THE INFLUENCE OF EASE OF RETRIEVAL ON INFORMATION SEEKING IN RISKY SITUATIONS

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Abstract

This research was aimed to answer the question whether ease of retrieval affects the information seeking in risky situations. The study design is inspired by the study of Dijksterhuis, Macrae and Haddock (1999). However, in this study the effect of the ease of retrieval on information seeking in risky situations is examined for the first time. To test this, a questionnaire was made using items from other research (Verroen, Gutteling, & de Vries, 2013; Ter Huurne 2008; Witte, K., McKeon, J., Cameron, K. & Berkowitz, J., 1995). Participants were distributed in two conditions (easy retrieval condition and difficult retrieval condition). The results indicate no significant effect of the ease of retrieval on information seeking but did find a significant effect of information sufficiency on the ease of retrieval. The study is a first attempt in finding a relationship between the ease of retrieval and information seeking in the field of risk communication. The current findings indicate that there is no association between both variables. With the help of the recommendations, follow-up research will have to show to what extent this is true.

1. Introduction

Nowadays the average citizen is aware of the risks that exist in the modern-day society, therefore the responsibility (of for instance the corporations related to dangerous activities) to inform people grows (Gutteling & Kuttschreuter, 2002; Slovic, 1999). The involvement should result in preventive behaviour instead of panic when a hazardous situation occurs (Ng & Hamby, 1997). However, in general people are wary while experts are less concerned, when it comes to hazards caused by modern-day industrial activities such as waste management (Williams, Brown & Greenberg, 1999). In the Netherlands, the drilling for gas extraction dominates the media and the political agenda. The gas extraction causes earthquakes in the province Groningen. These earthquakes engender cracks in the walls of houses and other buildings, therefore the pressure on the gas company and the government grows. The citizens are well informed to make sure that they are not at risk. But the question is, when is someone well informed? And when does someone feel the need to find additional information to guard against possible danger? This consideration includes the current knowledge that is being weighed against the sufficiency threshold (the amount of information, an individual thinks he or she needs), which does or does not lead to motivation to search for additional information.

Information seeking is very important to make sure people have the necessary knowledge to satisfy their goal. In order to achieve the goal satisfaction, a person should feel confident with the amount of information to handle the hazardous situation (Case, 2007). This means that the process of information seeking continues until someone feels confident. Besides the information sufficiency, the confidence could also be affected by the way of questioning. The effect of information retrieval on information seeking is therefore mediated by multiple variables. Besides the direct effect of information retrieval on information seeking. Earlier research never manipulated confidence to measure the influence on the information acquiring concerning risk information. This study will be a first attempt to investigate this effect. Dijksterhuis, Macrae and Haddock (1999), found that number of items participants had to give, affected the ease of retrieval. They suggest that a higher number of items increases the difficulty. This increase in difficulty could lower the confidence level, which ensures that the need for additional information grows. However, this research did not include information about risky situations. Therefore, the question is whether this is also the case when dealing with risk information. This research is going to investigate whether the ease of retrieval influences the confidence, which could in turn make that the person consult additional information.

2. Theoretical framework

1.1 Information seeking and risk perception

According to Case (2007) information seeking is "a recognition that your knowledge is inadequate to satisfy a goal that you have". According to this statement, one should search for information in order to handle a risky situation. The amount of information required differs, since people can have different goals depending on their situation. The judgement whether the information is sufficient enough is based on the risk perception and information needs. Multiple studies found that these factors are positively related and decide whether additional information should be gathered (Neuwirth, Dunwoody, & Griffin, 2000; Strating, Van Beuningen, Kuttschreuter, & Gutteling, 2004, as cited in Ter Huurne, 2008). These results support the assumption that higher risk perception is induced by higher uncertainty.

This risk perception can be influenced by the way a risky situation is experienced. Hampel

(2006) found that the intensity of a single occurrence has a larger influence on the perceived risk than multiple smaller occurrences. This could be the consequence of the factor 'habituation' which means that people know what the possible outcomes are, and therefore have confidence that they know how to take effective measures. Additionally, Hampel (2006) believes that technological risks are taken too seriously, while the hazards caused by nature are underestimated. This could be appointed to the fact that risky situation caused by nature have already occurred since the existence of mankind, while technology is still fairly new. Again, this can be explained as a difference in experience and therefore knowledge of the phenomenon. The assumption that technological risks are taken so seriously, could therefore be the result of a lack of knowledge. Gregory and Miller (1998) support this view, according to them, a large number of people are not informed enough to evaluate a technological threat. Therefore, it can be stated that knowledge determines risk perception.

2.2 Judgemental confidence

As described above, the information seeking behaviour is based on insufficient knowledge. Researchers found that in general, people do not have the necessary knowledge to make good considerations. On the other hand, when people feel that they are not informed enough to handle a situation, they need to seek for additional information. However, Chaiken, Liberman, and Eagly (1989, as cited in Sunblad, Biel, & Gärling, 2009) found that the actual knowledge and the confidence of the knowledge could be dissimilar, which leads to a distorted view. Therefore, the judgement can be biased when the actual knowledge and the confidence of the knowledge are not aligned. When for example a fire occurs at a factory, someone knows exactly what to do but still feels insecure and searches for information just to be sure. On the other hand, someone in the same situation does not know what to do but thinks he/she will be alright without searching for information. In these cases, the judgemental confidence of their knowledge and actual knowledge are not in line with each other. Especially when the personal involvement is high but the confidence in the current knowledge is low, people are eager to process for information. But it can also lead to the situation where a person with a high level of confidence, but a low knowledge level does not feel the need to search for additional information, while on the basis of his knowledge he or she should. But in general, the level of confidence and the actual knowledge are well balanced (Chaiken, Liberman, and Eagly, 1989 as cited in Sunblad, Biel, & Gärling, 2009).

Sundblad, Biel and Gärling (2009) address several factors that are connected to the confidence of one's knowledge. Firstly, the amount of effort has a positive effect on the confidence. The more effort it costs to obtain information and therefore knowledge, the higher the confidence (Chaiken, Liberman & Eagly, 1989, as cited in Sunblad, Biel, & Gärling, 2009). Secondly the source of the knowledge should be taken into account. People value the reliability of the source, which ensures that it isn't necessary to check the information. This could be a stumbling block, when people completely trust the information wrongly and become therefore overconfident about their knowledge (Eagly & Chaiken, 1993, as cited in Sunblad, Biel, & Gärling, 2009). The third factor is the influence of the media, in particular the activity of the journalist in the media. Journalists tend to 'balance' the information form multiple sources, as if they are all from the same worth, creates a bias in the information (Boykoff & Boykoff, 2004). This means that confidence is the source of the information retrieval. When people feel have a low confidence, will search for additional information until they feel confident. This confidence can be influenced by the ease by which information can be retrieved from the memory.

2.3 Ease of retrieval

When it comes to ease of retrieval, the difficulty of recalling information is meant. If an answer is generated quickly, the person experiences the process of information retrieval as easy. Being able to retrieve information indicates that the knowledge is present. But when the knowledge is not present, the person will have to consult sources to be able to access the needed information. As stated earlier, Dijksterhuis, Macrae and Haddock (1999) did research in which they manipulated the ease of retrieval. They concluded that number of requested items, influences the ease of retrieval. The more items the harder the exercise, and therefore the more difficult the ease of retrieval is. The ease of retrieval can in turn be seen as the source of confidence. Depending on the easiness of remembering the needed information, one's confidence is either positively or negatively influenced.

A study by Schwarz, Bless, Klumpp, Rittenauer-Schatka and Simons (1991) examined the assumption that information retrieval depends on the easiness used several conditions. The results indicated contradiction which was a result of the ease of retrieval. Participants who had to recall four examples of assertive behaviour gave themselves higher scores on assertiveness than participants who had to recall twelve examples. When it concerned examples of unassertive behaviour, the opposite happened. Participants who had to recall four examples scored lower on assertiveness than participants who had to recall twelve examples (Schwarz, Bless, Strack, Klumpp, Rittenauer-Schatka, & Simons, 1991). This means that that the impact of both the experienced subjective ease of retrieval and the retrieved information could be investigated. Schwarz, Bless, Strack, Klumpp, Rittenauer-Schatka, and Simons, (1991) found that the higher the number of examples that should be given the self-attributions should also be extreme, if the judgment is purely based on the content of the information. However, the research suggests that the content of the information cannot held entirely responsible for the results. The subjective ease of retrieval should also be taken into account, because the participants paid attention to the experience of the retrieval process. The conclusion that has been drawn is that when people judge about their own knowledge, both think about what they remember of the recall itself but also about the ease or difficulty they faced. The ease of retrieval decreases the judgement, concerning the frequency, probability and typicality (Schwarz, Bless, Strack, Klumpp, Rittenauer-Schatka, & Simons, 1991).

The RISP model can be used to investigate the drive of a person, to engage in analytical work when they are confronted with a risk. The model uses the information seeking and processing as dependent variables in contrast to other models (Dunwoody & Griffin, 2015). The model is based on the fact that people are driven by the gap between their current knowledge and their sufficiency threshold. In order to make a prediction about the gap, the model uses both the ability of a person to attain information and the person's belief about the available information sources. One of the motivators for information seeking is the sufficiency threshold, in the RISP model labelled as the 'information (in)sufficiency' and seen as an accuracy motivator. The second motivator is the injunctive norm, which is a subjective norm, concerning the perception of how people should behave. In this context, this motivator can be explained as the pressure from peers to learn about the risk (Dunwoody & Griffin, 2015). Dunwoody and Griffin (2015) mention that it is very important to take the influence of the environment into account, when doing research on the motivation for information search. The opinions of others are one of the strongest predictors of subjective norms in the information search and processing. However, this process is rarely mentioned as an influential factor by the participants themselves, which indicates that it has an unconsciously effect (Dunwoody & Griffin, 2015).

In the context of this research, the current knowledge should be supplemented to get to the desired level of knowledge (sufficiency threshold), in order to feel comfortable enough to take action during a hazardous situation (Chaiken, Liberman & Eagly, 1989, as cited in Dunwoody & Griffin, 2015). However, this process differs between people. Both the amount of current knowledge and the

sufficiency threshold is different for everyone. Some people have relatively much knowledge about a certain topic, but it is insufficient to meet their threshold. Others might have relatively little knowledge, but still achieve their threshold because the desired amount of information is low. According to Dunwoody and Griffin (2015), one's threshold is based on factors as one's socioeconomic status, ideological predispositions, the perception of the hazards posed by the risk, the worrying about the risk and the social pressure to gain information about the risk.

2.4 The current study

As described in the introduction, the literature could be interpreted in such a way to support the causal model in figure 1. The 'risk information and processing model' was used as a guide, when the causal model was designed. The observable factor, Information Seeking is depending on whether someone judges himself/herself as confident. The literature shows that the Judgemental Confidence depends on one's Current Knowledge and Information Sufficiency. In addition, the Self-Efficacy indicates whether someone considers himself/herself as capable to put the knowledge into practice. These three variables are being influenced by the Ease of Retrieval, just like the Information Seeking. Additionally, there are two extra variables that will be tested, which have been used in earlier research: Risk Perception and Personal Involvement, from which Risk Perception influences the Information Sufficiency and the Information Seeking while the Personal Involvement only affects the Information Seeking.

As the literature prescribes we should expect that people who are confronted with more difficult questions (who should give more examples) are less confident about their knowledge and therefore start looking for information. This lead to the following hypothesis: People in the high difficulty group have a higher intention to seek information than people in the low difficulty group.

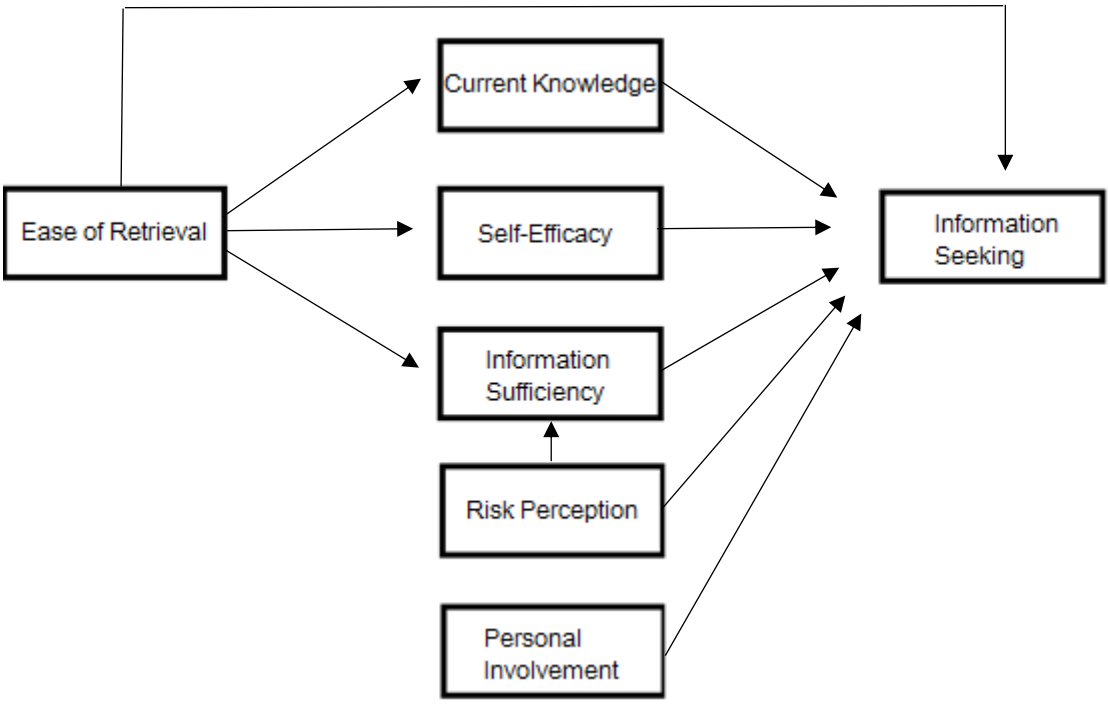

Figure 1. Causal model.

3. Methods

3.1 Participants and design

The recruiting of participants for this study was done by means of a convenience sample. This leads to the following main description of the participants: there are 69 people who participated (39 females and 30 males), with a mean age of 31.65 (SD = 15.778) ranging from 18 to 76 years which are all Dutch. The participants are randomly assigned to a condition (easy retrieval condition and difficult retrieval condition) where the effect of Ease of Retrieval (independent variable) on the Current Knowledge, Self-Efficacy, Information Sufficiency and Information Seeking will be tested (dependent variables). In addition, also the effect of Current Knowledge, Self-Efficacy, Information Sufficiency, Personal Involvement and Risk Perception (independent variables) on Information Seeking will be tested (dependent variable).

3.2 Procedure

There are multiple variables included in this study. The independent variable is the Ease of Retrieval. In other words, the difficulty to retrieve relevant information from the memory. This variable is manipulated, by making the task either easy or difficult. The participants are divided into two groups, either in there easy or the difficult group. The Current Knowledge, Self-Efficacy and Information Sufficiency are the mediator variables, which causes mediation between the independent and dependent variable. The subjective confidence is represented by the Current Knowledge and Information Sufficiency of the participants. Risk Perception and Personal Involvement will be tested as covariates. At last the Information Seeking is the dependent variable, that will give the needed results to answer the hypothesis.

The whole experiment was made on Qualtrics.com. The participants did the questionnaire either by mobile device or computer. The study is conducted in Dutch, to ensure that the participants understood everything and to make the assignment as real as possible.

At forehand, the participants had to fill in the informed consent, to ensure that they participated on the basis of free will and that they knew what their rights are. The assignment contained an adjusted article from a Dutch regional newspaper 'Tubantia' (appendix A). In the article people are warned that there was a big fire at a factory, that is specialized in fabrics for protective and work clothing, outdoor fabrics, synthetic turf components, composite materials for aerospace and antiballistic geosynthetics. The original article stated that there were no hazardous substances released during the fire, but the adjusted article says that carbon monoxide is released. A paragraph where a carefree citizen commented the situation has been deleted, because this could reduce the perceived severity.

After reading the article, the participants had to fill in the questionnaire (appendix B) which tests the causal model. The participants were separated in the two conditions, the easy retrieval condition had to give three examples of actions one should take during a factory fire, while the participants in difficult retrieval condition had to give eight examples. The questions that followed were the same for both conditions. At the end, there was a form where they had to fill in their nationality, age, gender and the distance between their place of residence and the fire (appendix C). This information gives an overview of the group of participants and makes it possible to compare the results between these demographical factors.

3.3 Measures

3.3.1 Ease of Retrieval

To check whether the participants actually found it easy or difficult, a manipulation check was added at the end of the experiment. The manipulation check consists of four items with a seven point (1. strongly disagree – 7. strongly agree) likert-scale. The first item is recoded, to make sure that all scores represent the confidence, while this question was the other way around and would therefore give the level of insecurity. The statement that is addressed is: *"I found it hard to give examples of actions that I have to perform during a factory fire".* The complete list of items can be found in appendix B. The variable has an alpha of .59, which is not sufficient. The lambda2 has a value of .60, which means that 60% of the variance is due to true scores and 40% is due to error. Considering the relatively low alpha and lamda2 only the first item is used, which presumably tests the ease of retrieval directly.

3.3.2 Current Knowledge

Current Knowledge was measured by asking if the participants had any knowledge about factory fires. To measure this variable, four items where measured using a seven point (1. strongly disagree – 7. strongly agree) likert-scale. The items were derived from the research of Ter Huurne (2008), called the framework of risk information seeking (FRIS). An example item is: *I know a lot of factory fires".* The complete list of items can be found in appendix B. The variable has an alpha of .87, which means that the correlation between the items is good. The Lambda2 has a value of .87, which means that 87% of the variance is due to true scores and 13% is due to error.

3.3.3 Information Seeking

To measure if the participants gather information and whether they feel the need to gather, is measured with two sets of items. These items were drafted by following the items of Ter Huurne (2008). To measure the Intention for Information Seeking, four items were used with a seven point (1. strongly disagree – 7. strongly agree) likert-scales. The alpha of Intention for Information Seeking is .87, which means that the correlation between the items is good. The lambda2 is .71, which means that 71% of the variance is due to true scores and 29% is due to error

To measure the Active Information Seeking, a multiple-choice question is used. The participants could choose multiple answers (one point for every ticked box). The last option "I do not want to visit any website" is not used in the data analysis because it is not an example of information seeking behaviour. Additionally, the missing values are also replaced by a zero to make sure that all items are used in calculating the mean score on Information Seeking. The multiple-choice question is as follows: *"Finally, we want to give you the possibility to indicate which of the following websites you would like to have further information. Tick your choice (s) below (multiple answers possible)".*
www.risicosinnederland.nl / www.risksinthenetherlands.nl
www.nlalert.nl / www.nlalert.nl
www.watdoejebijeengrotebrand.nl / www.whatdoyoudoinabigfire.nl
Ik wil geen site bezoeken / I do not want to visit any website".
(The complete list of items can be found in appendix B).
The alpha of Active Information Seeking is .57, which is not sufficient., The Lamda2 is .57, which means that 57% of the variance is due to true scores and 43% is due to error. Considering the low scores on both the alpha as the lambda, the Active Information Seeking will not be used in the data analysis. The intention for information seeking will be used as the only predictor of Information Seeking and is therefore named Information Seeking.

3.3.4 Information Sufficiency

The Information Sufficiency measures to what extent the participants are satisfied with the amount of information they had. It is measured by seven items with a seven point (1. strongly disagree – 7. strongly agree) likert-scale, whereof the first two items where derived from the sufficiency threshold items of the framework of risk information seeking (Ter Huurne, 2008). An example of an item is: *"I think it's important that I gather a lot of information to properly assess the risk".* The complete list of items can be found in appendix B. The variable has an alpha of .78, which is good value. The lambda has a value of .80, which means that 80% of the variance is due to true scores and 20% is due to error.

3.3.5 Personal Involvement

The Personal Involvement items are used to measure to what extent, on a seven point (1. strongly disagree – 7. strongly agree) likert-scale, the participants are feeling involved in factory fires. These four items are drafted on the basis of the items Verroen, Gutteling and de Vries (2013) used. The following statement is an example of the items used to test Personal Involvement (the complete list of items can be found in appendix B), "*I think it is important to be aware of the developments concerning the presence of hazardous substances".* The variable has an alpha of .79, which is good. The lambda has a value of .80, which means that 80% of the variance is due to true scores and 20% is due to error.

3.3.6 Risk Perception

To measure Risk Perception, six items were created of which one multiple choice question. And five, seven point (1. strongly disagree – 7. strongly agree) likert-scales. The items are derived from the framework of risk information seeking (Ter Huurne, 2008) and the risk behavior diagnosis scale (Witte, McKeon, Cameron, & Berkowitz, 1995). The multiple-choice question is afterwards recoded, from low Risk Perception to high Risk Perception. The question is: *"The news article makes me: Comfortable, at ease, satisfied, worried, tensed, anxious".* The complete list of items can be found in appendix B. The variable has an alpha of .68, which is acceptable. The Lambda2 has a value of .70, which means that 70% of the variance is due to true scores and 30% is due to error.

3.3.7 Self-efficacy

The items concerning Self-Efficacy measure the trust in own abilities of the participants. The variable consists of four items are tested with a seven point (1. strongly disagree – 7. strongly agree) likert-scale, which are derived from the 'Risk behavior diagnosis scale' (Witte, K., McKeon, J., Cameron, K. & Berkowitz, J., 1995). The following item gives an illustration of the items that are used: *"I can save myself at the time of a factory fire".* The complete list of items can be found in appendix B. The variable has an alpha of .69, which means that the correlation between the items is acceptable. Lambda2 is .71, which means that 71% of the variance is due to true scores and 29% is due to error.

4. Results

Looking at the data shows that some cases (participants) have a low progress, and therefore didn't finish the experiment or skipped some questions. Only cases with a progress higher than 94 (computed by Qualtrics) were used. This progress represents the completeness of the scores, a progress of 100 means that the survey is completely filled out. Scores lower than 95, meant that the experiment wasn't finished. Some participants reported that they made a mistake but couldn't go back and therefore they had to start over. Cases which had a score of 95 on the progress, missed values at a multiple-choice question. It was optional to give one, multiple or any response at all. Before analysing the results, the means of all the variables were computed by taking all related questions together. The computed mean represents the concerned variable.

4.1 Testing for normality

The 'test of normality' (table 1; appendix D) shows that all the variables except for Current Knowledge (0.04) Ease of Retrieval (.00) and Personal Involvement (.00), have a higher score on significance than the alpha (.05) concerning the Shapiro-Wilk. This means that except for Current Knowledge, Ease of Retrieval and Personal involvement, all variables are not statistically significant and therefore normally distributed. Looking at the plots of normality of Current Knowledge, Ease of Retrieval and Personal Involvement (appendix E), the scores are roughly distributed along the line of normality.

4.2 One-way ANOVA

The descriptive statistics are shown in table 2, while the effect of the manipulation on the variables can be found in table 3 (appendix F). According to the hypothesis, the mean score of the difficult retrieval condition should be higher when it comes to Information Seeking. The Ease of Retrieval shows the predicted effect that participants in the difficult retrieval condition should have a lower confidence and therefore a lower score. The effect of the manipulation on the Ease of Retrieval is statistically significant (F (1, 67) = 8.25, p =.01).

For Current Knowledge and Self-Efficacy, the easy retrieval condition should have higher scores, while the results show however that the difficult retrieval condition has a slightly higher score. Both Current Knowledge (F (1, 67) = 1.04, p = .31) and Self-Efficacy (F (1, 67) = .11, p =.75) show no statistical effect of the manipulation. The Information Sufficiency also shows an unpredicted effect, while the difficult retrieval condition scores higher than the easy retrieval condition. The effect of the manipulation on Information Sufficiency is not significant (F (1, 67) = 1.63, p =.21). The scores on Personal Involvement and Risk Perception show also a minimal difference, where the easy retrieval condition scores higher on Risk Perception, the difficult retrieval condition scores higher on Personal Involvement. Risk Perception (F (1, 67) = .02, p =.90) and Personal Involvement (F (1, 67) = .29, p =.59) show no sign of a statistically significant effect of the manipulation.

Table 2.

Descriptive Statistics

		N	Mean	SD	Min.	Max.
Current knowledge	Easy retrieval condition	36	3.17	1.33	1.00	5.75
	Difficult retrieval condition	33	3.51	1.39	1.00	5.75
	Total	69	3.33	1.36	1.00	5.75
Ease of retrieval	Easy retrieval condition	36	4.50	1.73	1.00	7.00
	Difficult retrieval condition	33	3.33	1.63	1.00	7.00
	Total	69	3.94	1.77	1.00	7.00
Information seeking	Easy retrieval condition	36	3.10	1.27	1.00	5.50
	Difficult retrieval condition	33	3.10	1.15	1.00	6.25
	Total	69	3.10	1.20	1.00	6.25
Information Sufficiency	Easy retrieval condition	36	3.96	.90	1.00	5.29
	Difficult retrieval condition	33	4.24	.91	2.57	6.14
	Total	69	4.09	.91	1.00	6.14
Personal involvement	Easy retrieval condition	36	4.91	1.25	1.00	7.00
	Difficult retrieval condition	33	5.06	1.08	3.00	7.00
	Total	69	4.98	1.64	1.00	7.00
Risk perception	Easy retrieval condition	36	4.34	.86	2.17	5.83
	Difficult retrieval condition	33	4.31	.69	3.00	5.67
	Total	69	4.33	.78	2.17	5.83
Self-efficacy	Easy retrieval condition	36	3.88	1.15	1.25	7.00
	Difficult retrieval condition	33	3.97	1.09	1.50	5.50
	Total	69	3.92	1.12	1.25	7.00

5.1 Outliers

Outliers could have an effect on the results. On Information Seeking, participant 69 has a lower score than the lower quartile. Personal Involvement has two outliers, namely participant 15 and participant 58. Both participants have lower scores than the lower quartile. On Risk Perception, participant 58 has a lower score than the lower quartile. On Information Sufficiency, participant 58 has a lower score than the lower quartile.

To assess whether they are extreme outliers, the inter-quartile range rule multiplier of 3.00 is used. This rule means that the difference between the 25^{th} and 75^{th} percentile value is multiplied by three, in order to set a limit value to detect extreme outliers. When distinguishing extreme outliers from the other outliers, the limit value can be added to the higher quartile and subtracted from the lower quartile. Scores outside these limit values are labelled as extreme outliers. However, all outliers stay between these limit values.

4.4 Multivariate analysis

To test the assumed effect of the Ease of Retrieval on the Current Knowledge, Self-Efficacy, Information Sufficiency and Information Seeking (as shown in the model), a multivariate analysis is executed. The dependent variables are: Current Knowledge, Information Seeking, Self-Efficacy and Information Sufficiency. The fixed factor is the Ease of Retrieval.

The Box's M statistic is 84.97 and has a p-value of p = .36, which is higher than the alpha of .001 that is common to use. This means that the observed covariance matrices op dependent variables are equal across the groups (table 4; appendix G). The Wilk's Lambda of the Ease of Retrieval (F (24, 207) = 2.58, p <.0005; Wilk's Λ = .40) indicates that Ease of Retrieval statistically significantly explains 40% of the variance among the dependent variables (table 5; appendix H).

The Ease of Retrieval has a statistically significant effect on the Current Knowledge (F (6,62) = 2.47; p = .03; partial η^2 =.19), Self-Efficacy (F (6,62) = 4.77; p <. 0005; partial η^2 .32), and the Information Sufficiency *(F* (6,62) = 3.18, p = .01; partial η^2 = .24). However, no effect has been found on Information Seeking (F (6,62) = 1,25; p = .29; partial η^2 = .11) (table 6; appendix I).

4.5 Regression analysis

The effect of the independent variables on Information Seeking is examined by a regression analysis. The independent variables are: Current Knowledge, Ease of Retrieval, Personal Involvement, Risk Perception, Self-Efficacy and Information Sufficiency. The analysis shows that 39.5% of the total variation in Information Seeking can be explained by the independent variables. Additionally, the regression model has a p-value of p < .0005 (F (6,62) = 8.08, p > .0005), which means that the model statistically significantly predicts Information Seeking (table 7; appendix J).

Table 8 shows the coefficients of the dependent variables on Information Seeking. Only Information Sufficiency significantly predicts Information seeking (p = .03). The standardized coefficients of Information Sufficiency (beta = .40) is higher than the other variables, from which can be deduced that the Information Sufficiency has the highest impact on Information Seeking. Additionally, Information Sufficiency has the highest uniqueness according to the semi-partial correlation of .22.

Table 8.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients			Correlations
Model	B	Std. Error	Beta	t	Sig.	Part
Current Knowledge	-.12	.13	-.14	-.90	.37	-.09
Ease of Retrieval	-0.7	.08	-.10	-.87	.39	-.08
Information Sufficiency	.54	.24	.40	2.28	.03	.22
Personal Involvement	.21	.14	.21	1.54	.13	.15
Risk Perception	.35	.18	.23	1.93	.06	.18
Self-Efficacy	.11	.16	.11	.72	.47	.07

5. Discussion

The goal of the research was to examine the influence that the Ease of Retrieval has on information seeking behaviour. To get a good picture, the Ease of Retrieval, Information Seeking, Current Knowledge, Personal involvement, Self-efficacy, Information Sufficiency and Risk perception of the participants was measured. Afterwards analyses were done to visualize the process of risk information seeking.
The corresponding hypothesis is as follows: People in the high difficulty group have a higher intention to seek information than people in the low difficulty group.. Based on the literature, people who have difficulty in retrieving information should be more inclined to seek for additional information. However, the results show no significant effect of both the Manipulation and Ease of Retrieval on Information Seeking. Therefore, the hypothesis is rejected. However, there is an effect of the Ease of Retrieval on the Current Knowledge, Self-Efficacy and the Information Sufficiency. This would mean that the easier the information retrieval is perceived, the higher the Current Knowledge, Self-Efficacy and the Information Sufficiency is perceived.

When investigating the effect of the independent variables on Information Seeking, only a statistically significant effect is found for Information Sufficiency. This outcome means that the higher the Information Sufficiency (the closer it is to the threshold) the higher the score on Information Seeking. This would mean that the more someone thinks he/she knows about the subject, the more information this person will seek.

The finding that the manipulation affects the Ease of Retrieval is in line with the findings of Dijksterhuis, Macrae and Haddock (1999), who found an effect of the number of items on Ease of Retrieval. However, the researchers found that effect of the high difficulty condition who had to give eight items did not cause too much trouble. Therefore, they were curious if this will be the case when the easy retrieval condition should give ten items and the difficult retrieval condition twenty. The current study did not find any effect of the condition on Ease of Retrieval, while using the same number of items for both conditions. However, the number of participants differs between the two studies, with ninety-three against sixty-seven participants. In addition, Dijksterhuis, Macrae and Haddock (1999) found evidence that individual differences influence the memory retrieval. In their study the participants had to list traits to men and women after being divided in different conditions (based on their score regarding prejudices), therefore this subject is susceptible to personal impressions. This could also be the case regarding to the current study, while mentioning actions is a relatively broad concept that could therefore be sensitive to personal interpretation.

The effect that the Information Sufficiency has on Information Seeking is surprising, since the opposite effect was expected. According to the findings of the current study, high sufficiency of knowledge would lead to more information seeking, in comparison with low sufficiency of knowledge. Despite the fact that the first two items are derived from the framework of risk information seeking by Ter Huurne (2008). The approach in the research of Ter Huurne differs somewhat from this research. Ter Huurne's items tests the height of the sufficiency threshold, the information sufficiency tests whether the knowledge is near to the sufficiency threshold. The decision to make additional items is made, to make sure that the variable is tested by more items than the two than Ter Huurne (2008) used. However, the nature of the variable is therefore changed from sufficiency threshold to information sufficiency. The research of Ter Huurne found that a higher information sufficiency results in less information seeking.

Dunwoody and Griffin (2015) found that information insufficiency creates a greater chance of information seeking. This outcome is therefore the opposite of the findings in the current study.

Another study that used information sufficiency is carried out by Yang and Kahlor (2013). They suggest that according to outcomes from earlier research, people do not only search information to gain their information sufficiency and therefore increase their judgemental confidence. However, the idea is that other affective and environmental factors influence this process alongside the information sufficiency.

5.1 Limitations

The biggest limitation of the research is the fact that the items that measure the information sufficiency aren't derived from earlier research. When interpreting the results, it should be taken into account that there is no certainty that these items actually measure the sufficiency threshold. When examining the items further, the doubt arises that some items could be classed under current knowledge as they measure to what extent someone's knowledge is sufficient.

Another limitation of the research is the situation sketch. Some participants indicated that they doubted their role in the situation. This can also be seen in the answers on the Ease of Retrieval question, which in some cases have to do with operations at the factory instead of in the living environment. In addition, some participants indicated that they made a mistake during the questionnaire and could not go back to adjust the mistake. That is why some participants had to do it over again, so there is a chance that they are placed in the other condition than they were before. This could mean that the answers of these participants were influenced through the changing of conditions or the questions that have already been seen.

Finally, regarding the design of this study, the items that should represent the Ease of Retrieval (the manipulation check) correlated poorly. Because of this, only one item was used to represent the Ease of Retrieval, which is too little.

5.2 Recommendations for future research

As mentioned earlier in the paper, the items of ease of retrieval should be drafted very carefully. The perceived difficulty of the retrieving process should solely be tested. Furthermore, the items used in this study to measure the information sufficiency, should be analysed further. Thirdly, the difference in the number of retrieved items should be increased, as suggested by Dijksterhuis, Macrae and Haddock (1999). The effect of personal interpretation will also have to be investigated further. Possibly the research design has to be adjusted to measure this adequately.. Lastly, the factors that affect the information sufficiency or sufficiency threshold as suggested by Yang and Kahlor (2013), should be investigated. When these relations become clear, there is also the possibility that new findings will be made regarding information seeking behaviour in risky situations.

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Appendix A

Article of the Dutch regional newspaper Tubantia.

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Zeer grote brand bij fabriek in Nijverdal

NIJVERDAL - De brandweer is donderdagmiddag uitgerukt voor een 'zeer grote brand' bij een fabriek Nijverdal. Er was sprake van veel rookontwikkeling. De brandweer heeft rond 19.00 uur het sein brand meester gegeven.

Redactie 28-01-16, 17:11 Laatste update: 24-02-17, 21:53

Rond 17.00 uur is er brand uitgebroken in een textielmachine. De brand breidde zich al snel uit via de afzuiginstallatie en sloeg over naar een tweede textielmachine. Het aanwezige personeel in de fabriekshal heeft zichzelf in veiligheid kunnen brengen. Van een grote evacuatie was geen sprake.

Vanwege de grote rookontwikkeling is de brand opgeschaald en zijn er blusvoertuigen uit Nijverdal, Hellendoorn en Wierden ingeschakeld. Ook een hoogwerker uit Rijssen was nodig om de brand te kunnen blussen. De F35 vanuit het centrum naar de Kruidenwijk is even afgesloten geweest. De schade in het pand is naast de twee textielmachines en afzuiginstallatie nog niet duidelijk.

Koolmonoxide

Bij de brand is een grote hoeveelheid koolmonoxide vrijgekomen. Koolmonoxide (CO) is een kleur- en geurloos gas dat vrijkomt bij verbranding.

Appendix B

Questionnaire.

Toestemmingsverklaringformulier (informed consent)

Titel onderzoek: The influence of confidence, on information aqcuiring in risky situations

Verantwoordelijke onderzoeker: Valentijn Schnater

Beste participant, het onderzoek waar u op het punt staat aan deel te nemen, staat in het teken van het onderwerp crisissituaties. Er zullen u vragen worden gesteld, die betrekking op uw kennis en overtuigingen. Vervolgens zullen er ook nog enkele demografische gegevens worden gevraagd om de gegevens te kunnen vergelijken en zodoende uitspraken te kunnen doen. Het onderzoek bevat geen schokkende details waardoor u nadien ongemakken zou kunnen krijgen. De gegevens zullen vertrouwelijk worden behandeld en zullen niet naar u terug te leiden zijn.

Om deel te nemen aan het onderzoek dient u akkoord te gaan met het onderstaande:

Ik verklaar op een voor mij duidelijke wijze te zijn ingelicht over de aard, methode, doel en de risico's en belasting van het onderzoek. Ik weet dat de gegevens en resultaten van het onderzoek alleen anoniem en vertrouwelijk aan derden bekend gemaakt zullen worden. Mijn vragen zijn naar tevredenheid beantwoord.

Ik stem geheel vrijwillig in met deelname aan dit onderzoek. Ik behoud me daarbij het recht voor om op elk moment zonder opgaaf van redenen mijn deelname aan dit onderzoek te beëindigen.

☐ Akkoord

Tijdens het onderzoek zal er worden gekeken naar de kennis die mensen hebben om te kunnen handelen tijdens een crisissituatie. Om de betrouwbaarheid en bruikbaarheid van de gegevens te garanderen wordt u vriendelijk verzocht het onderzoek waarheidsgetrouw en zorgvuldig in te vullen.

Hieronder ziet u een recent nieuwsartikel op een website van een krant. Het is voor het onderzoek van belang dat dit artikel goed leest; later in het onderzoek zullen hier vragen over worden gesteld. Klik na het lezen van het artikel vervolgens op de knop 'volgende' om met de vragen te beginnen.

ARTIKEL

Ease of Retrieval

In het voorgaande artikel heeft u gelezen over een brand in een fabriek. Nu willen we graag weten hoeveel kennis mensen hebben over wat ze moeten doen bij een crisissituatie als deze. We willen u daarom vragen om 3 / 8 voorbeelden te noemen van handelingen die u moet verrichten wanneer zich in uw buurt een dergelijke situatie voordoet. Voor een goed beeld van de kennis die mensen hierover hebben, is het van belang dat u uw best doet om 3 / 8 verschillende handelingen te noemen.

Hieronder kunt u deze 3 / 8 voorbeelden van handelingen beschrijven. Neem voor iedere nieuwe handeling die u noemt een nieuwe regel en probeer s.v.p. op ieder van de regels een handeling te noemen

...

...
...

Current Knowledge

De volgende stellingen gaan over uw kennis met betrekking op fabrieksbranden.
Klik op het bolletje dat bij uw mening aansluit, en klik na het invullen op de knop rechts onderin om naar de volgende pagina te gaan.

In hoeverre bent u het eens met de volgende stellingen?
- Ik weet veel over fabrieksbranden.
- Ik weet aan welke gevaarlijke stoffen ik kan worden blootgesteld in mijn woonomgeving door een fabrieksbrand.
- Ik heb genoeg kennis om in te schatten wat het risico is wanneer er een fabrieksbrand uitbreekt.
- Ik weet welke gezondheidsrisico's ik loop ten tijde van een fabrieksbrand.

Self-Efficacy

De volgende stellingen gaan over uw vertrouwen in eigen kunnen, met betrekking op fabrieksbranden.
Klik op het bolletje dat bij uw mening aansluit, en klik na het invullen op de knop rechts onderin om naar de volgende pagina te gaan.

In hoeverre bent u het eens met de volgende stellingen?
- Ik kan mijzelf redden ten tijde van een fabrieksbrand.
- Ik bezit de benodigde vaardigheden om veiligheidshandelingen uit te voeren bij een fabrieksbrand.
- Ik kan andere mensen informeren over het gevaar van een fabrieksbrand.
- Ik kan mijn kennis over fabrieksbranden bijhouden en uitbreiden.

Personal Involvement

De volgende stellingen gaan over uw betrokkenheid met betrekking op fabrieksbranden.
Klik op het bolletje dat bij uw mening aansluit, en klik na het invullen op de knop rechts onderin om naar de volgende pagina te gaan.

In hoeverre bent u het eens met de volgende stellingen?
- Ik vind het belangrijk op de hoogte te zijn van de ontwikkelingen rondom de aanwezigheid van gevaarlijke stoffen bij mij in de buurt.
- Ik ben geïnteresseerd in de gevolgen van een brand waarbij gevaarlijke stoffen vrij kunnen komen.
- Ik voel mij betrokken bij het risico dat samengaat met het verwerken van gevaarlijke stoffen.
- Een brand waarbij gevaarlijke stoffen vrijkomen, zal een invloed op mij hebben.

Information Sufficiency

De volgende stellingen gaan over uw mate van voldoening (benodigde hoeveelheid) op het gebied van kennis, met betrekking op fabrieksbranden.
Klik op het bolletje dat bij uw mening aansluit, en klik na het invullen op de knop rechts onderin om naar de volgende pagina te gaan.

In hoeverre bent u het eens met de volgende stellingen?
- Ik vind het belangrijk dat ik veel informatie verzamel, om het risico goed te beoordelen.
- Ik moet op de hoogte zijn van ongelukken in mijn omgeving.

- Het is belangrijk dat ik weet, hoe ik moet handelen bij een brand in een fabriek in mijn woonomgeving.
- Ik denk dat ik meer weet over de risico's van fabrieksbranden dan strikt noodzakelijk is
- Ik denk dat ik beter weet wat te doen bij een fabrieksbrand in mijn omgeving dan strikt noodzakelijk is.
- Ik denk dat ik voldoende weet over de risico's van fabrieksbranden om veilig te zijn bij zo'n gebeurtenis in mijn omgeving.
- Ik denk dat ik voldoende weet over wat te doen bij een fabrieksbrand om veilig te zijn bij zo'n gebeurtenis in mijn omgeving.

Risk Perception

De volgende stellingen gaan over uw risico waarneming, met betrekking op fabrieksbranden.
Klik op het bolletje dat bij uw mening aansluit, en klik na het invullen op de knop rechts onderin om naar de volgende pagina te gaan.

- Het nieuwsartikel maakt mij:

Gespannen
Tevreden
Angstig
Comfortabel
Zorgelijk
Op mijn gemak

In hoeverre bent u het eens met de volgende stellingen?

- Ik ben van mening dat stoffen die vrijkomen bij een brand zoals koolstofmonoxide erg gevaarlijk zijn.
- De kans is aanwezig dat ik slachtoffer word van een fabrieksbrand (met de bijbehorende vrijkomende stoffen).
- De kans is groot dat ik slachtoffer word van een fabrieksbrand (met de bijbehorende vrijkomende stoffen).
- Een ongeluk waarbij gevaarlijke stoffen vrijkomen heeft een grote invloed op het leven van mensen.
- Een ongeluk waarbij gevaarlijke stoffen vrijkomen heeft veel slachtoffers in de omgeving tot gevolg.

Information Seeking

De volgende stellingen gaan over uw informatie zoekgedrag, met betrekking tot fabrieksbranden.
Klik op het bolletje dat bij uw mening aansluit, en klik na het invullen op de knop rechts onderin om naar de volgende pagina te gaan.

In hoeverre bent u het eens met de volgende stellingen?

- Ik zoek naar zoveel mogelijk informatie over dit onderwerp.
- Ik zoek naar informatie over de handelingen die ik moet verrichten, wanneer een fabrieksbrand plaatsvind in mijn omgeving.
- Wanneer er ergens in Nederland een fabrieksbrand plaatsvind waarbij gevaarlijk stoffen vrijkomen, zal ik naar informatie gaan zoeken.
- Het huidige onderzoek wekt bij mij behoefte op, om informatie te zoeken over fabrieksbranden.

Tot slot willen we u de mogelijkheid geven aan te geven van welk van de onderstaande websites u nadere informatie zou willen hebben. Vink hieronder uw keuze(s) aan (meerdere antwoorden mogelijk)
www.risicosinnederland.nl
www.nlalert.nl
www.watdoejebijeengrotebrand.nl
Ik wil geen site bezoeken

Ease of Retrieval (manipulation Check)

De volgende vraag heeft betrekking op de vraag aan het begin van het onderzoek, waarbij u werd gevraagd om enkele voorbeelden te noemen van handelingen die gewenst zijn ten tijde van een fabrieksbrand.
Klik op het bolletje dat bij uw mening aansluit, en klik na het invullen op de knop rechts onderin om naar de volgende pagina te gaan.

In hoeverre bent u het eens met de volgende stellingen?

- Ik vond het moeilijk om voorbeelden te noemen van handelingen die ik moet uitvoeren bij een fabrieksbrand.
- Ik heb vertrouwen in de door mij gegeven voorbeelden van deze handelingen.
- Ik denk dat ik meer handelingen weet te noemen dan de gemiddelde Nederlander.
- Ik denk dat de handelingen die ik heb genoemd voldoende zijn om de mensen in de omgeving in veiligheid te brengen.

Appendix C
Demografic variables form.

Demographic data:
De volgende vragen zullen worden gebruikt om de data te kunnen vergelijken om uitspraken te kunnen doen.
Geslacht
- Man
- Vrouw

Leeftijd
...

Postcode (alleen cijfers)
...

Hoogst genoten opleidingsniveau (opleiding die u heeft afgerond)
- Basisschool
-VMBO (vroeger MAVO & huisartsschool)
- Havo (hoger algemeen onderwijs)
- Vwo (voorbereidend wetenschappelijk onderwijs)
- MBO (Middelbaar beroepsonderwijs)
- HBO (Hoger beroepsonderwijs)
- Universitaire Bachelor
- Universitaire Master

Dit is het einde van het onderzoek. Tot slot wil ik u volledig worden inlichten over het doel. De participanten zijn op willekeurige wijze verdeeld in twee groepen: in de ene werd gevraagd 3 voorbeelden van handelingen te noemen – dit is relatief gemakkelijk- en in de andere groep waren dat 8 voorbeelden – relatief moeilijk. Op basis van de gegevens zal er worden gekeken of de hoeveelheid te noemen voorbeelden invloed heeft op een aantal factoren zoals het zelfvertrouwen en de behoefte voor het zoeken van aanvullende informatie. Het idee daarbij is dat als mensen het moeilijk vinden voorbeelden te noemen, ze vervolgens hun eigen kennis op dat punt lager zullen inschatten (en dus meer nadere informatie zullen willen ontvangen) dan mensen die het gemakkelijk vonden. Risico-informatieverwerkingsmodellen nemen dat wel aan, maar het is nog nooit direct getest. Met dit onderzoek wil ik dus ene bijdrage leveren aan de wetenschappelijke kennis over het verwerken van risico-informatie.

Ik hoop dat ik u voldoende heb ingelicht. Mocht u nog verdere vragen hebben of interesse hebben in de onderzoeksresultaten, dan kunt u contact opnemen via v.a.g.schnater@student.utwente.nl

Mocht u na het uitvoeren van het onderzoek en het lezen van het doel alsnog willen afzien van deelname, dan kunt u dat nu alsnog aangeven.
☐ Ik wil nog steeds deelnemen
☐ Ik zie af van deelname

Ik wil u hartelijk danken voor uw bijdrage aan het onderzoek.

Appendix D

Test of normality.

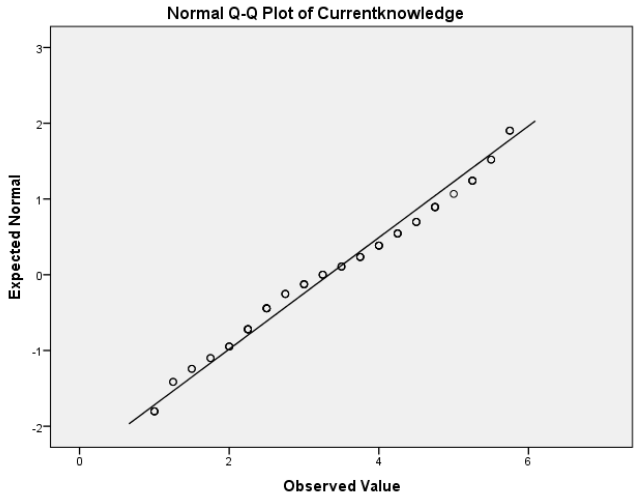
Table 1.

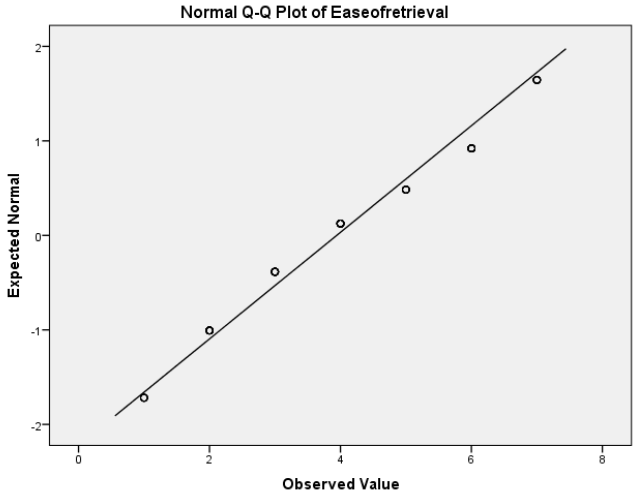
Test of Normality

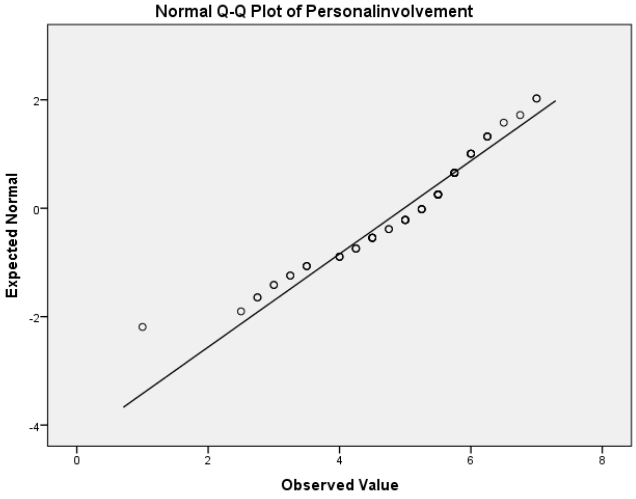
	Shapiro-Wilk		
	Statistic	df	Sig.
Current knowledge	.96	69	.04
Information seeking	.97	69	.11
Ease of retrieval	.93	69	.00
Information Sufficiency	.97	69	.13
Personal involvement	.94	69	.00
Risk perception	.98	69	.27
Self-efficacy	.98	69	.44

Appendix E

Plots of normality







Appendix F

One-way ANOVA

Table 3.

ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
Current Knowledge	Between Groups	1.92	1	1.92	1.04	.31
	Within Groups	123.41	67	1.84		
	Total	125.33	68			
Ease of Retrieval	Between Groups	23.44	1	23.44	8.25	.01
	Within Groups	190.33	67	2.84		
	Total	213.77	68			
Information Seeking	Between Groups	.00	1	.00	.00	1.00
	Within Groups	98.65	67	1.47		
	Total	98.65	68			
Information Sufficiency	Between Groups	1.33	1	1.33	1.63	.21
	Within Groups	54.50	67	.81		
	Total	55.83	68			
Personal Involvement	Between Groups	.39	1	.39	.29	.59
	Within Groups	91.77	67	1.37		
	Total	92.17	68			
Risk Perception	Between Groups	.01	1	.01	.02	.90
	Within Groups	41.29	67	.62		
	Total	41.30	68			
Self-Efficacy	Between Groups	.13	1	.13	.11	.75
	Within Groups	84.66	67	1.26		
	Total	84.79	68			

Appendix G

Box's test of equality of covariance matrices

Table 4.

Box's Test of Equality of Covariance Matrices

Box's M	84.97
F	1.06
Df1	60
Df2	1230.76
Sig.	.36

Note: Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

Appendix H

Multivariate tests

Table 5.

Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.
Ease of Retrieval	Wilks' Lambda	.40	2.58	24.00	207.04	.00

Appendix I

Test of between-subjects effects

Table 6.

Test of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Ease of Retrieval	Current Knowledge	24.15	6	4.03	2.47	.03	.19
	Information Seeking	10.64	6	1.77	1.25	.29	.11
	Information Sufficiency	13.14	6	2.19	3.18	.01	.24
	Self-Efficacy	26.78	6	4.47	4.77	.00	.32
Error	Current Knowledge	101.18	62	1.63			
	Information Seeking	88.01	62	1.42			
	Information Sufficiency	42.69	62	.69			
	Self-Efficacy	58.00	62	.94			
Total	Current Knowledge	892.00	69				
	Information Seeking	760.81	69				
	Information Sufficiency	1211.86	69				
	Information Sufficiency	1147.19	69				

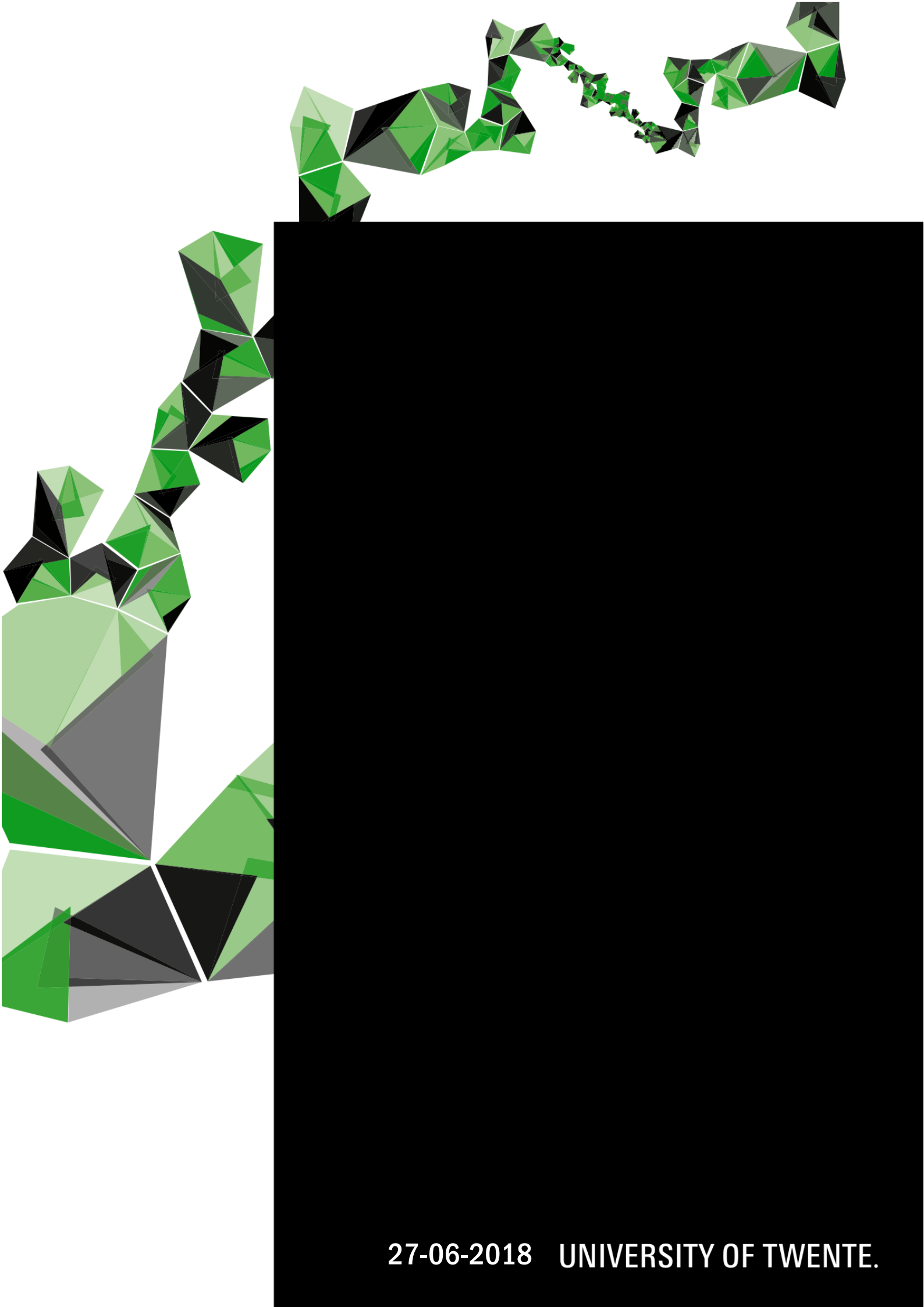
Appendix J

ANOVA

Table 7.

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	43.30	6	7.22	8.08	.00
Residual	55.35	62	.89		
Total	98.65	68			



27-06-2018 UNIVERSITY OF TWENTE.