would have resulted in more positive effects. There are also studies, however, in which determinants were targeted more generally and these studies report positive effects on intention (e.g., Hill, Abraham, & Wright, 2007). More research is needed to explore whether targeting specific beliefs would yield different effects on patients' attitudes, perceived social norm and intention.

Another possible reason for the lack of effects in the present study could be that we exposed our participants only once to a relatively short message. Research has indicated that more intensive use of targeting with multiple exposures can lead to greater effects (Webb et al., 2010). This could specifically be the case when attitudes and norms are based on individuals' own experiences with performing the behavior because these are more difficult to change than attitudes and norms that are based on information that is provided by others (Fishbein & Yzer, 2003; Hornik & Woolf, 1999).

The patients in our study had been diagnosed for over 3 years on average and had relatively high scores on past behavior, therefore it is plausible to assume that their attitudes and perceived social norm are based on their own experiences in consultations. In such a case, multiple exposures could be needed to allow for adaption of attitudes and norms (Kok et al., 2016). Future research could examine whether multiple exposures could be more effective in changing attitudes and norms that are based on patients' own experiences. Furthermore, a replication of this study is recommended with patients that are newly diagnosed to examine whether these results differ for patients who have not yet formed stable attitudes, norms and intentions to express concerns.

This study used information about positive emotional consequences (i.e., feeling relieved/ better after expressing concerns) and the approval of others (i.e., significant others want patients to discuss concerns) as techniques of targeting in the persuasive messages. These techniques are commonly used to changes attitudes, norms and intention, are feasible to use in short messages and showed positive effects on communication behaviors of cancer patients in previous studies (Hardeman et al., 2002; Henselmans et al., 2012; Kok et al., 2016). On the other hand, a meta-analysis on effective techniques used in health interventions shows that other techniques such as demonstration of the behavior can be very effective as well and perhaps this would have been a more suitable technique for concern expression (Webb et al., 2010). Demonstration of the behavior could, for example, be depicted in a video wherein a consultation is simulated in which a patient expresses concerns. In general, if we want to advance the field of targeting, more studies are needed to provide insights into which techniques are effective in changing certain types of health behaviors and intentions with specific populations (Michie et al., 2013). Future research could therefore further examine which (other) techniques can be used to positively change cancer patients' attitudes, perceived social norm and intention to express concerns.

To conclude, this study examined the effects of single and combined targeting in persuasive messages on cancer patients' attitudes, perceived social norm and intention to express concerns. There were no differences between the messages on the dependent variables for patients who had a potential to change. Further, we found the same effect for patients who only received a pre-test questionnaire. The pre-test questionnaire possibly caused an activation of patients' existing beliefs of concern expression which then lead to small positive changes in attitudes, perceived social norm and intention in the group of patients who had room for improvement. Thus, paying attention to concern expression, either by a message or a questionnaire, might already result in some positive effects for cancer patients. More research is recommended to identify effective techniques for persuasive messages, aside from providing information, which may yield larger changes in attitudes, norms and intentions.

References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211.
- Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology*, 52(1), 27-58.
- Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. *European Review of Social Psychology*, 11(1), 1-33.
- Avery, K. N., Donovan, J. L., Horwood, J., & Lane, J. A. (2013). Behavior theory for dietary interventions for cancer prevention: A systematic review of utilization and effectiveness in creating behavior change. *Cancer Causes & Control*, 24(3), 409-420.
- Barnett, A. G., van der Pols, J. C., & Dobson, A. J. (2005). Regression to the mean: What it is and how to deal with it. *International Journal of Epidemiology*, 34(1), 215-220. doi:10.1093/ijedyh299
- Bensing, J. & Verhaak, P. (2004). Communication in medical encounters. In J. Weinman & A. Kaptein (Eds.), *Health Psychology* (pp.261-287). Malden, MA, US: Blackwell Publishing.
- Brandes, K., Linn, A. J., Smit, E. G., & van Weert, J. C. (2016). Unraveling the determinants of cancer patients' intention to express concerns. *Journal of Health Communication*, 21(3), 327-336.
- Butow, P., Brown, R., Cogar, S., Tattersall, M., & Dunn, S. (2002). Oncologists' reactions to cancer patients' verbal cues. *Psycho-Oncology*, 11(1), 47-58.
- de Haes, H., & Bensing, J. (2009). Endpoints in medical communication research, proposing a framework of functions and outcomes. *Patient Education and Counseling*, 74(3), 287-294.
- Dijkstra, A., & de Vries, H. (2001). Do self-help interventions in health education lead to cognitive changes, and do cognitive changes lead to behavioural change? *British Journal of Health Psychology*, 6(2), 121-134.

- Farrell, C., Heaven, C., Beaver, K., & Maguire, P. (2005). Identifying the concerns of women undergoing chemotherapy. *Patient Education and Counseling*, 56(1), 72-77.
- Fishbein, M. (2000). The role of theory in HIV prevention. *AIDS Care*, 12(3), 273-278.
- Fishbein, M., & Cappella, J. N. (2006). The role of theory in developing effective health communications. *Journal of Communication*, 56(s1), S1-S17.
- Fishbein, M., & Yzer, M. C. (2003). Using theory to design effective health behavior interventions. *Communication Theory*, 13(2), 164-183.
- Francis, J. J., Eccles, M. P., Johnston, M., Walker, A., Grimshaw, J., Foy, R., . . . Bonetti, D. (2004). Constructing questionnaires based on the theory of planned behaviour. *A Manual for Health Services Researchers*, 2010, 2-12.
- Ghazali, N., Roe, B., Lowe, D., & Rogers, S. (2015). Patients concerns inventory highlights perceived needs and concerns in head and neck cancer survivors and its impact on health-related quality of life. *British Journal of Oral and Maxillofacial Surgery*, 53(4), 371-379.
- Grimsbø, G. H., Ruland, C. M., & Finset, A. (2012). Cancer patients' expressions of emotional cues and concerns and oncology nurses' responses, in an online patient–nurse communication service. *Patient Education and Counseling*, 88(1), 36-43.
- Hardeman, W., Johnston, M., Johnston, D., Bonetti, D., Wareham, N., & Kinmonth, A. L. (2002). Application of the theory of planned behaviour in behaviour change interventions: A systematic review. *Psychology and Health*, 17(2), 123-158.
- Heaven, C. M., & Maguire, P. (1998). The relationship between patients' concerns and psychological distress in a hospice setting. *Psycho-Oncology*, 7(6), 502-507.
- Henselmans, I., Haes, H. C. J. M., & Smets, E. (2012). Enhancing patient participation in oncology consultations: A best evidence synthesis of patient-targeted interventions. *Psycho-Oncology*, 22(5), 961-977.

- Heyn, L., Ruland, C. M., & Finset, A. (2012). Effects of an interactive tailored patient assessment tool on eliciting and responding to cancer patients' cues and concerns in clinical consultations with physicians and nurses. *Patient Education and Counseling*, *86*(2), 158-165.
- Hill, C., Abraham, C., & Wright, D. B. (2007). Can theory-based messages in combination with cognitive prompts promote exercise in classroom settings? *Social Science & Medicine*, *65*(5), 1049-1058.
- Hill, K., Amir, Z., Muers, M., Connolly, C., & Round, C. (2003). Do newly diagnosed lung cancer patients feel their concerns are being met? *European Journal of Cancer Care*, *12*(1), 35-45.
- Hornik, R., & Woolf, K. D. (1999). Using cross-sectional surveys to plan message strategies. *Social Marketing Quarterly*, *5*(2), 34-41.
- Kok, G., Gottlieb, N. H., Peters, G. Y., Mullen, P. D., Parcel, G. S., Ruitter, R. A., . . . Bartholomew, L. K. (2016). A taxonomy of behavior change methods; an intervention mapping approach. *Health Psychology Review*, *10*(3), 297-312.
- Michie, S., & Abraham, C. (2004). Interventions to change health behaviours: Evidence-based or evidence-inspired? *Psychology & Health*, *19*(1), 29-49.
- Michie, S., & Prestwich, A. (2010). Are interventions theory-based? Development of a theory coding scheme. *Health Psychology*, *29*(1), 1-8.
- Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., . . . Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: Building an international consensus for the reporting of behavior change interventions. *Annals of Behavioral Medicine*, *46*(1), 81-95.
- Montano, D. E., & Kasprzyk, D. (2008). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. *Health Behavior and Health Education: Theory, Research, and Practice*, *4*, 67-95.

- Street, R. L., Makoul, G., Arora, N. K., & Epstein, R. M. (2009). How does communication heal? Pathways linking clinician–patient communication to health outcomes. *Patient Education and Counseling, 74*(3), 295-301.
- Tuinman, M. A., Gazendam-Donofrio, S. M., & Hoekstra-Weebers, J. E. (2008). Screening and referral for psychosocial distress in oncologic practice. *Cancer, 113*(4), 870-878.
- Van den Putte, B., & Dhondt, G. (2005). Developing successful communication strategies: A test of an integrated framework for effective Communication1. *Journal of Applied Social Psychology, 35*(11), 2399-2420.
- Verkooijen, K. T., Stok, F. M., & Mollen, S. (2015). The power of regression to the mean: A social norm study revisited. *European Journal of Social Psychology, 45*(4), 417-425.
- Webb, T., Joseph, J., Yardley, L., & Michie, S. (2010). Using the internet to promote health behavior change: A systematic review and meta-analysis of the impact of theoretical basis, use of behavior change techniques, and mode of delivery on efficacy. *Journal of Medical Internet Research, 12*(1), e4.
- Zebregs, S., van den Putte, B., Neijens, P., & de Graaf, A. (2015). The differential impact of statistical and narrative evidence on beliefs, attitude, and intention: A meta-analysis. *Health Communication, 30*(3), 282-289.
- Zhao, X., Sayeed, S., Cappella, J., Hornik, R., Fishbein, M., & Ahern, R. K. (2006). Targeting norm-related beliefs about marijuana use in an adolescent population. *Health Communication, 19*(3), 187-196.
- Zimmermann, C., Del Piccolo, L., Bensing, J., Bergvik, S., De Haes, H., Eide, H., . . . Humphris, G. (2011). Coding patient emotional cues and concerns in medical consultations: The Verona coding definitions of emotional sequences (VR-CoDES). *Patient Education and Counseling, 82*(2), 141-148.

Appendix 4.1

The Persuasive Messages

Introduction messages that was used for all the messages:

Hello, my name is Ellen and I was diagnosed with cancer a year ago. After I was diagnosed, I experienced many concerns such as practical concerns about whether I would still be able to do my job, emotional concerns such as fear of dying, and physical concerns about the possible pain that I would experience as a result of this disease. I also experienced many concerns about my family and children, and how they would cope with my disease. I read in a magazine that many patients experience these concerns. For example, a third of the patients is worried about pain, work and dying. And half of the patients is worried about how their loved ones will cope with their disease.

Attitude message:

In the beginning of my disease trajectory, I found it very difficult to discuss my concerns with my doctor. I had doubts about whether I would feel unpleasant if I would do this and this withheld me from expressing my concerns. But I also noticed that my concerns were not going away and not discussing them made me feel worse. The concerns were constantly on my mind. Eventually, I decided to discuss my concerns with my doctor. My doctor responded with empathy and it felt good to talk about my concerns. After this conversation, I felt better. Because I discussed my concerns, I also felt relieved.

Perceived social norm message:

In the beginning of my disease trajectory, I found it difficult to estimate whether my loved ones would want me to express my concerns towards my doctor. I noticed that they wanted me to stay positive. Therefore, I found it difficult to discuss my concerns during a consultation because most of the times one my loved ones was present and I did not want my concerns to be a burden to them. This withheld me from expressing my concerns but the concerns were constantly on my mind. Eventually, I decided to discuss my concerns with my doctor. My loved ones thought this was a good decision and they supported me. I knew then they wanted me to express my concerns to my doctor.

Combined message:

In the beginning of my disease trajectory, I found it very difficult to discuss my concerns with my doctor. I had doubts about whether I would feel unpleasant if I would do this and whether my loved ones would want me to express my concerns towards my doctor. I noticed that they wanted me to stay positive. Therefore, I found it difficult to discuss my concerns during a consultation because most of

the times one my loved ones was present and I did not want my concerns to be a burden to them. This withheld me from expressing my concerns. But I also noticed that my concerns were not going away, and not discussing them made me feel worse. The concerns were constantly on my mind. Eventually, I decided to discuss my concerns with my doctor. My loved ones thought this was a good decision and they supported me. I knew then they wanted me to express my concerns to my doctor. In addition, my doctor responded with empathy and it felt good to talk about my concerns. After this conversation, I felt better. Because I discussed my concerns, I also felt relieved.

Control message:

I read that 100.000 people are diagnosed with cancer per year. The number of people who gets diagnosed with cancer increases every year with approximately 3%. The most important cause of this increase is that the population of the Netherlands grows and that people get older. The number of cancer patients increases the most in people that are 85 years or older. The most prevalent forms of cancer in the Netherlands are skin cancer, breast cancer, colon cancer, lung cancer and prostate cancer. These five forms of cancer together form two third of all the new diagnoses. The most diagnosed form of cancer differs per age group. For example, children are more frequently diagnosed with leukemia and older people with colon cancer.

Note. We translated the messages from Dutch into English to the best of our abilities. Some sentences might be longer or shorter than those in the original messages due to the translation. Some words that we used in the original messages also needed to be translated differently in English.

Appendix 4.2

Pre-tests

Four actors (two males and two females) were pre-tested among a panel of 23 healthy adults for trustworthiness, likeability and similarity. The results of the pre-test showed that one actress scored significantly higher on trustworthiness, likeability and similarity than the other actors and actress. Hence, this actress was chosen for all the videos. The scripts for the videos were pilot tested by five patients for understandability and adjusted accordingly. The scripts of the targeted messages contained four targeted sentences. To account for a possible exposure effect, two scripts and videos were developed for the combined message condition. One with all eight targeted sentences resulting in a video of 2:23 minutes and one with four targeted sentences (two about attitudes and two about norms) resulting in a video of 1:50 minutes (same length as the other videos). The introduction of the messages lasted 1 minute. When participants were randomized to the combined message condition, they received one of the two videos. ANOVA tests showed that there were no differences between the videos with respect to the dependent variables. Therefore, we combined the scores of the participants and treat them as one group (i.e., the combined message group) in further analyses.