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**Risk perception of UMTS and particulate matter
in two comparable Dutch municipalities**

Bachelor's thesis
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Abstract

The primary goal of this study was to investigate how risk perception for UMTS and particulate matter (PM) differs for two comparable municipalities, one of which has had serious issues with the placement of UMTS base stations. The municipalities that were selected were Haaksbergen (Ov.) and Voorst (Gld.). The secondary goal was to investigate whether message framing had any significant influence on risk perception or question response.

Method

To increase the range of information, this study not only focused on UMTS and PM, but also radon and genetically modified food ('gentech') were added. There were two versions of the questionnaire; one in a neutral framing, and one in a more explicit framing. These were designed to trigger different responses by wording certain concepts more explicitly to frame the concepts in a way that we believed would cause a higher perception of risk. Questionnaire items included, but were not limited to, items such as governmental supply of information, self-reported level of information. Next, items on openness, trustworthiness and whether different stakeholders acted in their own interest or in the public interest. Items on risk perception for the aforementioned technologies were added as well. We hypothesized that overall risk perception would be higher for UMTS than for particulate matter, risk perception for UMTS would be higher in Haaksbergen than in Voorst, that participants who responded to the explicitly worded questionnaire would have a higher risk perception towards these technologies and that overall risk perception would be higher for gentech than for radon gas.

Results

The questionnaire was spread using the internet. News items were also published in local newspapers, and a local radio station broadcast messages asking people to participate. In total, 100 participants started the study, of whom 73 completed the questionnaire. A website link randomly assigned participants to either the neutral or more explicitly worded questionnaire. No proof was found for any of the main hypotheses. Further analysis showed that proof was found for the exact opposite result for two of the four hypotheses. Specifically, overall risk perception for PM was significantly higher than for UMTS and overall risk perception for radon was significantly higher than for gentech.

In this study, framing was not found to have any effect on the response. This might be due to the small sample size, or perhaps the framing effects were formulated too subtly. Risk perception for gentech was significantly higher for Haaksbergen than for Voorst. Also, residents of Haaksbergen were significantly more in favour of a ban on genetically modified food. There also seemed to be a positive link between age and self-reported information on risk factors. In Haaksbergen participants with a higher level of trust in the government reported a lower risk perception of both UMTS and gentech. Also, we found a positive correlation between overall risk perception and the opinion that the government supplies enough information about technological health risks. These findings are an interesting pointer to further research, which might focus on government information, trust and perception of technological risks.

Introduction

Health risks have been playing increasing roles in our lives. As man has had to deal with all sorts of natural risks and disasters such as flooding, extreme weather conditions and earthquakes, the advancement of technology has introduced new, man-made and increasingly complex risk factors. Centuries ago, relatively low-tech man-made risks were easy to assess and clearly visible to anyone. The advent of newer, more sophisticated and technologically advanced risks have traditionally been eyed with suspicion and fear, and low levels of public knowledge about these new technologies often sparked waves of speculation about possible health risks attributed to these technologies. As today's world is becoming increasingly surrounded by – and dependent on – modern technologies such as mobile telephony, it is almost impossible not to be exposed to these new technologies. Concerns about these risks have resulted in a public demand to be protected from and informed about these risks by the government. Some of the modern technological risks that are currently hotly debated are UMTS, and genetically modified food. Other phenomena, like particulate matter and radon, have been around for a longer time, relatively unnoticed by the lay public despite their unquestionable health implications.

The Dutch government finds itself in an awkward position on the subject of UMTS. In 2000, the auctioning of UMTS-licences to Telecom providers earned the government 2.7 billion Euros, which was deemed rather disappointingly low in comparison with other western European countries (van Damme, 2002). The providers earned the right to erect base stations and the obligation to reach a designated percentage of coverage within a certain time span. However, under pressure from inhabitants who feared health risks, several local governments started refusing to grant building permits for base stations. Law firms began complex and lengthy – thus, expensive - law suits for both the providers and the inhabitants. The financial stakes are enormous and several parties have different, conflicting interests. This complex situation has led to regular media coverage. The sensational 'human-interest' type stories as printed by tabloid newspapers and the mainstream media convey a wide range of ominous messages pertaining to vague health problems as experienced by people living near UMTS-base stations, even though research on the actual hazards posed by UMTS is still ongoing.

Introduction to the health hazards

This study revolves around four specific, modern health risks, which are briefly introduced in this section.

UMTS

As the successor to the second generation (or 2G) GSM digital mobile telephony, the third '3G' generation UMTS allows much more data to be communicated over a wireless network. This enables high-speed internet, video telephony and many more broadband applications. Because of technical differences with the GSM network, UMTS needs different and more base stations than the GSM network as the range of the base stations is shorter. Practically, this means more antennae on masts or high buildings in urban areas to achieve sufficient coverage. Public concerns about the health risks of these base stations have been widespread, resulting in many protests and lawsuits. 3G is the precursor to the fourth generation mobile telephony, or 4G, which at present is in its infancy but is expected to be implemented within five years.

Particulate matter

Particulate matter is an umbrella term for very small particles which are suspended in the air. The size of these particles ranges from extremely fine to coarse (<0.1 μm to 10 μm in diameter, respectively). The biggest source of these particles is natural, but especially in urban areas, man-made particles coming from e.g. combustion engines, industries or power plants are common and may include a wide range of hazardous chemicals. Although the sight of a cloud of soot behind a truck or bus is familiar to everyone, the health hazards posed by these fine particles or particulate matter are a relatively new issue. The smaller particles, i.e. those smaller than 5 μm , are considered especially hazardous as these are not filtered out by the human upper respiratory tract. The particle size and chemical composition of diesel smoke is especially hazardous, and emission reduction of particulate matter has been an increasing field of interest in recent years.

Gentech

The third risk is new, unknown, and as yet not very widespread in the Netherlands, namely 'gentech' or genetically modified food. In contrast to cross-breeding different subtypes of crops, the DNA of crops is modified directly to favourably manipulate certain properties of a

crop, such as a higher yield or resistance to certain diseases. In the Netherlands, the application of gentech has been limited to small test patches of crops, and real-life exposure to gentech is arguably almost non-existent for most people. According to Preston (2005), an 'overwhelming majority' of peer reviewed publications on genetically modified food reports no (health) effects on animals.

Radon

Contrary to UMTS, gentech or particulate matter, the fourth risk is in essence not man-made. It is a genuine health risk however. Radon, a radioactive element that gives off radon gas, occurs naturally and is one of the major factors in the earth's background radiation and indoor pollutants to which we all are exposed. It may be released from the soil or building materials made from natural materials such as clay and stone. It accumulates in the air and, according to the Environmental Protection Agency (EPA; 2003) in the United States alone it is reported cause 21,000 annual deaths, mainly by causing or aggravating lung cancer. Research for the World Health Organization (WHO) suggests a linear relationship between the concentration of radon and the occurrence of lung cancer. For smokers, this risk is 25 times greater, and most of the radon-induced lung cancer deaths are observed in smokers (WHO, 2005). Despite this, public awareness about radon gas appears to be quite low.

Goals

The primary goal of this study was to investigate how risk perceptions, mainly for UMTS, differ for two comparable municipalities. The selected municipalities were Haaksbergen and Voorst. In the recent past, Haaksbergen has had serious issues with the placement of UMTS base stations.

The secondary goal was to investigate whether message framing had any significant influence on risk perception or question response, both between and within municipalities. This principle of message framing will be discussed further on in the study.

Key concepts

Risk perception

Risk - or rather; perceived, subjective risk - is a complex amalgam of factors, which are interactive and different for everyone. In order to find a way to understand and predict the

responses to different technological risks, Fischhoff et. al. (1978) have proposed a framework to assess the qualitative characteristics of perceived risk, consisting of nine opposing pairs of characteristics, called the psychometric model. The risk of a certain hazard is perceived as a combination of certain characteristics. These include basic questions such as; 'Is this a new risk?', 'Is it know to science?', 'Is it a common risk?'. According to the psychometric model, the risk someone perceives of a certain hazard is a 'profile' made up of these nine characteristics. In this study, we chose not to explicitly measure these risk characteristics in the study, but to employ this framework as a base for predicting differing risk perceptions for the different risks we presented to the participants. Notwithstanding the doubts about the validity and methodological soundness of this framework as posed by Sjöberg (2000), we found Fischhoff's framework to be a useful departing point for this study.

In the light of Fischhoff's framework, the hazards as used in this study are both similar and dissimilar. For example, when breaking down the characteristics of UMTS and particulate matter, we see that exposure to both is involuntary, and that both may have delayed health effects. On the level of public awareness of these risks, both risks are relatively new. Apart from the base stations, UMTS is invisible, and as it is relatively new, it is also uncommon (or: it is a 'dread' risk), as is gentech. Particulate matter is arguably invisible, as the finer and more dangerous particles cannot be seen with the naked eye. But as clouds of soot coming from chimneys, cars and trucks are a familiar sight all over the world, this could be seen as a both a 'visible' and 'common' risk, although the visible manifestation of this risk (the largest particles) is not the actual risk (the smaller particles). Radon and gentech are both invisible, involuntary, and both 'not known to exposed'. Objectively, the risks of both are arguably known to science, although public opinion often has strong doubts about this issue.

Communicating risks

The media play an important role in the quantity and quality of information lay people receive about risks. Unfortunately, the media tend to 'simplify and sensationalize [news], and set up debates concerning responsibility and blame, in the hope of attracting the attention of mass audiences' (Joffe, 2003). On the other side of the fence, scientists and governmental agencies have been trying to assure the public that no harm is to be expected. There is a wide discrepancy in how experts and the lay public process information about risks. As Gutteling and Kuttschreuter note, it is a fault to 'assume that the public uses the same style of analytic

thought as expert risk communication sources'. Joffe concurs, pointing out that 'anxiety and trust (...) may well play pivotal roles in the apprehension of risk'.

Trust

Trust, according to Slovic (1993), is an important aspect of the risk-perception problem. More specifically in connection with modern technologies, Slovic states that 'numerous recent studies clearly point to a lack of trust as a critical factor underlying the divisive controversies that surround the management of technological hazards'. In other words, people need to trust those who manage, regulate and give them information about technological hazards.

Unfortunately for those seeking to gain trust, trust is easier to destroy than it is to create. Slovic calls this the 'asymmetry principle'. Additionally, there are three psychological factors that hamper the creation of trust according to Slovic. First, negative news is more visible and 'news-worthy' than positive news. Second, negative news is seen as more important, i.e., carrying greater weight than positive news. Third, sources of bad news are believed to be more trustworthy than sources of good news. Slovic exemplifies this third factor by an 'intuitive toxicology' example. As Slovic states, 'Positive (bad news) evidence from animal bioassays is presumptive evidence of risk to humans; negative evidence (e.g. the chemical was not found to be harmful) carries little weight'. This is particularly interesting in connection with laboratory experiments conducted with mobile phone radiation. Several bioassays using mice and rats were conducted using sources of non-ionising radiation, and those finding an effect are widely quoted as positive evidence of health risks by those opposing UMTS-base stations and usage.

The net result of these contradictory sources of information is a hesitant 'assumed safe for the time being' as communicated by the scientific community against a strong 'it is definitely dangerous' as communicated by pressure groups. It would not be illogical to infer that the uncertainty of the information as communicated by the scientific community is detrimental to the perceived quality and trust of scientific knowledge. Indeed, in 1988, Kasperson et. al. hypothesized four major pathways that initiate response systems of social amplification. One of these is signal value: high-signal events suggest something interesting or something special which deserves attention. As an example, he states that an event like scientific dispute over a matter may elicit the message in the public that the 'experts do not understand the risks'. Contrary to this hypothesis, a study by Wiedemann et. al. (2006) reveals

that communicating uncertainties in scientific research does not lower, but actually raises the appraisal of the state of scientific knowledge, although they did not find a significant effect on trust and risk perception. As this study found results quite contrary to Kasperson's hypothesis, this may prove an interesting field of research in risk communication.

Authorities and the precautionary principle

According to the WHO, the precautionary principle is a 'risk management policy applied in circumstances with a high degree of scientific uncertainty, reflecting the need to take action for a potentially serious risk without awaiting the results of scientific research.' (WHO, 1998).

The official standpoint of the Dutch government is that 'there are no indications that serious, adverse health effects can be caused by base stations, as long as the exposure limits are not exceeded.' (Antennebureau, 2008; our translation). As far as the Dutch government is concerned, this means that officially, there is no reason to implement the precautionary principle as there is no 'potentially serious risk'. However, experimental research by Wiedemann et. al. (2005) has shown that although the public may call for the adoption of the precautionary in EMF-related issues, the results 'indicate that precautionary measures may trigger concerns and amplify EMF-related risk perceptions and may lower trust in public health protection'.

In short, the public may actually call for actions that will not make them feel safer – quite the opposite. Whether the non-adoption of the precautionary principle is actually helping the Dutch government in increasing public trust remains inconclusive. In this study, we included a question that measured the wish for a precautionary principle to be implemented, and a question to assess whether the participants felt that the government gives them sufficient information about the four hazards mentioned earlier.

Another issue, raised by Gutteling and Kuttischreuter (2002), is that persuasion to adopt a certain point of view (e.g., persuasion to adopt a government standpoint) where personally relevant issues are concerned could lead to increasing fear and decreasing trust. In this study, participants were asked to rate different stakeholders in terms of their perceived honesty, openness and the extent to which they pursued their own interests, or those of others.

Framing and connotation

Sometimes, certain words in a message can prime people to think of unrelated, but genuine

risk factors. In the discussion on GSM and UMTS health hazards, one of the possible factors for the risk perception of these technologies is the use of the phrase 'UMTS radiation', as the first thing many people think of when they hear the word 'radiation' is radioactivity, which itself associates with nuclear disasters, cancer and death. In a 1978 study, Fischhoff et. al. concluded that nuclear power, then far less advanced than now, was considered the greatest perceived technological risk by both women voters and college students in the United States. As this study was compiled in 1978, public opinion on nuclear power could not have been influenced by two of the best known civilian nuclear accidents, namely those at Three Mile Island (1979) and Chernobyl (1986).

These events will certainly not have influenced public opinion on nuclear power and radiation in a positive way, and the umbrella term 'radiation' today remains linked to an invisible, highly dangerous phenomenon of which the lay public often has little knowledge. In Fischhoff's terms, it is involuntary and, because of its invisibility, unknown to the exposed. This vague association of certain terms with other, different hazards has been named the 'connotation' level in his three-level analysis of mediated communication by Barthes (1973), as quoted in Murdock et. al. (2003). This is a set of associations that are triggered by certain phrases or words within the message. A key factor here is that these associations are not necessarily related or relevant to the subject at hand, and may elicit all sorts of irrelevant affective responses, as exemplified by the word 'radiation'.

This principle of connotation has been incorporated into the study by creating a second, duplicate version of the study. Details are discussed in the methods section.

Hypotheses

Based on the theoretical foundations as described earlier, we will state four specific, main hypotheses for this study.

- **H1.** *Overall risk perception will be higher for UMTS than for particulate matter. We expect this result because UMTS is less common and less visible than particulate matter.*
- **H2.** *Risk perception for UMTS will be higher in Haaksbergen than in Voorst. This*

result is expected because Haaksbergen has had a lot of publicity on the matter of UMTS recently.

- **H3.** *Participants who responded to the explicitly worded questionnaire will have a higher risk perception towards these technologies.* We expect this result because framing the message more 'dangerously' will increase risk perception for these technologies.
- **H4.** *Overall risk perception will be higher for gentech than for radon gas.* This result is expected because gentech has had more publicity recently, and because it is 'new'.

Method

Design

The basic design of this study is an internet questionnaire among residents of both municipalities. As mentioned before, two versions of the questionnaire were prepared. One was a less explicitly framed questionnaire ("A"), the other was more explicitly framed ("B"). These were designed to trigger different responses by wording certain concepts more explicitly to frame the concepts in a way that we believed would cause a higher perception of risk. Specifically, this involved changing the phrase 'UMTS-waves' to 'UMTS-radiation' and, in certain questions, 'genetically modified food' to 'genetically manipulated food'. Thus, a typical question from the neutrally framed questionnaire A is 'How dangerous would you rate UMTS and GSM base stations for public health?'. The corresponding question in questionnaire B is 'How dangerous would you rate UMTS and GSM radiation for public health?'.

In either of the two questionnaires, the participants entered their residence as being either Voorst or Haaksbergen¹. In combination with the two differently framed questionnaires, this resulted in a 2 x 2 quasi-experimental design, featuring two groups and two different conditions, thus yielding four separate conditions: Voorst(A), Voorst(B), Haaksbergen(A) and Haaksbergen(B).

Sample

¹ Initially, three options were presented: 'Voorst', 'Haaksbergen' or 'other'. Upon examination of the IP-addresses of these participants, those who entered 'other' all appeared to be coming from the geographic area of the municipality of Voorst and were therefore counted as coming from Voorst.

For this study, two relatively similar municipalities in the Netherlands were selected. The first is Haaksbergen, a small city which, as mentioned, has had an unusual amount of public resistance and consequent media attention concerning the placement of UMTS base stations. The second municipality, Voorst, was selected as a rough control municipality to Haaksbergen. The main criteria were number of inhabitants and approximate geographic situation, as both municipalities are situated in a mixed rural landscape near larger cities in the eastern part of the Netherlands. As far as could be established, neither of the two municipalities has had marked or special issues with particulate matter, gentech or radon in the immediate past.

Table 1 lists overall population and sample statistics. There were no significant differences in age (Mann-Whitney $U=468.0$, $Z = -1.12$, $p = .26$) or education (Mann-Whitney $U=536.5$, $Z = -3.08$, $p = .76$).

Table 1: *population statistics for both municipalities*

	Total	Voorst	Haaksbergen
Population statistics: ²	n/a	23522	24344
<i>of which men</i>	n/a	50.1%	50.2%
<i>of which women</i>	n/a	49.9%	49.8%
Sample statistics			
N	73	22	51
Mean age (SD)	46.7 (15.2)	43.5 (16.2)	48.1 (14.8)
Range age	16-74	16-70	20-74
Mean education (SD) ³	5.6 (2.0)	5.3 (2.4)	5.7 (1.8)
Range education	1-8	2-8	1-8

² Source: 2006 census, CBS (Central Bureau for Statistics of the Netherlands)

³ Based on the following categorization: 1 = primary education, 2 = LBO/VMBO, 3 = MAVO, 4 = MBO, 5 = HAVO, 6 = VWO, 7 = HBO, 8 = WO

Table 2 lists specific sample statistics for each condition. There were no significant differences in age ($\chi^2(3) = 3.58, p = .31$) or education ($\chi^2(3) = .95, p = .81$).

Table 2: *participant distribution in conditions*

Questionnaire version	Voorst		Haaksbergen	
	A	B	A	B
Sample statistics:				
N	11	11	21	30
Mean age (SD)	48.1 (15.4)	38.8 (16.3)	46.6 (16.1)	49.1 (14.0)
Range age	24-70	16-63	20-72	22-74
Mean education (SD)	5.5 (2.5)	5.0 (2.4)	5.6 (1.8)	5.8 (1.7)
Range education	2-8	1-8	2-8	2-8

Data collection

Through links on social networking sites, articles in local newspapers, announcements on a local radio station and direct e-mailing, participants were invited to visit the www.umfi.nl website link. On this page, a simple script randomly assigned the participants to one of two groups and redirected them to either the explicitly or less explicitly worded studys. The participants entered their municipality in the study itself. Because the website was publicly accessible and the invitations were also widely broadcast, it is unknown how many were invited and consequently a response rate could not be established. Completion rates for the less explicitly worded questionnaire (A) and the explicitly worded questionnaire (B) were 61.4% and 64.3% respectively.

Questionnaire content and measures

Both questionnaire A and questionnaire B (in Dutch) are included as an appendix to this paper. Instead of concentrating on UMTS exclusively, we opted to include three other health risks to diffuse the attention on UMTS, and to shift the focus from UMTS to more general technological health risks. This would help to assess general risk perception, as well as presenting the study as a more 'balanced' questionnaire and comparing risk perception for risks placed in different positions according to Fischhoff's (1978) framework. The questionnaire was designed to measure three different self-reported concepts. These were 'information', 'trust' and 'risk perception'.

The first questions of the study established demographic variables of residence, age and highest education. Education was measured on an 8-point scale presenting the participant with a choice of 8 well-known Dutch educational levels, ranging from primary education to an academic degree.

Information

After that, the questions centred around 'information' and the participants were asked to rate their level of knowledge on the subjects of gentech, particulate matter, UMTS and radon. Subsequently the subjective perception of the quality of their knowledge relative to their surroundings, and the extent to which they were sure about their knowledge, and their primary source(s) of information and their perception of the quality of this information. Sample questions from these concepts are, 'Compared to people around you, would you say you were informed better or worse about risks in your environment?' and, tagged to this question, 'How sure are you about that?'

The next set of questions was designed to establish the participants' views on whether the government is doing its best to inform the public about each of the four health risks. These were then pooled to form a satisfaction scale with the overall information of risks as supplied by the government. This measure seemed reliable ($\alpha=.86$).

Trust

The next set of questions was design to establish the participants' trust in the diverse parties which are involved in health risks. These individual stakeholders were the government, scientists, large companies (such as Telecom providers), pressure groups, the media and legal firms. These three items measured the extent to which the participants thought these stakeholders supplied honest information about risks ('trustworthiness'), the openness about their intentions ('openness') and whether they were acting on their own behalf or on behalf of the public ('public interest'). A sample question of this is, 'I think the government provides honest information about risks in my environment, such as UMTS, particulate matter, genetically modified food and radon'.

We theorized that a high degree of openness, a high degree of trustworthiness and a high degree of public interest would combine to form a high level of trust. Therefore, the scores on these items of openness, trustworthiness and stakes were pooled to form a sum score of trust for each of the separate stakeholders. These measures seemed reliable ($.77 < \alpha < .85$)

Precautionary principle and acquiescence

Following this, the next four questions centred around the precautionary principle and the tendency to acquiesce with others. The first question was designed to measure the wish for the precautionary principle to be implemented. Specifically, it asked whether 'a technology could not be used as long as we don't know it is safe'. The following question was the exact opposite, 'a technology can be used as long as we don't know it is unsafe'. In the same line of thought, the next two questions asked the participants whether they would agree with a 7 out of 10 majority that states it is allowable to use a technology of which the complete safety has not yet been established. Conversely, the second question asked the participants whether they would agree with a 3 out of 10 minority that states it is not allowable to use a technology of which the complete safety has not yet been established. Practically, the numerical result of these questions is the same – 7 in favour, 3 not in favour of using a possibly unsafe technology.

Risk perception

After that, a set of questions focused on the actual risk perceptions of the four aforementioned health risks, as well as introducing two additional risks: smoking and global warming. The latter two were introduced as opposites: one concrete risk with direct health implications, and one phenomenon which is vague and inconclusive. These were introduced to be able to rank the public health risk perception of participants in order of importance. As a measure of lay persons' perception of risk, participants were asked to all rate all hazards according to their own knowledge and opinions on a five-point scale ranging from 'absolutely harmless' to 'absolutely harmful'.

The second question designed to measure the public health risk perception of participants was a list of suggested government health interventions designed to protect public health from the six hazards mentioned in the previous question. The suggestions included mandatory smoke alarms, mandatory home radon measurements, a public smoking ban, a ban on placing UMTS base stations near built-up areas, mandatory diesel particulate filters on vehicles and a ban on genetically modified food. Participants were asked to rate these suggestions on a five-point scale ranging from 'absolutely useless' to 'absolutely useful'. The scores on the items of risk harmfulness and intervention usefulness were pooled for each separate risk to form a sum score of 'overall risk perception', which were used to test the hypotheses. These sum scores seemed reliable ($.67 < a < .92$).

The media were included by presenting the participants with the same lists of health hazards as mentioned before. The participants were asked to rate whether either of the health risks were overrated or underrated in the media, representing a subjective sense of importance for every health risk. These items were pooled to form a sum score of media health risk rating. This measure seemed reliable ($\alpha = .64$)

The last item was included to assess lay persons' appreciation of 'human interest' stories in the media. These items were linked to an adapted article about a couple who move to a house near GSM and UMTS base stations, and subsequently report health problems such as headaches, depression, concentration issues and other diffuse health problems. Participants were then asked to rate the probability and the justness of said health effects, and the overall trustworthiness of the article.

In all, a number of compounded sum scores were established; namely trust, information, total risk perception for all risks together and individual risk perception for each of the four health risks. Also, sum scores were established within the trust group, i.e. trust in the government, scientists, large companies (such as Telecom providers), pressure groups, the media and legal firms. Another sum score was determined for the self-reported level of information on the four health risk topics, and for the total amount of information made available by the government. The media were represented by pooling items to form a total media health risk rating. All of these sum scores seemed to be reliable, with Cronbach's alpha ranging between .63 and .92.

Hypotheses H1 and H2 were testing using a t-test. Hypotheses H2 and H3 were tested using a Mann-Whitney test. Correlations were used to explore additional findings. Between-group findings were tested using a Mann-Whitney test.

Results

Main hypotheses

No support was found for either of the four main hypotheses. However, a number of other interesting findings were unearthed during data analysis. The implications and possible causes of these findings and the failure to find support for the main hypotheses will be elaborated on in the discussion section of this paper.

H1. The first hypothesis stated that overall risk perception would be higher for UMTS than

for particulate matter. The opposite was found to be true: risk perception for particulate matter was significantly higher than for UMTS ($t=-4.44$, $p<0.01$, $n=69$).

H2. The second hypotheses stated that risk perception for UMTS would be higher in Haaksbergen than in Voorst. No support was found for this hypothesis ($U=383.0$, $Z = -1.25$, $p = .21$). Additionally, no significant difference was found for any of the other technologies between both municipalities.

H3. The third hypothesis stated that the participants who responded to the explicitly worded questionnaire would have a higher risk perception towards UMTS and gentech. No support was found for this hypothesis, neither for UMTS ($U=524.5$, $Z = -.788$, $p = .43$) nor for gentech ($U=557.0$, $Z = -.395$, $p = .693$). No significant additional differences between participants for groups A and B were found.

H4. The last hypothesis stated that overall risk perception would be higher for gentech than for radon. Support was found for the opposite of this hypothesis: overall risk perception for radon was found to be significantly higher than for gentech ($t=-4.13$, $p<0.01$, $n=69$).

Additional findings

Information

There was a weak, but significant correlation between the self-reported level of information and age ($r=.31$, $p<.01$, $n=22$) in the entire group. Also, a moderate and significant correlation was found between age and the sum score of sufficiency of information supplied by the government in the Voorst ($r=.46$, $p<.05$, $n=22$). This effect was not found in Haaksbergen. In Haaksbergen, a significant negative correlation was found between the sum score of information supplied by the government and overall risk perception ($r=-.59$, $p<0.01$, $n=50$). This effect was not found in Voorst.

There was a positive, significant correlation between the self-reported information level and the reported level of information supplied by the government on the topics of UMTS and particulate matter in Voorst. Correlations were $r=.43$ and $r=.61$, $p<0.05$ and $p<0.01$ respectively. Neither of these effects were found in Haaksbergen.

The Media

In both municipalities, a high and significant negative correlation was found between the sum score of perceived media health risk rating and overall risk perception. For Haaksbergen and Voorst, these were $r = -.796$ ($n = 49$) and $r = -.758$ ($n = 16^4$) respectively, both $p < 0.01$.

Trust

On the subject of trust, we found a negative correlation between risk perceptions for both UMTS and gentech and overall government trust for Haaksbergen. These correlations were $r = -.510$, $p < 0.01$ and $r = -.342$, $p < 0.01$ respectively ($n = 51$). This effect was not found in Voorst.

Gentech

In the municipality of Haaksbergen, risk perception for genetically modified food was significantly higher than for Voorst ($U = 288.5$, $Z = -2.56$, $p = .01$). Also, they were significantly more supportive of a ban on genetically modified food ($U = 295.0$, $Z = -2.53$, $p = .01$).

Conclusion and discussion

The data from this study did not support our initial hypotheses. However, the results did lead us to other interesting conclusions. First, overall risk perception for particulate matter was significantly higher than risk perception for UMTS. This could mean that particulate matter is seen as a much more 'real' danger than UMTS. Our hypothesis that risk perception for UMTS would be higher in Haaksbergen than in Voorst due to the amount of media exposure and controversy is not supported, even though media attention for the UMTS situation in Haaksbergen has been much more extensive than in Voorst. Our reasoning that risk perception for UMTS would be higher because, in Fischhoff's terms, it was 'invisible' and 'uncommon', seems to be unsupported. Also, no framing or connotation effects were observed. This may be due to the relatively small sample size, or the framing effects may have been too subtle to elicit an effect.

In Haaksbergen, we found a negative correlation between the perceived sufficiency of information supplied by the government and overall risk perception. This means that higher

4 Due to some participants exiting the study without answering all the questions, the number of participants used in this analysis is lower than that used for analysis pertaining to earlier questions in the study.

levels of satisfaction with the amount of information made available to people is related to lower levels of risk perception. Also, we found a negative correlation between perceived risk from UMTS and gentech and pooled government trust. In other words, this means that higher trust in the government is related to lower levels of risk perception, in this case specifically concerning UMTS and gentech. This is in support of Slovic (1993), who stated that there is a direct link between trust in those who manage technological hazards and risk perceptions for those hazards. This negative correlation between perceived risk and government trust was not found in Voorst, although this could be a result of the smaller sample size from Voorst.

Participants from Haaksbergen also reported genetically modified food as more risky than participants from Voorst. Inhabitants from Haaksbergen were also significantly more supportive of a ban on genetically modified food. This gives rise to the idea that, despite the assumed similar background of both municipalities, some underlying factors may be at work. Another explanation would be that our sample from Voorst is simply not large enough to produce effects.

In Voorst, we found a positive correlation between the sufficiency of risk information communicated by the government, and self-reported level of overall risk information on the topics of UMTS and particulate matter. This may mean that participants who deem themselves sufficiently informed also feel the government is giving them sufficient information on these topics. Also, we found a weak but significant correlation between age and the sufficiency of risk information communicated by the government. This may indicate the older people are more content with health risk information supplied by the government, or conversely, that younger people are less content with this information. Despite the larger sample size, these effects were not found in Haaksbergen.

In both municipalities, we found a weak but significant correlation between age and self-reported level of overall risk information, indicating that older people may find themselves better informed than younger people. Of course, this is a self-report measure and does not necessarily reflect objective knowledge about the subjects at hand.

Concerning the media, we found a high negative correlation between perceived media health risk rating and overall risk perception. This means that low levels of risk perception generally mean the participants find that media attention given to health risks is overrated. This stands to reason, as little media attention should have to be given to issues which the participants do not experience as risky. Conversely, participants with high overall risk

perception might think certain issues poorly represented in the media.

Discussion and recommendations

The primary goal of this study was to investigate how risk perception, mainly for UMTS, differs for two comparable municipalities, one of which has had serious public opinion issues regarding the placement of UMTS base stations. The secondary goal was to investigate whether message framing had any significant influence on risk perception or question response, both between and within municipalities. For two of our hypotheses, the results turned out to be quite the opposite of what we had expected, and none of our initially formulated hypotheses could be confirmed. A possible explanation for this could be the discrepancy in the number of participants from Haaksbergen and Voorst. Despite extensive searches for participants, only 22 participants from Voorst actually completed the study, compared to 51 from Haaksbergen. This may be due to the holiday season, as the study was made available in the months of July and August. Another reason may be that the residents of Haaksbergen are simply more 'on-line'. This may mean the sample from Haaksbergen is less representative than the sample from Voorst. However, mean age in the samples from both municipalities were almost identical, and relatively high for an internet questionnaire, where one would expect predominantly younger participants. A tentative explanation may be that the participants from Haaksbergen are more supportive of modern technologies such as the internet. If and to what extent this influences risk perceptions for other modern technologies (such as UMTS) remains uncertain.

Also, completion rate for the study was rather low. Only 73 of the 100 participants who started the study actually finished it, with most of the detractors stopping at the second page of the study. It is hard to provide a reason for why participants dropped out of the study. Quite possibly the outlook of a list of questions was unattractive or demotivating. A future questionnaire would probably benefit from a more appealing layout and more varied questions, possibly made more attractive by adding images, different colours or an interactive component like a quiz. Additionally, a more fortunate timing for the distribution of the study could be planned (i.e., outside of the holiday season), as not only many people were on holiday, many helpful organizations and people (e.g. newspapers, radio stations) could not be reached, or were severely understaffed.

Despite the fact that the main hypotheses were not supported in this study, some

interesting insights were revealed on the perceived quality of government-supplied information and risk perception. Also, as Slovic (1993) had already established, we found a link between trust and risk perception.

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1. Hallo!

Hallo en welkom bij deze vragenlijst!

Alvast van harte bedankt dat u mee wilt doen. U helpt mij er enorm mee!

Kent u naast zichzelf nog mensen die in uw gemeente wonen die deze vragenlijst zouden willen invullen dan zijn zij uiteraard van harte welkom.

Ik voer dit onderzoek uit in het kader van mijn zogeheten bachelorscriptie aan de Universiteit Twente.

Het doel van dit onderzoek is om inzicht te krijgen over hoe mensen risico's ervaren. In het bijzonder wil ik kijken naar risico's die te maken hebben met technologie. Het gaat dus niet over 'natuurlijke' risico's zoals bijvoorbeeld extreem weer of overstromingen.

Op de volgende pagina's vindt u een aantal vragen. Ik zou het zeer op prijs stellen als u antwoord zou willen geven op deze vragen.

Het invullen van de gehele vragenlijst duurt ongeveer 10-15 minuten. Uw gegevens worden absoluut anoniem behandeld en worden gewist na afloop van dit onderzoek.

U kunt bovenaan de pagina zien hoe ver u bent met het invullen. Nogmaals: alvast hartelijk bedankt!

Vriendelijke groet,
Robin Kok
Universiteit Twente

P.S. Mocht u vragen hebben over deze vragenlijst, dan kunt u mij e-mailen op r.n.kok@student.utwente.nl

2. Inleiding

Deze vragenlijst is voornamelijk bedoeld voor de inwoners van de gemeenten Haaksbergen en Voorst. Inwoners van andere gemeenten zijn natuurlijk ook van harte welkom om mee te doen!

1. In welke gemeente woont u?

- Overig
- Haaksbergen
- Voorst

2. Wat is uw leeftijd?

3. Wat is de hoogste opleiding die u afgemaakt heeft?

- basisonderwijs
- LBO/VMBO
- MAVO
- MBO
- HAVO
- VWO
- HBO
- WO
- Anders; wilt u het toelichten?

3. Informatie

Op deze pagina wil ik u graag wat vragen stellen over hoe goed u zich geïnformeerd vindt over diverse 'moderne' technologieën en verschijnselen.

4. Als u zich vergelijkt met de mensen om u heen, hoe goed vindt u zich geïnformeerd over de risico's van...

	helemaal niet goed geïnformeerd	niet goed geïnformeerd	niet goed en niet slecht geïnformeerd	goed geïnformeerd	zeer goed geïnformeerd
Fijnstof	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Genetisch gemanipuleerde voeding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radon	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
UMTS-straling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. In vergelijking met de mensen om u heen, zou u dan zeggen dat u beter of slechter geïnformeerd bent over de risico's in uw leefomgeving?

	veel slechter geïnformeerd	slechter geïnformeerd	niet slechter of niet beter	beter geïnformeerd	veel beter geïnformeerd
Ik vind mijzelf...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Hoe zeker bent u daar van?

	heel onzeker	onzeker	niet onzeker en niet zeker	zeker	heel zeker
Ik ben...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Waar haalt u uw informatie vandaan over de risico's in uw leefomgeving?

- Ik ga niet op zoek naar zulke informatie.
- TV en radio
- Internet
- Kranten en tijdschriften
- Kennissen
- Anders; namelijk:

8. Hoe juist denkt u dat deze informatie is?

	heel erg onjuist is	onjuist is	niet onjuist of juist is	juist is	heel erg juist is
Ik denk dat deze informatie meestal...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. De overheid en andere instanties

Op de volgende pagina vindt u een aantal stellingen over hoe de overheid, bedrijven en instanties met risico's omgaan.

Deze risico's hebben vaak voordelen, maar ook nadelen. Ook hebben sommige mensen of instanties vaak andere belangen. Hieronder wordt uw mening gevraagd hierover.

9. De overheid doet voldoende om ons te informeren over de risico's van UMTS-straling

	helemaal mee oneens	mee oneens	niet oneens en niet eens	mee eens	helemaal mee eens
Ik ben het daar...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. De overheid doet voldoende om ons te informeren over de risico's van fijnstof

	helemaal mee oneens	mee oneens	niet mee oneens en niet mee eens	mee eens	helemaal mee eens
Ik ben het daar...	jn	jn	jn	jn	jn

11. De overheid doet voldoende om ons te informeren over de risico's van radon

	helemaal mee oneens	mee oneens	niet mee oneens en niet mee eens	mee eens	helemaal mee eens
Ik ben het daar...	jn	jn	jn	jn	jn

12. De overheid doet voldoende om ons te informeren over de risico's van genetisch gemanipuleerde voeding

	helemaal mee oneens	mee oneens	niet mee oneens en niet mee eens	mee eens	helemaal mee eens
Ik ben het daar...	jn	jn	jn	jn	jn

13. Ik vind dat de volgende personen of instanties eerlijke informatie geven over risico's in de leefomgeving zoals UMTS-straling, fijnstof, genetisch gemanipuleerde voeding en radon.

	helemaal niet eerlijk	niet eerlijk	niet oneerlijk en niet eerlijk	eerlijk	helemaal eerlijk
de overheid	jn	jn	jn	jn	jn
wetenschappers	jn	jn	jn	jn	jn
bedrijven (Vodafone, Shell, enz.)	jn	jn	jn	jn	jn
Kranten en TV (de media)	jn	jn	jn	jn	jn
actiegroepen (Greenpeace, StopUMTS, enz.)	jn	jn	jn	jn	jn
advocaten en juristen	jn	jn	jn	jn	jn

14. Net zoals bedrijven en instanties allemaal andere informatie kunnen geven, hebben ze ook allemaal andere belangen. Hieronder vindt u een lijst met bedrijven en instanties. In hoeverre denkt u dat ze handelen volgens eigen belang, of het belang van de bevolking?

	Heel erg eigen belang	eigen belang	geen enkel belang	maatschappelijk belang	heel erg maatschappelijk belang
wetenschappers	jn	jn	jn	jn	jn
advocaten en juristen	jn	jn	jn	jn	jn
actiegroepen (Greenpeace, StopUMTS, enz.)	jn	jn	jn	jn	jn
Kranten en TV (de media)	jn	jn	jn	jn	jn
bedrijven (Vodafone, Shell, enz.)	jn	jn	jn	jn	jn
de overheid	jn	jn	jn	jn	jn

15. In hoeverre denkt u dat de volgende bedrijven en instanties openheid geven over hun bedoelingen?

	heel weinig openheid	weinig openheid	niet veel en niet weinig openheid	redelijk veel openheid	heel veel openheid
Kranten en TV (de media)	ja	ja	ja	ja	ja
wetenschappers	ja	ja	ja	ja	ja
bedrijven (Vodafone, Shell, enz.)	ja	ja	ja	ja	ja
de overheid	ja	ja	ja	ja	ja
Advocaten en juristen	ja	ja	ja	ja	ja
Actiegroepen (Greenpeace, StopUMTS, enz.)	ja	ja	ja	ja	ja

5. Pagina 4

Op deze pagina volgen een aantal stellingen. Deze stellingen hebben betrekking op gezondheidsrisico's.

Graag zou ik weten wat uw mening is over deze gezondheidsrisico's. Geeft u alstublieft aan in hoeverre u het eens bent met de volgende stellingen.

16. Als we niet zeker weten dat een technologie veilig is, vind ik dat we het niet mogen gebruiken.

	helemaal mee oneens	mee oneens	niet oneens en niet eens	mee eens	helemaal mee eens
Ik ben het hier...	ja	ja	ja	ja	ja

17. Zolang niet bewezen kan worden dat een technologie onveilig is, vind ik dat we het best mogen gebruiken.

	helemaal mee oneens	mee oneens	niet oneens en niet eens	mee eens	helemaal mee eens
Ik ben het hier...	ja	ja	ja	ja	ja

18. Stelt u zich het volgende voor: er wordt een nieuwe technologie uitgevonden die bepaalde dingen in het leven veel gemakkelijker maken.

We weten alleen nog niet zeker of deze technologie wel 100% veilig is om te gebruiken. Toch vinden 7 van de 10 mensen vinden dat we deze technologie mogen gebruiken. Bent u het met deze mensen eens?

	helemaal mee oneens	mee oneens	niet oneens en niet eens	mee eens	helemaal mee eens
Ik ben het hier...	ja	ja	ja	ja	ja

19. Stelt u dezelfde situatie als hierboven voor.

We weten niet zeker of de technologie wel 100% veilig is om te gebruiken. Nu vinden 3 van de 10 mensen dat we deze technologie niet mogen gebruiken. Bent u het met deze mensen eens?

	helemaal mee oneens	mee oneens	niet oneens en niet eens	mee eens	helemaal mee eens
Ik ben het hier...	ja	ja	ja	ja	ja

20. Hieronder ziet u een lijst van gezondheidsrisico's. Van sommige weten we dat ze inderdaad schadelijk zijn voor de gezondheid, en voor anderen weten we het (nog) niet.

In deze vraag wil ik u graag vragen om per risico aan te geven hoe gevaarlijk u dit vindt voor de volksgezondheid.

	absoluut onschadelijk	onschadelijk	niet onschadelijk en niet schadelijk	schadelijk	absoluut schadelijk
UMTS en GSM-straling	jn	jn	jn	jn	jn
Radon	jn	jn	jn	jn	jn
'Global warming'	jn	jn	jn	jn	jn
Roken	jn	jn	jn	jn	jn
Genetisch gemodificeerd voedsel	jn	jn	jn	jn	jn
Fijnstof	jn	jn	jn	jn	jn

21. Om gezondheidsrisico's te beperken worden er vaak door de overheid bepaalde maatregelen genomen.

Deze vraag gaat weer over de gezondheidsrisico's van de vorige vraag. Hieronder ziet u een aantal maatregelen die gebruikt kunnen worden om die gezondheidsrisico's te beperken.

Zou u voor elke maatregel aan willen geven hoe nuttig u deze maatregel vindt voor de volksgezondheid?

	absoluut zinloos	zinloos	niet zinloos en niet nuttig	nuttig	absoluut nuttig
Verbod op het plaatsen van UMTS-masten dicht bij woningen	jn	jn	jn	jn	jn
Verplicht plaatsen van brandmelders in woningen	jn	jn	jn	jn	jn
Verplicht plaatsen van roetfilters bij dieselauto's	jn	jn	jn	jn	jn
Verplichte jaarlijkse radon-metingen in woningen	jn	jn	jn	jn	jn
Verbod op roken op alle plaatsen waar mensen bij elkaar komen	jn	jn	jn	jn	jn
Verbod op genetisch gemodificeerd voedsel	jn	jn	jn	jn	jn

6.

Ook op deze pagina gaat het helemaal om uw mening. Vult u daarom in wat u zelf vindt: er is geen goed of fout antwoord.

22. Hieronder ziet u een lijst van gezondheidsrisico's. Van sommige weten we dat ze inderdaad schadelijk zijn voor de gezondheid, en voor anderen weten we het (nog) niet.

In de media is er veel aandacht voor gezondheidsrisico's. Of dit helemaal terecht is, is ook niet altijd duidelijk. Hieronder ziet u weer een lijst met mogelijke risico's. Hier wil ik u vragen of u vindt dat deze risico's onderschat of overschat worden in de media.

	erg onderschat	onderschat	niet onderschat en niet overschat	overschat	erg overschat
'Global warming'	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Genetisch gemodificeerd voedsel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radon	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Roken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fijnstof	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
UMTS en GSM-straling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. Leest u het onderstaande artikel:

"Marijke en Henk kochten hun droomhuis in Twente. Alles ging goed, tot ze na een half jaar plotseling vreemde klachten kregen.

"I neens had ik een vreemde hoge piep in mijn hoofd, en een drukkend gevoel.", aldus Marijke. Kort daarna kreeg ook haar partner Henk klachten. "Hoofdpijn, depressie, gepiep in het hoofd, concentratiestoornissen, het gevoel alsof je een helm op je hoofd hebt, vermoeidheid."

Ze hadden hun vorige woning nog niet verkocht, en het gekke was dat de klachten meteen verdwenen als ze in hun oude huis waren. Toen vond Marijke op internet een artikel waarin oorsuizen in verband werd gebracht met de straling van UMTS-masten.

Met een metertje constateerde Henk dat hun droomhuis in een bundeling van elektromagnetische straling lag. Binnen een afstand van 350 meter van het huis staan twee zendmasten, voor GSM en UMTS. Daarnaast staan er ook zenders van het vliegveld in de buurt. Het paar was geschrokken. De straling zou de oorzaak kunnen zijn van hun symptomen.

"Er is niets anders in de omgeving die de klachten kan veroorzaken", zegt Henk. "Voordat we in dit huis kwamen, waren we kerngezond. Er zijn geen andere factoren die een rol kunnen spelen. We zitten hier midden in Twente met niets dan prachtige natuur om ons heen."

Hieronder volgen een aantal vragen over het artikel.

	helemaal niet erg	niet erg	gemiddeld	erg	heel erg
Vindt u het terecht dat deze mensen hun klachten toeschrijven aan de aanwezigheid van UMTS- en GSM-zendmasten?	j0	j0	j0	j0	j0
Hoe waarschijnlijk vindt u het dat de klachten van deze mensen veroorzaakt worden door de aanwezigheid van UMTS- en GSM-zendmasten?	j0	j0	j0	j0	j0
Hoe betrouwbaar lijkt u de informatie in dit artikel?	j0	j0	j0	j0	j0

7. Einde

Dit is het einde van de vragenlijst. Nogmaals hartelijk bedankt voor uw deelname, u helpt mij er enorm mee!

Hieronder kunt u eventueel nog opmerkingen toevoegen. Dit is uiteraard niet verplicht.

Nogmaals bedankt!

24. Heeft u nog opmerkingen over deze vragenlijst? Laat het mij weten. Ik heb er zeker wat aan!

1. Hallo!

Hallo en welkom bij deze vragenlijst!

Alvast van harte bedankt dat u mee wilt doen. U helpt mij er enorm mee!

Kent u naast zichzelf nog mensen die in uw gemeente wonen die deze vragenlijst zouden willen invullen dan zijn zij uiteraard van harte welkom.

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2. Inleiding

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1. In welke gemeente woont u?

Haaksbergen

Overig

Voorst

2. Wat is uw leeftijd?

3. Wat is de hoogste opleiding die u afgemaakt heeft?

basisonderwijs

LBO/VMBO

MAVO

MBO

HAVO

VWO

HBO

WO

Anders; wilt u het toelichten?

3. Informatie

Op deze pagina wil ik u graag wat vragen stellen over hoe goed u zich geïnformeerd vindt over diverse 'moderne' technologieën en verschijnselen.

4. Als u zich vergelijkt met de mensen om u heen, hoe goed vindt u zich geïnformeerd over de risico's van...

	helemaal niet goed geïnformeerd	niet goed geïnformeerd	niet goed en niet slecht geïnformeerd	goed geïnformeerd	zeer goed geïnformeerd
Radon	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fijnstof	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
UMTS-golven	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Genetisch gemodificeerde voeding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. In vergelijking met de mensen om u heen, zou u dan zeggen dat u beter of slechter geïnformeerd bent over de risico's in uw leefomgeving?

	veel slechter geïnformeerd	slechter geïnformeerd	niet slechter of niet beter	beter geïnformeerd	veel beter geïnformeerd
Ik vind mijzelf...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. Hoe zeker bent u daar van?

	heel onzeker	onzeker	niet onzeker en niet zeker	zeker	heel zeker
Ik ben...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Waar haalt u uw informatie vandaan over de risico's in uw leefomgeving?

- Kranten en tijdschriften
- TV en radio
- Internet
- Kennissen
- Ik ga niet op zoek naar zulke informatie.
- Anders; namelijk:

8. Hoe juist denkt u dat deze informatie is?

	heel erg onjuist is	onjuist is	niet onjuist of juist is	juist is	heel erg juist is
Ik denk dat deze informatie meestal...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. De overheid en andere instanties

Op de volgende pagina vindt u een aantal stellingen over hoe de overheid, bedrijven en instanties met risico's omgaan.

Deze risico's hebben vaak voordelen, maar ook nadelen. Ook hebben sommige mensen of instanties vaak andere belangen. Hieronder wordt uw mening gevraagd hierover.

9. De overheid doet voldoende om ons te informeren over de risico's van UMTS-golven

	helemaal mee oneens	mee oneens	niet oneens en niet eens	mee eens	helemaal mee eens
Ik ben het daar...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. De overheid doet voldoende om ons te informeren over de risico's van fijnstof

	helemaal mee oneens	mee oneens	niet mee oneens en niet mee eens	mee eens	helemaal mee eens
Ik ben het daar...	jn	jn	jn	jn	jn

11. De overheid doet voldoende om ons te informeren over de risico's van radon

	helemaal mee oneens	mee oneens	niet mee oneens en niet mee eens	mee eens	helemaal mee eens
Ik ben het daar...	jn	jn	jn	jn	jn

12. De overheid doet voldoende om ons te informeren over de risico's van genetisch gemodificeerde voeding

	helemaal mee oneens	mee oneens	niet mee oneens en niet mee eens	mee eens	helemaal mee eens
Ik ben het daar...	jn	jn	jn	jn	jn

13. Ik vind dat de volgende personen of instanties eerlijke informatie geven over risico's in de leefomgeving zoals UMTS-golven, fijnstof, genetisch gemodificeerde voeding en radon

	helemaal niet eerlijk	niet eerlijk	niet oneerlijk en niet eerlijk	eerlijk	helemaal eerlijk
de overheid	jn	jn	jn	jn	jn
wetenschappers	jn	jn	jn	jn	jn
bedrijven (Vodafone, Shell, enz.)	jn	jn	jn	jn	jn
Kranten en TV (de media)	jn	jn	jn	jn	jn
actiegroepen (Greenpeace, StopUMTS, enz.)	jn	jn	jn	jn	jn
advocaten en juristen	jn	jn	jn	jn	jn

14. Net zoals bedrijven en instanties allemaal andere informatie kunnen geven, hebben ze ook allemaal andere belangen. Hieronder vindt u een lijst met bedrijven en instanties. In hoeverre denkt u dat ze handelen volgens eigen belang, of het belang van de maatschappij?

	Heel erg eigen belang	eigen belang	geen enkel belang	maatschappelijk belang	heel erg maatschappelijk belang
bedrijven (Vodafone, Shell, enz.)	jn	jn	jn	jn	jn
de overheid	jn	jn	jn	jn	jn
advocaten en juristen	jn	jn	jn	jn	jn
wetenschappers	jn	jn	jn	jn	jn
Kranten en TV (de media)	jn	jn	jn	jn	jn
actiegroepen (Greenpeace, StopUMTS, enz.)	jn	jn	jn	jn	jn

15. In hoeverre denkt u dat de volgende bedrijven en instanties openheid geven over hun bedoelingen?

	heel weinig openheid	weinig openheid	niet veel en niet weinig openheid	redelijk veel openheid	heel veel openheid
Kranten en TV (de media)	ja	ja	ja	ja	ja
wetenschappers	ja	ja	ja	ja	ja
bedrijven (Vodafone, Shell, enz.)	ja	ja	ja	ja	ja
Advocaten en juristen	ja	ja	ja	ja	ja
de overheid	ja	ja	ja	ja	ja
Actiegroepen (Greenpeace, StopUMTS, enz.)	ja	ja	ja	ja	ja

5. Pagina 4

Op deze pagina volgen een aantal stellingen. Deze stellingen hebben betrekking op gezondheidsrisico's.

Graag zou ik weten wat uw mening is over deze gezondheidsrisico's. Geeft u alstublieft aan in hoeverre u het eens bent met de volgende stellingen.

16. Als we niet zeker weten dat een technologie veilig is, vind ik dat we het niet mogen gebruiken.

	helemaal mee oneens	mee oneens	niet oneens en niet eens	mee eens	helemaal mee eens
Ik ben het hier...	ja	ja	ja	ja	ja

17. Zolang niet bewezen kan worden dat een technologie onveilig is, vind ik dat we het best mogen gebruiken.

	helemaal mee oneens	mee oneens	niet oneens en niet eens	mee eens	helemaal mee eens
Ik ben het hier...	ja	ja	ja	ja	ja

18. Stelt u zich het volgende voor:

er wordt een nieuwe technologie uitgevonden die bepaalde dingen in het leven veel gemakkelijker maken.

We weten alleen nog niet zeker of deze technologie wel 100% veilig is om te gebruiken. Toch vinden 7 van de 10 mensen dat we deze technologie mogen gebruiken. Bent u het met deze mensen eens?

	helemaal mee oneens	mee oneens	niet oneens en niet eens	mee eens	helemaal mee eens
Ik ben het hier...	ja	ja	ja	ja	ja

19. Stelt u dezelfde situatie als hierboven voor.

We weten niet zeker of de technologie wel 100% veilig is om te gebruiken. Nu vinden 3 van de 10 mensen dat we deze technologie niet mogen gebruiken. Bent u het met deze mensen eens?

	helemaal mee oneens	mee oneens	niet oneens en niet eens	mee eens	helemaal mee eens
Ik ben het hier...	ja	ja	ja	ja	ja

20. Hieronder ziet u een lijst van gezondheidsrisico's. Van sommige weten we dat ze inderdaad schadelijk zijn voor de gezondheid, en voor anderen weten we het (nog) niet.

In deze vraag wil ik u graag vragen om per risico aan te geven hoe gevaarlijk u dit vindt voor de volksgezondheid.

	absoluut onschadelijk	onschadelijk	niet onschadelijk en niet schadelijk	schadelijk	absoluut schadelijk
Roken	jn	jn	jn	jn	jn
UMTS en GSM-masten	jn	jn	jn	jn	jn
Fijnstof	jn	jn	jn	jn	jn
'Global warming'	jn	jn	jn	jn	jn
Radon	jn	jn	jn	jn	jn
Genetisch gemodificeerd voedsel	jn	jn	jn	jn	jn

21. Om gezondheidsrisico's te beperken worden er vaak door de overheid bepaalde maatregelen genomen.

Deze vraag gaat weer over de gezondheidsrisico's van de vorige vraag. Hieronder ziet u een aantal maatregelen die gebruikt kunnen worden om die gezondheidsrisico's te beperken.

Zou u voor elke maatregel aan willen geven hoe nuttig u deze maatregel vindt voor de volksgezondheid?

	absoluut zinloos	zinloos	niet zinloos en niet nuttig	nuttig	absoluut nuttig
Verplicht plaatsen van brandmelders in woningen	jn	jn	jn	jn	jn
Verbod op het plaatsen van UMTS-masten dicht bij woningen	jn	jn	jn	jn	jn
Verbod op genetisch gemodificeerd voedsel	jn	jn	jn	jn	jn
Verbod op roken op alle plaatsen waar mensen bij elkaar komen	jn	jn	jn	jn	jn
Verplicht plaatsen van roetfilters bij dieselauto's	jn	jn	jn	jn	jn
Verplichte jaarlijkse radon-metingen in woningen	jn	jn	jn	jn	jn

6.

Ook op deze pagina gaat het helemaal om uw mening. Vult u daarom in wat u zelf vindt: er is geen goed of fout antwoord.

22. Hieronder ziet u een lijst van gezondheidsrisico's. Van sommige weten we dat ze inderdaad schadelijk zijn voor de gezondheid, en voor anderen weten we het (nog) niet.

In de media is er veel aandacht voor gezondheidsrisico's. Of dit helemaal terecht is, is ook niet altijd duidelijk. Hieronder ziet u weer een lijst met mogelijke risico's. Hier wil ik u vragen of u vindt dat deze risico's onderschat of overschat worden in de media.

	erg onderschat	onderschat	niet onderschat en niet overschat	overschat	erg overschat
Genetisch gemodificeerd voedsel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
'Global warming'	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Roken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
UMTS en GSM-masten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Radon	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fijnstof	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

23. Leest u het onderstaande artikel:

"Marijke en Henk kochten hun droomhuis in Twente. Alles ging goed, tot ze na een half jaar plotseling vreemde klachten kregen.

"I neens had ik een vreemde hoge piep in mijn hoofd, en een drukkend gevoel.", aldus Marijke. Kort daarna kreeg ook haar partner Henk klachten. "Hoofdpijn, depressie, gepiep in het hoofd, concentratiestoornissen, het gevoel alsof je een helm op je hoofd hebt, vermoeidheid."

Ze hadden hun vorige woning nog niet verkocht, en het gekke was dat de klachten meteen verdwenen als ze in hun oude huis waren. Toen vond Marijke op internet een artikel waarin oorsuizen in verband werd gebracht met de straling van UMTS-masten.

Met een metertje constateerde Henk dat hun droomhuis in een bundeling van elektromagnetische straling lag. Binnen een afstand van 350 meter van het huis staan twee zendmasten, voor GSM en UMTS. Daarnaast staan er ook zenders van het vliegveld in de buurt. Het paar was geschrokken. De straling zou de oorzaak kunnen zijn van hun symptomen.

"Er is niets anders in de omgeving die de klachten kan veroorzaken", zegt Henk. "Voordat we in dit huis kwamen, waren we kerngezond. Er zijn geen andere factoren die een rol kunnen spelen. We zitten hier midden in Twente met niets dan prachtige natuur om ons heen."

Hieronder volgen een aantal vragen over dit artikel.

	helemaal niet erg	niet erg	gemiddeld	erg	heel erg
Vindt u het terecht dat deze mensen hun klachten toeschrijven aan de aanwezigheid van UMTS- en GSM-zendmasten?	ja	ja	ja	ja	ja
Hoe waarschijnlijk vindt u het dat de klachten van deze mensen veroorzaakt worden door de aanwezigheid van UMTS- en GSM-zendmasten?	ja	ja	ja	ja	ja
Hoe betrouwbaar lijkt u de informatie in dit artikel?	ja	ja	ja	ja	ja

7. Einde

Dit is het einde van de vragenlijst. Nogmaals hartelijk bedankt voor uw deelname, u helpt mij er enorm mee!

Hieronder kunt u eventueel nog opmerkingen toevoegen. Dit is uiteraard niet verplicht.

Nogmaals bedankt!

24. Heeft u nog opmerkingen over deze vragenlijst? Laat het mij weten. Ik heb er zeker wat aan!