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**Justifying Age Thresholds for Mammographic Screening: An application of Pragma-
Dialectical Argumentation Theory**

Abstract

Information campaigns on breast cancer screening in the Netherlands need to convince women above 50 to have biannual mammography, and women below 50 that regular mammograms are not recommended for them. This article reports the results of two experiments in which the construction of the persuasive messages was informed by argumentation-theoretical insights. No differences were found between either statistical and anecdotal evidence or gain- and loss-framing in the attempt to convince women under 50 that they normally do not need regular mammography. A striking contrast emerged, however, between the overwhelming acceptance of breast cancer screening for women above 50 and the relative restraint and reluctance to consent that mammography is usually not recommended for women under 50. The reluctance to accept that regular mammography is not recommended for women under 50 is traced back to ego-involvement.

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Justifying Age Thresholds for Mammographic Screening: An application of Pragmatic-Dialectical Argumentation Theory

Breast cancer is the most common type of cancer for women, and the fifth most common cause of cancer death in the world. In the Netherlands, one out of eight women will get breast cancer at some point in her life. Every year, approximately 3500 Dutch women die from breast cancer. To decrease the number of deaths from breast cancer, the Dutch government in 1990 introduced the *National Screening Program for Breast Cancer*, as a part of which all women between 50 and 75 years of age receive an invitation for screening every other year. Participation in the screening program is voluntary and free; every year some 80% of all invited women (which amounts to 800.000 women) accept the offer. One and a half percent of all screened women are redirected to a hospital for further investigation, and about half of them test positively for a form of breast cancer (Oldenburg, Vrancken Peeters, & Bohemen, 2007).

Since the introduction of the population-based mammography screening program in Holland, the mortality rate due to breast cancer has declined by 23.5% (LETB, 2007; Otto et al., 2003). As the probability of getting breast cancer begins to increase substantially at the age of 40, several pressure groups (operating mainly on the internet to get enough support for a formal petition to the Minister of Health Care) have demanded that women between 40 and 50 also be invited to participate in the screening program (<http://petities.nl/petitie/borstkankeronderzoek-vervroegen>). Their principal argument is that 25% of all breast cancer patients are younger than 50. At the same time, three women above 75, attempting to abolish the upper limit of 75 years, went to the courts in October of 2007. Although they did not eventually prevail, they accused the Dutch state of age discrimination:

in roughly 2200 cases per year breast cancer is diagnosed in women above 75. The Dutch government, however, following the advice of the National Health Council, is as yet not willing to lower the threshold age for invitations to screening. Similarly, is it not willing to increase the upper limit above 75 years.

The government's reasons for not lowering the threshold include, among other things, that no significant reduction in breast cancer mortality has been shown in women offered annual screening between the ages of 40 and 48 years (Moss, Cuckle, Evans, Johns, Waller, & Bobrow, 2006; see also Nyström et al., 1993; Nyström, Andersson, Bjurstam, Frisell, Nordenskjöld, & Rutqvist, 2002). This is because most women under 50 have not yet gone through menopause, which means that their breast tissue is much denser than it will be after menopause. The high density of the tissue makes it hard to interpret the radiographs correctly. This results in misleading conclusions: real tumours are missed, and normal tissue is mistaken for a tumour. According to government policies, this causes unnecessary anxiety for healthy women who have to go through painful follow-up research, while women with cancer are erroneously set at ease. Another reason that the government does not want to lower the age limit for screening is that the radiation used to do the mammography is damaging and can itself increase the chance of getting cancer. Furthermore, lowering the eligibility age to 40 years entails a great deal of expense. Experts ask whether the benefits compensate for the costs: because the chances of breast cancer for younger women are smaller, the screening is less effective (Gøtzsche & Nielsen, 2006; Vainio & Bianchini, 2002).

Health campaigns regarding breast cancer screening in the Netherlands therefore need to persuade women above 50 to accept the invitation for screening, and at the same time they need to make clear and to convince women under 50 that, in line with prevailing health policies, breast cancer screening has not been approved for them unless there are special risk factors such as family history or sudden deviations in the breasts.

This article reports two small-scale experiments that tested the effectiveness of various ways of communicating both messages, especially the persuasive message to women below 50. The messages were constructed from an argumentational-theoretical point of view. The factors tested were

- the use of anecdotal vs. statistical evidence
- the use of gain- vs. loss-framing

In Experiment I gain- versus loss-framing is investigated within a framework of an anecdotal mode of argumentation, whereas in Experiment II gain- versus loss-framing is investigated within the framework of a statistical mode of argumentation. Comparison between the two experiments allows us to assess the relative effectiveness of the anecdotal versus the statistical mode. In both experiments a leaflet constructed for the purposes of this study and informing women about breast cancer screening was used as the experimental stimulus.

Theoretical Considerations and Past Research

Anecdotal vs. Statistical Evidence

Many empirical studies have compared the persuasiveness of statistical and anecdotal evidence. Anecdotal evidence is also called narrative evidence, story evidence, story-telling, anecdotes, exemplars or case reports. Following Rieke and Sillars (1984), anecdotal evidence can be seen as a specific case or example that is adduced as an argument in favor of a standpoint (i.e. a claim), whereas statistical evidence consists of a numerical summary of a large number of cases that are put forward to support a standpoint. In a meta-analysis of 19 experiments, Baesler and Burgoon (1994) found that anecdotal evidence was superior in 13 studies; the reverse was shown in two investigations, and no difference in persuasiveness was found in the remaining four experiments. However, on the basis of a newer meta-analysis, Allen and Preiss (1997) concluded that statistical evidence was more persuasive than anecdotal evidence, but just to a small extent. O'Keefe (2002), commenting on these meta-

analyses, noticed that there are enormous differences in effect size between the various studies, and rightly concludes that much is unknown about the conditions and mechanisms that are responsible for all these differences.

One limitation in past research has to do with differences in ecological validity: in the (statistical or anecdotal) messages presented to the subjects, fictitious topics are sometimes addressed that are hardly appealing, having no consequences for the personal life of the subjects. This is different in the experiments to be reported here: in general, the involvement of female subjects in the issue of breast cancer is high (Schulz & Meuffels, 2009). A second limitation is that text presenting anecdotal evidence is often longer than text presenting statistical evidence. Differences in length could account for differences in persuasiveness. The stimulus material in this study avoided this; the texts used were of approximately similar length.

A third limitation is the lack of an explicit, systematic argumentational-theoretical perspective. As a consequence, it is often not clear how the independent variables in these studies are to be interpreted in argumentational terms - after all, what in the literature is called anecdotal and statistical evidence are “modes of argumentation.” In the experiments to be reported here, the design of the messages and the evidence presented to respondents was guided by pragma-dialectical argumentation theory (Van Eemeren & Grootendorst, 1992; Van Eemeren, Grootendorst, Jackson, & Jacobs, 1993; Van Eemeren & Grootendorst, 2004) in order to make the case as strong as possible. Using an argumentational-theoretical approach has, in principle, three major advantages. First, the levels of the independent variable (i.e. the messages) can be unambiguously and explicitly described in argumentational-theoretical terms, making generalisations to other persuasive messages possible. Second, such an approach can elucidate and explain why the experimental messages are designed and built up according to

the specific way in which they are. Thirdly, such an approach can suggest testable hypotheses pertaining to the differential persuasive effects of various argumentative moves.

The pragma-dialectical argumentation theory conceptualizes the persuasive messages that use anecdotal and statistical evidence similarly, regardless of the specific, substantive content of the messages. If the leaflet used in the experiments to present the stimulus is imagined to be one side of a dialogue in which the other side, the reader, cannot rejoin, then (in pragma-dialectical terminology) the type and kind of arguments that are adduced to support the standpoint depend on what objections the campaigner anticipates: doubt or criticism (i.e. an own standpoint). Depending on this anticipated reaction, different types of argument are required. Following pragma-dialectical theory, if the campaigner expects only doubt from the other side regarding the acceptability of the standpoint, it suffices to adduce only pro-arguments as a defense for the standpoint. However, if the campaigner expects objections and criticism from the other side (i.e. the other side accepts a counter-standpoint), the campaigner should – to make a dialectically strong case – first refute the counter-argument that is explicitly or implicitly adduced in favor of the counter-standpoint, and then adduce pro-arguments for the advocated standpoint. This is precisely what happens in the constructed health leaflet: in the case of the first standpoint (have a mammogram when older than 50) only pro-arguments will be adduced (because only doubts are assumed), while in case of the second standpoint (don't have a mammogram under 50) criticism and objections are expected, and consequently various counter-arguments will be refuted.

The two standpoints that are simultaneously defended in the leaflet (“have a mammogram above 50” and “don't have a mammogram when under 50”) are of a special type: they are both inciting standpoints, albeit standpoints that recommend (or advise against) a particular course of action. Both standpoints would be defended by means of multiple and subordinative argumentation (consisting of more than one defense and using arguments

supporting arguments). Standpoints in health issues are usually defended by *pragmatic* argumentation, i.e. the subtype of causal argumentation in which favorable consequences of the propagated behavior are mentioned (or unfavorable consequences of the dissuaded course of action are spelled out; Schellens & De Jong, 2004). Anecdotal and statistical evidence both constitute arguments that involve the same pragma-dialectical *type* of argument scheme (i.e. the specific way the argument and standpoint are linked together): *symptomatic* argumentation. In symptomatic argumentation, a standpoint is defended by citing a sign, symptom, or distinguishing mark of what is claimed in the standpoint, and the critical issue is how compelling the link is (Van Eemeren, Grootendorst, & Snoeck Henkemans, 2002). And, finally, both anecdotal and statistical modes of argumentation fall in the category of *argumentation by example*, in which one (anecdotal evidence) or more (statistical evidence) specific cases are presented as indicative of something more general.

In contrast to social science theories, it is not the task of normative argumentation theories such as pragma-dialectics to yield testable hypotheses, especially for the persuasiveness of messages that are so similar in pragma-dialectical terms. But if a health leaflet is imagined to be one side of a dialogue, then the argumentation to be adduced is selected with critical questions in mind that a reader may ask to challenge the argumentation. And these questions may, in the case of statistical and anecdotal modes of argumentation, be answered quite differently. The question in the case of *argumentation by example* is: How representative is the evidence? A critical reader may conclude that statistical evidence is more likely to be representative than anecdotal. Therefore argumentation theory suggests the hypothesis that the statistical mode of argumentation is more persuasive than the anecdotal.

Gain- vs. Loss-framing

In health communication the inciting standpoints can amount to propagating or advising against a course of action. In both cases, standpoints are characteristically defended

by means of pragmatic argumentation: favorable or unfavorable consequences of the action are spelled out. Whether these consequences are positive or negative, does not matter much from an argumentational point of view: in both cases the same type of pragma-dialectical argumentation scheme is applied, pragmatic argumentation. So argumentation theory suggests that both types of “framing” the consequences, whether positive or negative, are equally persuasive. Psychological theories, however, lead to different predictions about the persuasive effects depending on the specific ways that these consequences are phrased (or framed, worded).

One persuasive message variation that has been of interest to researchers in this domain is the contrast between gain-framed and loss-framed appeals. A gain-framed appeal emphasizes the advantages of compliance with the advocated action or non-action (e.g., “if you don’t have a mammogram below 50, you won’t run the risk of distressing follow-up examinations after a false alarm”); a loss-framed appeal emphasizes the disadvantages of noncompliance (“if you do have a mammogram below 50, you run the risk of distressing follow-up examinations after a false alarm”). Framing impacts people because individuals perceive losses and gains differently: a loss is more devastating than the equivalent gain is gratifying (Tversky & Kahneman, 1981). Thus, people tend to avoid risk when a positive (gain-) frame is presented but seek risks if a negative (loss-) frame is utilized.

Different psychological theories, however, lead to different predictions about the type of framing that is the most effective in case of mammographic screening. One approach (Salovey, Schneider, & Apanovitch, 2002) considers taking part in mammographic screening as a risky behavior: each time a woman has a mammogram, she faces the risk of being confronted with a life-threatening disease. In this case loss-framing would be the most effective way to persuade women to participate in the screening. Another approach (Levin, Schneider, & Gaeth, 1998) considers receiving a mammogram as rational behavior that is

performed in order to reach a certain goal: detection of breast cancer. According to this approach, loss-framed messages in which women are encouraged to have a mammogram will be more persuasive than gain-framed messages (see Banks et al., 1995; Krishnamurthy, Carter, & Blair, 2001).

In the research reported here, however, mammography is not recommended for women below 50; these women discouraged from receiving mammograms. The focus is not on the *detection* of breast cancer, but on behavior to *prevent* or avoid undesirable consequences like false positives or detrimental effects of radiation. In this particular case, gain-framing would be the most persuasive, according to Salovey et al. (2002), while Levin et al. (1998) would claim that loss-framing would be the most effective. On the basis of the meta-analysis of O'Keefe and Jensen (2007) it is even plausible to predict that no differences in persuasive effect will be found between gain- or loss-framed messages, a result which is in accordance with the prediction stemming from argumentation theory. Given this state of conflicting theoretical insights, no clear-cut hypothesis pertaining to the relative persuasiveness of gain- and loss-framed messages can be posed; instead an explorative research question is asked: Is loss-framing or gain-framing more effective in persuading women below 50 not to have regular breast cancer screening?

Experiment I: Gain- and Loss-framing in Anecdotal Mode of Argumentation

Method

The experimental material consisted of eight different versions of the same health communication leaflet; eight different exemplars were presented to the participants, each participant reading just one exemplar. In half of the messages the desirable consequences of not having a mammography before 50 were emphasized (gain-framing), while – conversely – in the other half the negative consequences of having one were stressed (loss-framing). A sample message is presented in Appendix A.

Procedure. The female participants were recruited on a train. Each participant was surveyed individually by female interviewers and assigned randomly to one of the eight versions. Participants were told that the Communication Department of the University of Amsterdam was testing the effectiveness of an informational leaflet on breast cancer screening. After filling in a pre-experimental booklet with questions about background variables (like age, level of education, etc.) they were asked to read the experimental text. Subsequently they had to fill in several questions pertaining to, among others, the quality of the arguments in the text and the acceptance of each of the two standpoints. An experimental session lasted about 15 minutes.

Participants. The age of the participants ranged from 29 to 71, with an average of 49.4 (SD = 10.2): 0.6% was younger than 30, 21.5% had an age between 30-39, 33.7% between 40-49, 24% between 50-59, 19% between 60-69, and 1.2% was above 70 years old. Education ranged from primary education to a masters' degree; the majority (97.5%) had completed at least elementary school (15.6% had completed elementary school or pre-vocational technical school; 32.6% had followed low secondary level or low-level vocational; 10% had completed middle-level vocational technical school or high level secondary; and 41.9% had completed high-level vocational or university). Over 98% of the participants were born in Holland, and spoke Dutch as mother tongue.

Material. In the eight messages only one standpoint (don't go < 50) was explicitly propagated; the other standpoint (go > 50) was only implicitly presented, in light of the results of a pilot study.¹ Several independent arguments were adduced to support this explicit standpoint: (1) in the case of young women, chances of getting breast cancer are lower than for older women, (2) young women have more "condensed" breast tissue (with consequences: X-ray photos are more difficult to assess, so the chances of a false alarm are much higher than for older women), (3) receiving a mammogram hurts (Keemers-Gels, Groenendijk, van den Heuvel, Boetes, Peer, & Wobbes, 2000), and (4) possible detrimental effects of X-rays for younger women (their breast texture has a higher sensitivity for radiation, and: young women have a higher life expectancy, leading to a higher risk of disadvantageous effects).²

All the messages started with the same general introduction, ending with the implicit standpoint (go > 50)³:

Breast cancer is the most frequent type of cancer among women in the Netherlands: 1 out of 9 women will get breast cancer in her life. That is frightening, but luckily the chances of survival for women with breast cancer are pretty high nowadays. This has to do with the effective treatment methods and the early detection. To detect breast cancer in an early stage, women in the age of 50-75 are invited every other year to take a mammography (an X-ray photo of the breasts), for free.

In the second paragraph the messages focused on the question why women below 50 do not receive an invitation for the nation-wide mammographic screening program (thereby addressing and refuting possible counter-arguments), ending with the explicit standpoint:

But why only women above the age of 50? Younger women can get breast cancer too, can't they?

Sure, but in the case of young women chances are not that high. Apart from that, younger women have usually "more condensed" breast tissue compared with

women after the menopause. As a consequence, the photos of the breasts are more difficult to assess whether there are deviations or not. Therefore, women below 50 are strongly advised against taking a mammography if there are no well-founded reasons for it.

Next an exemplar was introduced in the eight messages. In each time another woman (aged below 50) told her own story; each woman had her own reasons for receiving (loss-framing) or not receiving (gain-framing) a mammogram. The argumentational structure and length of these exemplars were controlled; the length varied from 171 to 191 words. Here is an example of gain-framing:

Some time ago Joke Visors (age 46) felt a strange, little nodule in her breast. Of course, she was at once terribly worried, and right the same day she decided to see her family doctor.

“I expected that I had to take a mammography. I was rather reluctant to do that, because a friend of mine told me that it fairly hurts. And apart from that: all that endless waiting for the result, just terrible! But luckily it turned out that I didn’t have to take a mammography. The doctor asked me a few questions, such as whether breast cancer is running in my family. At the end he decided that having a mammogram was not necessary. He reassured me that the little nodule was simply a greasy swelling, and that having a mammogram would only lead to pain and needless uncertainty.

I was so happy that the doctor told me that nothing was really wrong! After all, he is at home in these matters, so I am set at ease. And I am happy that I can wait till I am 50 for taking a mammography.⁴

In the concluding part of the message additional pragmatic arguments for not receiving a mammogram were raised. Like the introduction and the second paragraph, this part was the same in all messages, with the exception of the first and last sentence: in these

sentences reference was made to the positive consequence of not having a mammogram (for example: “Indeed, a very sensible choice of Joke”) or the negative consequences of having one before 50, depending on the manipulation.

Indeed, a very sensible choice of Joke.

When women below 50 take a mammography, the outcome is never absolutely reliable. An added reason is that the chances of a “false alarm” are pretty high: this means that a mammogram at times seems to indicate that something is looking totally wrong, while after subsequent examinations it turns out that everything is fine. As a consequence, many young women are needlessly left in uncertainty for a long period of time. Finally, the potential harmfulness of X-radiation must not be forgotten, especially in the case of younger women whose breast texture is more sensitive for radiation.

So, trust the judgment of your doctor, and act like Joke: don’t have a mammogram if there are no good reasons for that!

The length of the 8 messages varied from 447 to 467 words.

Measures. As standardized measures were lacking, all pre- and post-experimental measures were specifically developed for this study. The pre-experimental questionnaire contained questions about the participants’ knowledge of the age guidelines regarding breast cancer, age, level of education etc., the post-experimental questionnaire contained eleven 7-point Likert scales and semantic differentials for measuring (among other things) the persuasiveness of the arguments and the acceptance of the two standpoints. Appendix B shows the wording of all post-experimental questions and scales, as well as scale averages and standard deviations of the results. In what follows, for reasons of space the focus will be on those post-experimental questions that are crucial for the effectiveness of the health communication leaflet: (1) the (perceived) persuasiveness of the adduced arguments and (2)

the acceptance of the two claims. Based on the results of a factor analysis⁵ we constructed a composite scale pertaining to the persuasiveness of the leaflet, called “Persuasiveness of arguments and acceptance of standpoint don’t go < 50.” This scale is composed of three 7-point (Likert type) scales (1 = totally disagree; 7 = totally agree), one asking about the credibility of the adduced arguments (factor loading: .87), the other about the convincingness of the arguments (factor loading: .87), and the third one about acceptance of the standpoint that women below 50 should follow the advice in the leaflet (factor loading: .64; alpha for this unidimensional scale: .89). The three scales were worded respectively as: (1) I am of the opinion that the arguments that are adduced in the message for not having a mammography if women are younger than 50 are credible, (2) I am of the opinion that the arguments that are adduced in the message for not having a mammography if women are younger than 50 are persuasive, (3) I am of the opinion that women below 50 should follow the advice in the leaflet. All the reported statistical tests pertaining to the persuasiveness are applied to this unidimensional scale.

Results Experiment I

Participants on average were fairly neutral in their judgment of the persuasiveness of the leaflet with regard to not having a mammogram below age 50, as was the case in the pilot study. In fact, the mean of the assessed persuasiveness of the leaflet ($M = 4.14$; $SD = 1.80$) was not significantly different from the neutral mid-point (i.e. 4) of the scale, $t(159) = 1.01$; $p > .31$. No reliable differences in persuasiveness could be found between the two types of frame: gain frame: $M = 3.97$, $SD = 1.95$; loss frame: $M = 4.32$, $SD = 1.63$; $F(1, 158) = 1.48$; $p > .23$. However, in agreement with the outcome of the pilot, participants were quite willing to accept the advice for women above 50 (see Table 1): the average acceptance rating reached almost the absolute maximum of the scale, pointing to a ceiling effect,⁶ but the subjects were not inclined – at least certainly not to that extent – to accept the advice for women below 50:

in this case the average rating was close to the neutral scale midpoint ($M = 3.92$; $SD = 1.94$), i.e. not statistically different from 4: $t(159) = -.53$; $p > .59$.

Insert Table 1 about here

That the message not to have mammography under 50 can be considered as far from being effective may also be inferred (see Table 2) from the subjects' responses on the four scales (with primary factor loadings of respectively .62, .58, .58 and .17⁷) intending to map their generalized behavioral intentions (i.e. acting against the advice of the doctor and receive a mammogram < 50). In this case, too (alpha combined scale: .84), framing appeared to have no effect, $F(1, 157) = 1.46$; $p > .23$.

Insert Table 2 about here

Consistent with these findings are the judgments of the participants about the behavior of women below 50 who would nevertheless elect to receive a scan, even against the advice of the family doctor. Subjects were quite inclined to assess this behavior as rather meaningful ($M = 4.60$; $SD = 1.73$), conceivable, ($M = 5.32$; $SD = 1.58$), wise ($M = 4.71$; $SD = 1.72$) and clever ($M = 4.70$; $SD = 1.65$), totally against the intent of the persuasive messages (M of the combined scale = 4.84, $SD = 1.53$, with factor loadings of the four individual scales of .85, .81, .94 and .90 respectively). For the combined scale (alpha: .95) as well, no differences could be found between the gain- and loss-framed messages ($F < 1$; n.s.).

Experiment II: Gain- and Loss-framing in Statistical Mode of Argumentation

Method

To be able to compare the anecdotal mode with the statistical one, Experiment I was replicated in an altered form; the eight exemplars, either gain-framed (four messages) or loss-framed (four messages), were each replaced by a “pale” description (only slight differences in wordings between them) such as this one:

At times women below 50 nevertheless suspect that they have breast cancer, for example because they have detected a little nodule in their breasts. In this case it is wise to see the doctor. He shall ask then if heredity factors are playing a part. If not, then he will presumably discourage taking a mammography. Besides that, he will of course examine the breasts; most of the time it simply appears to be a greasy swelling. Moreover, the majority of the women who ever took a mammography don't like this examination at all because it is rather painful and irritating. That is because the breasts are flattened out between two plates of glass. So it is good not to suffer any superfluous pain if the doctor thinks it is not necessary to take a mammography.

Other than these differences in material, Experiment II used the same design, the same procedure, the same number of subjects and the same pre- and post-experimental questions as Experiment I.

Participants. The age of the 160 participants ranged from 20 to 78 ($M = 43.93$, $SD = 13.2$): 13.1% was younger than 30, 29.4% had an age between 30-39, 24.4% between 40-49, 21.3% between 50-59, 9.4% between 60-69, and 2.4% was above 70 years old. Education ranged from primary education to a masters' degree; 6.9% had completed elementary school or pre-vocational technical school; 15% had followed low secondary level or low-level vocational; 13.8% had completed middle-level vocational technical school or high level secondary; and 63.8% had completed high-level vocational or university. Over 96% of the participants were born in Holland, and spoke Dutch as their mother tongue.

Results Experiment II

The results are consistent with those of Experiment I: once again the assessed persuasiveness ratings "Persuasiveness of arguments and acceptance of standpoint don't go < 50" ($\alpha = .85$) did not differ in a statistically significant sense between gain-framed messages, $M = 3.77$; $SD = 1.50$, and loss-framed messages, $M = 4.23$; $SD = 1.72$; $F(1, 158) =$

3.35; $p > .07$. Moreover, participants again judged the persuasiveness as rather neutral ($M = 4.00$; $SD = 1.62$), on average not significantly different from the neutral mid-point of the scale, $t(159) = 0.0$; $p > .99$. And, once again, they overwhelmingly accepted the advice for women above 50, but not – at least not to that extent – for women below 50 (see Table 3), even if there were by far more arguments raised in favor of the second explicit standpoint (i.e. don't go when < 50) than in favor of the first (implicit) standpoint (go when > 50). And again, no reliable differences could be shown between gain-framed or loss-framed messages, neither in the case of acceptance of the standpoint go > 50 ($F < 1$; n.s.) nor in the case of acceptance of the standpoint don't go < 50 , $F(1, 158) = 1.31$; $p > .25$.

Insert Table 3 about here

The respondent's ratings of the intention to have a mammogram under 50, even against the advice of the doctor, were in accordance with the results of Experiment I as well. According to our respondents, women below 50 would yet receive a mammogram even if the doctor advised against it ($M = 5.46$; $SD = 1.72$). In line with this, our respondents were of the opinion that a 46 year old woman in their neighbourhood, worried about having breast cancer, would still elect to receive a mammogram, even if this runs counter to the advice of the doctor ($M = 5.82$; $SD = 1.41$). Just as in Experiment I, our subjects have the strong feeling that they themselves must be given the opportunity to decide about having a mammogram ($M = 6.12$; $SD = 1.36$) and, on top of that, they also would advise a friend below the age of 50 to have a mammogram, against the advice of the doctor ($M = 5.15$; $SD = 1.83$).

Consistent with the previous findings is the appraisal of the behavior of women below 50 who are planning to have a mammogram against the advice of the family doctor. As before, subjects judged this behavior as meaningful ($M = 5.17$; $SD = 1.65$), conceivable ($M = 5.80$; $SD = 1.34$), wise ($M = 5.16$; $SD = 1.51$) and clever ($M = 5.09$; $SD = 1.55$), in contradiction with the explicit aim of the persuasive messages (M of the combined scale =

5.31, $SD = 1.36$, with an alpha of .92, with factor loadings of the four individual scales of .83, .66, .91 and .87 respectively). For the combined scale as well, no differences could be found between the gain- and loss-framed messages ($F < 1$; n.s.).

Comparison Between the Two Modes of Argumentation

Apart from the specific way of supporting the main pragmatic argument (either by statistical or by anecdotal evidence), the setup and implementation of Experiment I is the same as that of Experiment II. As a consequence, the results of Experiment I can be compared directly with those of Experiment II in a statistical manner: which of the two modes of argumentation leads to a greater acceptance of the claims, an anecdotal or a statistical mode? The statistical analysis⁸ showed a highly significant difference in acceptance between the two standpoints, $M = 6.33$ vs. $M = 3.84$; $F(1, 316) = 350.78$; $p < .000$, $\eta^2 = .53$, but – although there was a tendency for the anecdotal mode to be more effective ($M = 5.22$ vs. $M = 4.95$) – no statistically significant differences could be found between anecdotal and statistical mode of argumentation, $F(1, 316) = 3.38$; $p > .07$.⁹ Neither the factor framing, $F(1, 316) < 1$, nor the interaction between mode of argumentation and framing appeared to be significant, $F(1, 316) < 1$.

Post-experimental Responses

Our experimental variations did not produce any effects. Mode of argumentation (anecdotal vs. statistical) and type of framing (gain vs. loss) just did not matter in conveying the message that, according to the Dutch government regulations, women under 50 do not need mammograms unless there are special risk factors such as family history or sudden deviations in the breasts.

But a striking difference emerged between the two kinds of standpoints considered in this study. The attempts to persuade women to take part in the *National Screening Program for Breast Cancer* when they are 50 years or older turned out to be superfluous – from the

observed ceiling effect one may infer that participants were already convinced of that anyway.

The attempts to discourage women to receive a mammogram below the age of 50, however, simply appeared to be futile and were quite unsuccessful in the experiments reported here.

How could this be explained?

Sometimes people resist all attempts to persuade them, a fact that has been known for a long time. The key variable here is (ego-) “involvement” (Sherif & Cantril, 1947; Sherif & Hovland, 1961; Sherif & Sherif, 1967). In a meta-analysis of 15 empirical persuasion studies Johnson and Eagly (1989) conclude that involvement “of this type typically inhibits (...) persuasion” (p. 305). Studies in mass communication have shown that involvement can cause recipients to perceive a medium as biased against their own view, and thus make them reject messages (Choi, Yang, & Chang, 2009). In the case of breast cancer, the issues raised in the persuasive messages undoubtedly aroused a high level of involvement among study participants, evoking not only those values that are presumed to be aspects of the self-concept (the ego, the “self-picture intimately felt and cherished,” Sherif, Sherif, & Nebergall, 1965, p.vi), that is to say: values that are especially important and enduring, but also putting life itself at stake. Survival (or avoiding premature death or long agony) is the most basic interest a human being has. Even if the threat of death by cancer is not spelled out in the arguments for or against mammography, it is present whenever cancer is discussed. What the arguments against having regular mammograms under 50 are saying is basically: we could save your life, but it is just too expensive (not used in this study), too painful, the likelihood of success is too small (small risk of developing cancer, dense breast tissue), and the risk of side effects (physical/radiation and psychological/dealing with false positives and false negatives) is too high. All the arguments thus implicitly adduce money, pain, likelihood of success and risk considerations against the (however unlikely) possibility of saving a person’s life. This unspoken promise of cancer screening makes it an issue for which ego-involvement will

invariably be high, but the participants' basic values central to their ego and fundamental to their feminine (sexual) identity may also have contributed to the reaction. Given the importance of ego-involvement, it is likewise conceivable that subjects rated the arguments in the messages advocating a position that pays tribute to their basic interest to survive (falling in what in Social Judgment Theory is called the "latitude of acceptance," (Sherif & Hovland, 1961) as credible and convincing, while the arguments that appear to pass over this interest (falling in the "latitude of rejection") are judged as rather weak, no matter how cogent (from an argumentational-theoretical perspective) they are. So, for the participants a kind of restructuring and re-interpretation of the messages, or so it was assumed, was needed to cope with the discrepant information in order to maintain their original position. A semi-structured interview with 30 women after the implementation of Experiment II attempted to shed light on the reasons why the persuasive attempts to convince women not to have a mammogram when under 50 consistently failed and how participants tackled the problem of discrepant information, seen from an argumentation theoretical point of view: How did they react to the adduced arguments? To prevent *ad hoc* coding, pragma-dialectics again was used as a tool for interpreting the responses.

Some interviewees did not so much reject one or more of the adduced arguments in particular because these would be invalid or fallacious according to their opinion, but they turned down the whole message completely ("it's unreasonable"), because "the source is highly biased and the message is extremely one-sided: only the disadvantages for younger women taking a mammography are spelled out, while the advantages are kept secret." In pragma-dialectical terms: according to these women the (pre-)conditions for a critical discussion are violated, and the message is accordingly judged as absolutely non-persuasive.

The other responses of the interviewees could be fit into the pragma-dialectical taxonomy of critical reactions belonging to the pragmatic argument scheme. In the messages

the position that women under 50 should not receive a mammogram is defended by pragmatic argumentation: (1) Y is true of X, *because* (2) Z is true of X, *and* Z leads to Y). To assess whether this argumentation is conclusive, the relevant critical questions have to be answered satisfactorily: (1) Does Z always lead to Y? (2) Is Y really (un)favourable? Some interviewees answer the first critical question about the causal relationship between, for example, radiation and a higher likelihood of getting cancer in the negative: “That argument about radiation ...well, I don’t think it is valid. If the starting age was lowered to 40, those women would get 5 doses of radiation more than what they would get if they started at 50. And nowadays the doses are small, erm, very small; so I really don’t think the risk increases substantially.” Another woman, attacking the same causal relation, noted: “Yeah, radiation is harmful, erm, if you would start earlier you have a higher risk to get cancer. Okay, okay, fine, but in my opinion there is no scientific proof for that, so...” Other interviewees do not question the causal chain between Z (radiation) and Y (cancer), but answer the second critical question (whether the consequences of, for example, false positives are really unfavorable) negatively: “And those false positive outcomes, well, I really think that people will put up with all these follow-up examinations if they can get certainty” or “The doctor can err herself; I want to have absolute certainty in a stage as early as possible, even if all the follow-up examinations are a nuisance.”

In sum: to cope with the discrepant information in the leaflet, the interviewees (apart from those who dismissed the whole message as unreasonable) either attacked the causal chain in the pragmatic argumentation scheme, or denied that consequences were really unfavorable. By evaluating and responding to the arguments in this specific way the women were able to nullify the adduced arguments that were not in accordance with their ego and to maintain their original position.

General discussion

In the Netherlands, breast cancer screening has long been publicly advocated, and the results of the studies reported here consistently show that the message for women above the age of 50 to receive a mammogram regularly came across and was totally accepted. But attempts to persuade women under 50 that they do not need breast screening unless there are special risk factors consistently failed whatever the nature of the adduced arguments.

The health communication leaflets about breast cancer apparently touched the participants' basic values central to their ego, and were fundamental to their feminine (sexual) identity. Ego-involvement challenges the persuasiveness of the adduced arguments, leading to poor acceptance of the message that younger woman should not to receive a mammogram. Women who have had mammography performed will know that it hurts, and their daughters, younger relatives and friends will also know; moreover, the fact that X-rays are associated with a cancer risk is a medical fact well-known among laity. So the message, even if not explicitly stated, seems to be (as addressed to women above 50): The pain and the risk associated with mammography is something you just have to subject yourself to, for the sake of the more valuable good of early detection of breast cancer. But telling a woman of 48 that neither suffering the pain nor subjecting oneself to the risk is necessary has a paradoxical element to it, when the same pain and the same risk are considered necessary two years later. In other words, given the argumentative context of past mammography advocacy and current medical knowledge, the argument that pain and risk can be avoided if women under 50 do not seek breast screening is not – or may just not be perceived as – a very strong one.

People want to have certainty: How do the trouble and temporary fear after a false positive test and the dangers of a false negative test compare against living one's life with an undetected and possibly life-threatening tumor in one's breast? They are likewise quite willing to put up with all the negative consequences of false alarms, but at the same time are quite insensitive to arguments in terms of extra costs, possible harmful long-term effects of

radiation or to the fact that no method to detect breast cancer produces absolutely certain results. In line with these beliefs and convictions are the subjects' responses to the (Likert type) statement posed in both Experiments I and II: "I am of the opinion that I myself must be given the opportunity to decide if I have a mammogram, regardless of the negative advice of the doctor in the information leaflet" ($M = 5.71$; $SD = 1.73$ in Experiment I; $M = 6.12$; $SD = 1.36$ in Experiment II). As one of the interviewed women typically declared: "I want to be 'boss in my own breasts'."

Beyond the subject of mammography and early breast cancer detection, our results are evidence that the criteria applied in public health decisions (in this case not to finance routine mammograms for women under 50) do not necessarily provide arguments that persuade concerned individuals of the suitability of this decision for themselves. This has at least three implications. It first points to the necessity of testing health information material before distributing it. Even if officially endorsed and—in terms of argumentation theory—sound arguments are used, this does not guarantee that the materials will achieve their ends. No matter what arguments are adduced in information material, which stylistic and formal devices are used, and whatever the purposes of such material, testing it before dissemination with representatives of the target group is advisable. Second it suggests that government, in order to avoid irritation or outrage, is well advised to assess anticipated public reactions before they develop and implement policies for areas that will be of vital concern to many individuals. This also points to a field of activities for research: Without interfering with evidence-based criteria for policy decisions, research could alert government and administration to potential upcoming communication problems. And third, this study suggests the need for more research into the effectiveness of health information material and its dependence on content, design, situational and recipient variables. This includes, but is not restricted to, the variables addressed in this study: type of argument, argument framing, and

ego-involvement. It is apparent that the policy developed by the government of the Netherlands did not take into consideration the high level of ego-involvement associated with this issue.

Finally the results reported here suggest that communication theory and research address the difficulties involved in a particular type of health messages. Usually messages in public health campaigns relate (1) that a person might be at risk (due to his or her life style, genes, age) and suggest (2) that the person should do something about it (change his or her life, have the recommended screening examinations). The health message that was so difficult to get across to women in this study is of a different type: under certain conditions (young age in this case) behavior that otherwise appears to be good health care may not be advisable because of the risk involved, because the cost and the side effects are too high and because the potential benefits are too low. The difficulty is to convince concerned persons that such a decision may not amount to bad health care, but may be based on good reasons. Methods to relate such messages effectively have not yet received much attention in health communication research. Our results suggest this is a subject to be addressed more intensively in the future.

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Appendix A

Example of Loss-Framing in Experiment I

The differences between gain-framed and loss-framed examples have to be sought not so much on a sentence level as on the level of the text. The same topics are addressed. In the gain-framed example the woman is glad not to have to experience pain, lengthy follow-ups and uncertainty, while in the loss-frame exactly these three kinds of experiences are spelled out (as a consequence of her own decision to have a mammogram before 50).

An example of loss-framing runs like this:

Paulien Willems (46) takes it easy most of the time, but when she recently detected a sort of swollen spot in her breasts, she got fairly panic-stricken. Next day she immediately visited her family doctor. Strangely enough he told her that this type of swollen spots occurs rather frequently, and that there was no reason at all to take a mammography. ‘Jesus Christ, I probably have cancer,’ I thought; ‘in a little while I will be dead, while you are just telling me not to take a mammography! So I told the good guy that I absolutely wanted to have a mammogram. The next week I got my mammography. What a hell of a pain! My breasts were really totally crushed. After a few weeks they told me that follow-up examinations were necessary – obviously I had breast cancer: I knew it! After weeks of follow-up examinations nothing turned out to be wrong. Of course, an enormous relief, but I was pretty fed up by having had that stress all the time – for nothing. You are constantly thinking of it anyhow. Maybe I shouldn’t have been so stubborn...’ [Indeed, Paulien had better be not so stubborn].

Appendix B

Post-experimental Questions in Experiment I and II

Values shown are scale means with SD; first two values pertain to Experiment I, last two values to Experiment II:

1. I am of the opinion that the text I have read, is:

Difficult 1 2 3 4 5 6 7 easy (6.33; .97) (6.15; 1.19)

Not interesting 1 2 3 4 5 6 7 interesting (5.52; 1.39) (5.76; 1.38)

Detached 1 2 3 4 5 6 7 appealing (5.32; 1.36) (5.06; 1.64)

Tedious 1 2 3 4 5 6 7 captivating (5.08; 1.27) (4.99; 1.59)

Dull 1 2 3 4 5 6 7 lively (5.20; 1.24) (4.74; 1.56)

2. The message in the leaflet made me:

afraid (not at all 1 2 3 4 5 6 7 very much) (2.08; 1.53) (2.13; 1.72)

nervous (not at all 1 2 3 4 5 6 7 very much) (2.07; 1.62) (2.07; 1.78)

anxious (not at all 1 2 3 4 5 6 7 very much) (2.14; 1.64) (2.14; 1.74)

3. I am of the opinion that women **above** 50 should participate in the National Breast Cancer Screening Program (totally disagree 1 2 3 4 5 6 7 totally agree) (6.51; 1.26) (6.14; 1.55)

4. I am of the opinion that the arguments adduced in the message for not taking a scan if women are **younger than 50** are credible (totally disagree 1 2 3 4 5 6 7 totally agree) (4.32; 2.05) (4.32; 1.83)

5. I am of the opinion that the arguments adduced in the message for not taking a scan if women are **younger than 50** are persuasive (totally disagree 1 2 3 4 5 6 7 totally agree) (4.19; 1.99) (3.92; 1.85)

6. I am of the opinion that women **below 50** should follow the advice in the leaflet (3.92; 1.94) (3.76; 2.14)

7. If a women **below 50** took a scan against the advice of her practitioner, I would consider that:

Meaningless 1 2 3 4 5 6 7 meaningful (4.60; 1.73) (5.17; 1.65)

Inconceivable 1 2 3 4 5 6 7 conceivable (5.32; 1.58) (5.80; 1.34)

Unwise 1 2 3 4 5 6 7 wise (4.71; 1.72) (5.16; 1.51)

Stupid 1 2 3 4 5 6 7 clever (4.70; 1.66) (5.09; 1.55)

8. I am of the opinion that if a women of 46 in my neighbourhood is worried of having breast cancer, she will take a scan – even if her doctor assures her that there are no reasons to have worries (5.52; 1.75) (5.82; 1.41)

9. If Joke [or Astrit, or another name **...] were a friend of mine and would ask my advice, I would dissuade/advise her to go for a scan, even against the advice of her doctor.

(completely dissuade 1 2 3 4 5 6 7 completely advise (4.53; 2.08) (5.15; 1.83)

Women **older than 50**: In answering the last two questions, please put yourself in the position of a women who is younger than 50.

Women **younger than 50**: please, answer the last two questions from your own position.

In Experiment II this question was framed as: If a friend of mine, 46 years old, asked etc.

10.I If I were worried of having breast cancer, I would take a scan - even if my doctor assures me that there are no reasons to have worries (5.42; 1.84) (5.46; 1.72)

11. I am of the opinion that I myself must be given the opportunity to decide if I go for a scan, regardless of the negative advice of the doctor in the information leaflet (5.71;1.73) (6.12; 1.36)

Table 1

Ratings of the Acceptance of the two Standpoints by Frame; Anecdotal Mode of Argumentation

Standpoint	Gain frame	Loss frame
Go when > 50	6.63 (.99)	6.40 (1.47)
Do not go when < 50	3.84 (2.05)	4.00 (1.82)

Values shown are scale means (1 = absolutely not accept; 7 = absolutely accept) with SD in brackets.

Table 2

Ratings of the Intention to Go for a Scan for Women Younger than 50, Against the Advice of the Doctor, by Frame; Anecdotal Mode of Argumentation

	Gain frame	Loss frame
(1) If I were worried of having breast cancer, I would take a mammography - even if my doctor assures me that there are no reasons to have worries	5.36 (1.96)	5.47 (1.72)
(2) I am of the opinion that if a women of 46 in my neighborhood is worried of having breast cancer, she will have a mammogram – even if her doctor assures her that there are no reasons to have worries	5.40 (1.94)	5.65 (1.51)
(3) I am of the opinion that I myself must be given the opportunity to decide if I have a mammogram, regardless of the negative advice of the doctor in the information leaflet	5.53 (1.93)	5.89 (1.51)
(4). If Joke were a friend of mine and would ask my advice, I would dissuade/advice her to have a mammogram even against the advice of her doctor (1 = dissuade; 7 = advise)	4.31 (2.18)	4.74 ((1.96)
Scale “Intention to go < 50 against advice doctor”	5.15 (1.67)	5.43 (1.33)

Values shown are scale means (1 = absolutely disagree; 7 = absolutely agree for items 1, 2 and 3) with SD in brackets.

Table 3

Ratings of the Acceptance of the two Standpoints by Frame; Statistical Mode of Argumentation

Standpoint	Gain frame	Loss frame
Go when > 50	6.16 (1.57)	6.13 (1.52)
Do not go when < 50	3.56 (2.18)	3.95 (2.09)

Values shown are scale means (1 = absolutely not accept; 7 = absolutely accept)

with SD in brackets.

Footnotes

¹ The pilot was run among 200 women, who overwhelmingly accepted the standpoint to have a scan above 50 ($M = 6.43$, $SD = .73$) but were relatively reluctant to follow the advice not to have a scan below 50 ($M = 4.61$, $SD = 1.67$; measured on a scale ranging from 1 = totally reject and 7 = totally accept). See for more methodological details and specific results the website www.ich.com.usi.ch

² The perceived weight or strength of the various arguments in the constructed messages were not pre-tested, as is often done in persuasion research (see for example Johnson & Eagly, 1989). A pre-test was deemed unnecessary because the arguments adduced are precisely those that were used (among others) by the National Health Council in the eighties when it advised the Dutch government to introduce and finance the *National Screening Program for Breast Cancer* among women between 50 and 75. The same arguments can also be found in numerous health care leaflets and brochures of the *Koninklijk Wilhelmina Fonds*, the national fund-raising organization in Holland responsible for the fight against cancer.

³ More details about how exactly the messages were constructed from an argumentational-theoretical point of view can be found on the website www.ich.com.usi.ch

⁴ An example of loss-framing and some explanation of the differences between the two is given in the Appendix.

⁵ All the post-experimental questions were factor-analyzed, making use of the maximum likelihood method. Factors were extracted if eigenvalues were larger than 1, and subsequently rotated to a Varimax-solution. In both Experiment I and II five factors were extracted, resulting in an adequate goodness of fit, in Experiment I: $\chi^2(100) = 104.83$; $p = .35$, and in Experiment II $\chi^2(100) = 131.25$; $p = .02$. The five factors in Experiment I together explained 67% of the total variance; in Experiment II 64% of the variance was explained. Most

important, after orthogonal (Varimax) rotation the 5 factors were relatively easy to interpret.

More details are reported on the website www.ich.com.usi.ch

⁶ In line with the interpretation of the high acceptance of the advice go > 50 in terms of a ceiling effect is the fact that this variable is the only one that has no significant loadings (i.e. > .30) on the five extracted factors – such “zero correlations” are precisely what one should expect in case of a ceiling effect.

⁷ The “non-significant” loading of the last scale (.174), which in a conceptual sense is clearly linked to the other three scales, is probably due to sampling error: in Experiment II the loadings are .68, .75, .62 and .46.

⁸ A repeated measurement analysis with mode of argumentation and framing as between-subject factors, and a within-subject factor with two levels: (1) Acceptance of the standpoint to go > 50, (2) Acceptance of the standpoint not to go < 50.

⁹ In a third experiment a new argument pertaining to the costs of additional screening was introduced. It neither appeared to be persuasive.