The effects of persuasive messages on cancer patients' attitudes, norms and intention to express concerns

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The effects of persuasive messages on cancer patients' attitudes, norms and intention to express concerns

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ABSTRACT

Objective: To examine whether the use of persuasive messages in which cancer patients' attitudes and perceived social norms were either simultaneously or exclusively targeted can positively change patients' attitudes, perceived social norms and the intention to express concerns in consultations.
Methods: Two online experiments were conducted. The first experiment had a pre-test and post-test measurements design with 4 conditions (attitudes message, social norms message, combined message, control message). The second experiment had a pre-test and post-test measurements design with 2 conditions (message and no message group).
Results: The results of the first study showed small positive changes for patients who could potentially change, but there were no differences in effects between conditions. 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 conditions.
Conclusion: The results indicate that paying attention to the expression of concerns by patients might increase patients' intention to express further concerns.
Practice implications: Providers might be able to support patients' in their sharing of concerns through simple communication strategies such as explicitly mentioning that the expression of concerns is possible during a consultation.

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1. Introduction

Expressing concerns during cancer consultations has been associated with various positive outcomes for patients, such as reduced levels of anxiety and better well-being [1,2]. Although this expression seems beneficial, cancer patients often do not voice their concerns during consultations [3,4]. Different interventions have been developed to support cancer patients in expressing their concerns [e.g., 3, 5–9]. Most of these interventions consist of tools to prepare the consultation such as concern lists. Concern lists summarize topics that patients might be concerned about (e.g., side-effects of the treatment). Patients receive a concern list prior to their consultation and are asked to select the topics of relevance to them. Most of the studies on these interventions assessed which topics patients selected from the concern lists [e.g., 7] and/or the extent to which patients report to have discussed these topics with their healthcare provider [e.g., 8]. The effects of such interventions on the actual expression of concerns remain limited and inconclusive. For example, patients might express concerns about medical topics but not about psychosocial topics [8]. More research is therefore needed to determine how interventions can support the expression of concerns.

Using a behavioral theory such as the integrative model of behavioral prediction (IMBP) [10] as a basis for identifying relevant intervention targets [11–13] shows promise in developing these interventions. Interventions based on behavioral theories are often more effective in changing health- related behavior and intentions than interventions that are not [14,15]. The IMBP postulates that individuals do or do not perform a behavior (in this case expressing concerns) based on their intention. According to this theory, the intention of the individual is formed by attitudes, perceived social norms and self-efficacy [10,16]. A recent study [17] took the IMBP

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as a starting point to examine determinants of cancer patients' intention to express concerns. The results of this study showed that patients' intention to express concerns can be explained by their attitudes (more specifically the affective component; *concern expression can be unpleasant*) and perceived social norms (more specifically the injunctive component, *significant others do not want patients to express their concerns*). These determinants can be targeted in persuasive messages (i.e., communications that are theory-based and have the goal to change or reinforce a behavior or a behavioral intention) [12]. To examine ways in which persuasive messages can be optimally effective, it is important to test their single and combined effects [18,19]. Therefore, we developed persuasive messages in which patients' attitudes, perceived social norms or both were targeted. The aim of this study is to test which of these persuasive messages is most effective in positively changing the aforementioned attitudes, perceived social norms and, consequently, intention to express concerns in patients.

2. Methods study 1

2.1. Participants and procedure

The participants were recruited between November- December 2014 via two cancer patient panels in the Netherlands (i.e., kanker.nl and PanelCom). Participants were eligible if they were; (1) 18 years or older, (2) currently received treatment for cancer or had received treatment for cancer in the past and (3) still underwent 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).

2.2. Study design

This study consisted of an online experiment with 4 conditions (attitudes message, social norms message, combined message and control message) and within- between subject measures. 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 given message.

2.3. Materials

Three persuasive messages were developed in which the determinants were manipulated (an attitudes message, a social norms message and a combined message). The control message was an informational story 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). Video-testimonials were chosen as a format for the persuasive messages because previous studies have indicated that messages with affective/ emotional components are best presented with narratives such as testimonials using visual aids [20,21]. Appendix A shows the texts of all the different messages. We conducted two pre-tests; one to test the scripts of the videos and one to test the character featured. Both pre-tests are described in Appendix B.

2.4. Sample size

To estimate the required sample size to detect a meaningful difference between and within participants, a power calculation was

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 [22]. 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.

2.5. Measures

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

2.5.2. 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 were still receiving, which treatments they received in the past and their treatment goal (palliative or curative).

2.5.3. 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 (T1: α = .91, M = 5.75, SD = 1.26, T2: α = .91, M = 5.67, SD = 1.24) [23,24].

2.5.4. Perceived social norms
Perceived social norms were measured at T1 and T2 with eight items [23,24]. 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 people of importance within their environment wanted them to express concerns during a consultation (i.e., if applicable: their partner, their children, their siblings, their friends and other cancer patients; T1: α = .84, *M* = 5.09, *SD* = 1.15, T2: α = .82, *M* = 5.05, *SD* = 1.12).

2.5.5. Intention
Intention was measured at T1 and T2 with three items, which participants answered by indicating whether they intended to express concerns during their next cancer consultation on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*) (T1: α = .90, *M* = 5.12, *SD* = 1.63, T2: α = .91, *M* = 5.17, *SD* = 1.55) [23,24].

2.5.6. Past behavior
Participants' expression of concern during past consultations was measured with 1 item in which they had to indicate whether they expressed their concerns towards their healthcare provider on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*) (T1: *M* = 5.51, *SD* = 1.49, T2: *M* = 5.28, *SD* = 1.60) [23].

2.5.7. 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 (α = .91, *M* = 4.92, *SD* = 1.07).

2.5.8. Manipulation check

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

2.6. Analyses

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

3. Results study 1

3.1. Response

The pre-test questionnaire was filled in 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 (χ^2 (1) = 1.11, p = .291), age (F (1, 224) = 2.87, p = .092) and level of education (χ^2 (2) = 2.33, p = .312).

3.2. 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%). Table 1 shows all the demographic and disease-related characteristics of the sample.

3.3. Randomization

A total of 190 participants were randomized to 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 (χ^2 (3) = 1.36, p = .715), age (F (3, 186) = .28, p = .837) and level of education (χ^2 (6) = 2.81, p = .832).

3.4. Covariates

Gender, level of education, past behavior and attitudes towards the message were identified as possible covariates in previous studies [12,20]. None of the results were significantly influenced by these variables. To retain as much power as possible, we present the findings of the analyses without the covariates.

3.5. 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, 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, p < .001). Since the attitude and social norm messages were perceived as intended, we consider the manipulation to be successful.

Table 1
Demographics and Disease Characteristics of the Sample (N = 190).

Characteristic	N	%
Gender		
Male	90	47.4
Female	100	52.6
Age		
M (SD)	60.61 (9.76)	
Range	35-85	
Educational level		
Low	45	23.7
Middle	59	31.1
High	86	45.2
Living arrangements		
Alone	26	13.7
Partner	115	60.5
Partner and child(ren)	41	21.6
Child(ren)	5	2.6
Other	3	1.6
Children		
Yes	156	82.1
No	34	17.9
Employed		
Yes	74	38.9
No	116	61.1
Type of cancer		
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
Time since diagnosis (months)		
M (SD)	52.83 (67.54)	
Undergoing treatment		
Yes	102	53.7
No	88	46.3
Treatment intent		
Curative	124	65.3
Palliative	57	30.0
Unknown	9	4.7
Treatment		
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	22	5.5

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

3.6. Main analyses

We found no significant time-related effect (i.e., a change in participants' attitudes at T2 compared to T1) (F (1, 182) = 1.37, p=.244) and no differences in effects between conditions (F (3, 182) = .30, p = .824) for attitudes. For perceived social norms there was also no significant time-related effect (F (1, 182) = 1.41, p = .236) and no differences between conditions (F (3, 182) = 2.26, p = .083). The analyses did show a significant time-related effect (F (1, 182) = 4.49, p = .035) for intention, but there were no significant differences between conditions (F (3, 182) = .78, p = .507).

The analyses only revealed a time-related 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 (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-related effect for attitudes ($F(1, 182) = 29.25$, $p < .001$), perceived social norms ($F(1, 182) = 17.23$, $p < .001$) and intention ($F(1, 182) = 22.82$, $p < .001$) was different for participants who scored either below or 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 norms 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 2–4 show the mean scores of the participants (below and above the median) at T1 and T2 on all the dependent variables.

3.7. Discussion study 1

This study aimed to examine the effects of several messages on cancer patients' attitudes, perceived social norms and intention to express concerns. We had sufficient power to detect meaningful differences. However, we only found positive time-related effects for participants who scored below the median at pre-test on the outcome measures and no differences in effects between the different messages. These results may imply that it does not matter which message patients with the potential for change receive. As with all the dependent variables at the baseline, it could also be possible that we found that it was our pre-test questionnaire to which the effect was attributable, instead of the messages. On the basis of the first data collection, we could not attribute our findings to the messages with any certainty. Therefore, we performed a second study in which we randomized participants to a message or to a no exposure condition. The aim of the second study was to examine whether the time-related 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.

4. Methods study 2

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

4.1. 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. We included a question about whether they participated in a similar study before.

4.2. Study 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.

4.3. 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 was 1 min. This intro was also shown in all the conditions in study 1. It could therefore be that particularly this part of the message explained the effects found in study 1.

4.4. Sample size

The 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.

4.5. Measures

The same measures were used as in Study 1. The reliability and mean scores on the scales are described in Table 5.

5. Results study 2

5.1. 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 ($\chi^2(2) = .04$, $p = .979$).

5.2. 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%). Table 6 shows all the demographic and disease characteristics of the participants.

Table 2
Mean Scores and Standard Deviations of the Participants (N = 190) at T1 and T2 on Attitudes.

	n	Attitudes T1	Attitudes T2
Attitudes message			
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)
Social norms message			
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)
Combined message			
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)
Control message			
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)
Total sample			
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 3
Mean Scores and Standard Deviations of the Participants (N = 190) at T1 and T2 on Perceived Social Norms.

	n	Perceived social norms T1	Perceived social norms T2
Attitudes message			
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)
Social norms message			
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)
Combined message			
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)
Control message			
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)
Total sample			
Below the median at T1	104	4.30 (.93)	4.53 (1.14)
Above the median at T2	86	6.03 (.46)	5.67 (.69)
Total	190	5.09 (1.15)	5.05 (1.12)

Table 4
Mean Scores and Standard Deviations of the Participants (N = 190) at T1 and T2 on Intention.

	n	Intention T1	Intention T2
Attitudes message			
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)
Social norms message			
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)
Combined message			
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)
Control message			
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)
Total sample			
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)

Table 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 norms	.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.

5.3. 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 (χ^2 (1) = 0.07, p = .796), age (F (1, 61) = .08, p = .774) and level of education (χ^2 (2) = .39, p = .823).

5.4. Covariates

Attitude towards the message was only measured in the message group. Gender, level of education, attitudes towards the message and past behavior did not significantly influence the results of the analyses. To retain as much power as possible, we present the findings of the analyses without the covariates.

5.5. Main analyses

There was no significant time-related effects for attitudes (F (1, 59) = .14, p = .712), perceived social norms (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 norms (F (1, 59) = .01, p = .914) and intention (F (1, 59) = 2.05, p = .158).Consistent with study 1, we added a median split to the analyses. For attitudes, a significant time-related 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 ($M_{difference}$ = .402, p = .043) and did not change in the group that scored above the median ($M_{difference}$ = -.303, p = .097). For perceived social norms we also found a significant time-related effect for participants who scored below the median at baseline across conditions (F (1, 59) = 5.97, p = .018). Participants' perceived social norms significantly increased in the group that scored below the median ($M_{difference}$ = .447, p = .022) and did not change in the group that scored above the median ($M_{difference}$ = -.227, p = .261). For intention the time-related 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 norms (F (1, 59) = .03, p = .862) and intention (F (1, 59) = .06, p = .803). Tables 7–9 show the mean scores of the participants (below and above the median) at T1 and T2 on all the dependent variables.

5.6. Discussion study 2

In the second study we aimed to examine whether the time-related effects for participants who had a potential to change found in study 1 were caused by the exposure to a message or to the questionnaire. In the second study we found the same time-related effects in both groups (i.e., the message group and no exposure

Table 6
Demographics and Disease Characteristics of the Second Sample (N = 63).

Characteristic	N	%
Gender		
Male	20	68.3
Female	23	21.7
Age		
M (SD)	56.94 (10.52)	
Range	27-76	
Educational level		
Low	15	23.8
Middle	21	33.3
High	27	42.9
Living arrangements		
Alone	10	15.9
Partner	36	57.1
Partner and child(ren)	15	23.8
Child(ren)	1	1.6
Other	1	1.6
Children		
Yes	49	77.8
No	14	22.2
Employed		
Yes	26	41.3
No	37	58.7
Type of cancer		
Breast	17	24.3
Digestive-gastrointestinal	14	20.0
Haematological	3	4.3
Lung	4	5.7
Gynaecological	9	12.9
Urologic	6	8.6
Head and neck	3	4.3
Skin	2	2.9
Other	12	17.1
Time since diagnosis (months)		
M (SD)	33.03 (34.88)	
Undergoing treatment		
Yes	31	49.2
No	32	50.8
Treatment intent		
Curative	48	76.2
Palliative	11	17.5
Unknown	4	6.3
Treatment		
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.

Table 7
Mean Scores and Standard Deviations of the Second Sample (N = 63) at T1 and T2 on Attitudes.

	n	Attitudes T1	Attitudes T2
Message condition			
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)
Control condition			
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)
Total sample			
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)

group) for attitudes and perceived social norms. However, we did not find any effects on intention. In behavioral models intention is always presented after attitudes and perceived social norms. It is therefore more likely that messages will influence attitudes and perceived social norms before influencing intention [13]. We had less power than we aimed for (i.e., 63 instead of 84 participants), making it possible that we had insufficient power to detect an effect on intention.

6. Discussion and conclusion

6.1. General discussion

To our knowledge, this study was the first to 1) use a behavior change theory to develop intervention materials to stimulate patients' attitudes, perceived social norms and intention to express concerns and 2) use an experimental controlled design to assess its effects on the determinants of concern expression. The results of the first study show that 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 (meaning there was room for improvement in their attitudes, perceived social norms and intention). A possible explanation for the effects of the pre-test questionnaire can be that existing beliefs are activated [11,25]. The questions might have primed participants' attention for their attitudes, norms and intentions. The questions can therefore enhance the accessibility and salience of existing beliefs about concern expression. By increasing this accessibility and salience, individuals' perception of the need to perform the behavior (i.e., expressing concerns) can increase and, consequently, attitudes, norms and intention can improve [25,26].

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 extremely 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 extremely high mean score at baseline, the subsequent score will decrease because it was not possible that the baseline mean score could improve [27,28]. Regression to the mean effects have also been demonstrated in other studies that examined the effects of persuasive messages [28]. A possible explanation for the high scores on T1 could be that patients give socially desirable answers or overestimate their communicative behavior.

Another possible reason for the lack of effects in the present study could be that we only exposed our participants to a relatively short message once. Research has indicated that more intensive use of targeting with multiple exposures can lead to greater effects [15]. This could specifically be the case when attitudes and norms are based on an individuals' own experiences with performing the behavior. Such attitudes and norms are more difficult to change than attitudes and norms that are based on information that is provided by others [13,29]. The patients in our study had on average been diagnosed over three years ago and had relatively high scores on past behavior. It is therefore plausible to assume that their attitudes and perceived social norms are based on their own experiences with consultations. In such a case, multiple exposures could be needed to allow for adaption of attitudes and norms [30]. Future research could examine whether multiple exposures could be more effective in changing attitudes and norms that are based on patients' own experiences.

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 messages. These

Table 8
Mean Scores and Standard Deviations of the Second Sample (N = 63) at T1 and T2 on Perceived Social Norms.

	n	Perceived social norms T1	Perceived social norms T2
Message condition			
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)
Control condition			
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)
Total sample			
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 9
Mean Scores and Standard Deviations of the Second Sample (N = 63) at T1 and T2 on Intention.

	n	Intention T1	Intention T2
Message condition			
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)
Control condition			
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)
Total sample			
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)

techniques are commonly used to change attitudes, norms and intention, are feasible to use in short messages and showed positive effects on communicative behaviors of cancer patients in previous studies [30–32]. 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. Perhaps this would have been a more suitable technique for concern expression [15]. Demonstration of the behavior could, for example, be depicted in a video wherein a consultation is simulated in which a patient expresses concerns. Future research could therefore further examine which (other) techniques can be used to positively change cancer patients' attitudes, perceived social norms and the intention to express concerns.

6.2. Conclusion

Similar effects were found for patients who were exposed to a persuasive message and patients who only received a pre-test questionnaire. The pre-test questionnaire and/or persuasive message possibly activated patients' existing beliefs around the expression of concerns, which then lead to small positive changes in attitudes, perceived social norms 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.

6.3. Practice implications

Simply paying attention to concern expression might already support cancer patients. This could mean that providers can already support patients' expression of concerns by using simple communication strategies such as asking patients whether they want to discuss concerns or by letting patients know that this expression is possible.

Conflict of interest

None declared.

Appendix A

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.

Attitudes 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 norms 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 B

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 min and one with four targeted sentences (two about attitudes and two about norms) resulting in a video of 1:50 min (same length as the other videos). The introduction of the messages lasted 1 min. 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.

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