

Bachelor thesis

The effect of the ease-of-retrieval manipulation on perceived knowledge and information seeking: Is the reliance on the feeling of ease conditional on self-regulatory orientation?

by

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Abstract

An online experiment was conducted to test the effect of the ease-of-retrieval manipulation on perceived knowledge and information seeking. Perceived knowledge is a key predictor of information seeking in conceptual models like the Risk Information Seeking and Processing Model (RISP). However, the relevance of perceived knowledge to influence information seeking has rarely been tested by manipulating the variable directly. Moreover, in this study, it was hypothesized that the mediation of the ease-of-retrieval manipulation via subjective ease is conditional on an individual's self-regulatory orientation. It was assumed that the feeling of ease is perceived as more relevant by promotion- than by prevention-focused individuals. Participants ($N = 138$) were randomized to one of the two ease-of-retrieval conditions (few vs. many). The results of the moderated mediation analysis using the PROCESS macro by Hayes (2017) showed a significant indirect-only mediation via subjective ease. Against expectations, the reliance on the feeling of ease was not more pronounced for promotion- than for prevention-focused participants. Also, perceived knowledge did not predict information-seeking behaviour presumably due to a floor effect of the outcome variable. In sum, the ease-of-retrieval effect was replicated but the manipulation of perceived knowledge did not affect information-seeking behaviour. Avenues for future research are discussed.

International travel has experienced continual growth in the past decades and is one of the world's fastest expanding economic sectors (WTO, 2011). According to Glaesser et al. (2017) international tourist arrivals have increased from 25 million in 1950 to 1.186 billion arrivals in 2015. This trend is expected to continue with estimated international tourist arrivals of 1.8 billion in the year 2030 (WTO, 2011). However, international travel comes with various health risks, depending on the characteristics of the traveller and the travel (WHO, 2012). Especially in tropical and subtropical geographic areas in which tourist industries are growing fastest, travellers have an increased probability to be exposed to specific health risks such as communicable infectious diseases (Rack et al., 2005; UNWTO, 2011). These health risks range from often mild and self-limiting diseases like Travellers' diarrhea to potentially life-threatening diseases such as malaria and dengue fever (Rack et al., 2005). The risk of acquiring most travel-related diseases can be markedly reduced by applying preventive measures like pre-travel advice, vaccinations, or chemoprophylaxis (Kain et al., 2019). Nevertheless, many travellers are not fully aware of the health hazards, and even well-informed travellers do not always adhere to recommended safety precautions (Zimmermann et al., 2012).

According to Kain et al. (2019), one important reason for this is the gap between travellers' low perceived risk of acquiring an infection and the actual risk of getting an infection. This so-called knowledge and perception gap appears to drive the inaction across a wide range of domains, including obtaining pre-travel advice and travel vaccinations (Kain et al., 2019). Studies in the context of environmental health risks have shown that increasing the risk perception by exposing people to high threat (versus low threat) health messages leads to more information-seeking behaviour (e.g., Hovick et al., 2021; Kievik et al., 2012). This is in line with the recommendation by Kain et al. (2019) who argue that enhancing travellers' perception of risk, to better reflect one's actual risk, would allow for individuals to make well-informed decisions and likely improve adherence to travel recommendations.

Another reason for travelling without taking adequate precautions could be overconfidence in the knowledge people feel they have about safety precautions. Conceptual models of risk communication like the Framework of Risk Information Seeking (FRIS) and the Risk Information Seeking and Processing Model (RISP) focus on perceived information sufficiency (Griffin et al., 1999; Huurne & Gutteling, 2008). In these models, information seeking "is a planned, purposive knowledge acquisition process that is driven by the perception that one lacks the knowledge needed to deal adequately with a topic" (Kahlor et al., 2019, p. 3). Information sufficiency is therefore the gap between the amount of knowledge about a given topic that people think they need (sufficiency threshold) and the amount of knowledge they think they currently possess (perceived knowledge) (Kahlor et al., 2019). As stated above, information-seeking behaviour has been increased in previous studies by confronting participants with risk messages. The sufficiency threshold was elevated, leading to a gap between perceived knowledge and the sufficiency threshold. So far, no study has tested the possibility to undermine people's confidence in their perceived knowledge directly instead of elevating the sufficiency threshold.

One possibility to influence an individual's confidence in their own knowledge (perceived knowledge) may be the ease-of-retrieval manipulation – also referred to as few vs. many manipulation. The widely used ease-of-retrieval paradigm was introduced by Schwarz et al. (1991). In their original study, participants either had to recall 12 examples ("many"-condition) or 6 examples ("few"-condition) of past assertive behaviours. The crucial result was that the participants in the "many"-condition rated themselves less assertive than the participants in the "few"-condition, even when, they had greater evidence to assume high assertiveness. Apparently, participants used the feeling of ease (subjective ease) of generating examples to form a judgment about their assertiveness. When assertive behaviour was difficult to recall in the "many"-condition, participants rated themselves lower on the trait of assertiveness (Schwarz et al., 1991). The ease-of-retrieval manipulation demonstrates that people rely on feelings of ease to make judgments and has been highly influential and applied in a wide range of judgmental contexts (Weingarten & Hutchinson, 2018). The question arises whether this manipulation can be used to influence people's judgment about their current perceived knowledge (which is central to models like RISP or FRIS) and stimulate information seeking in the context of travel health. Furthermore, feelings like the subjective ease in the ease-of-retrieval manipulation are perceived as more relevant by some individuals than by others. For example, the perceived relevance of feelings in judgments appears to depend on dispositional factors like an individual's habitual regulatory orientation (Greifeneder et al., 2011).

Based on the above-mentioned considerations, this study investigates the impact of the ease-of-retrieval manipulation on one's perceived knowledge and further information-seeking behaviour about precautions against tropical diseases. To further explore this, the potential moderating role of different self-regulatory orientations (promotion and prevention) between the ease-of-retrieval effect and perceived knowledge is examined. This results in the following research questions, "Can the ease-of-retrieval manipulation influence perceived knowledge and promote further information-seeking behaviour?" and "Does the ease-of-retrieval manipulation work differently for people with promotion and prevention self-regulatory orientations?".

1.1 Theoretical Framework

1.1.1 Risk Information Seeking and Processing Model (RISP). Information seeking plays an important role in adopting preventive behaviours and individuals can better respond to health risks by gaining more knowledge about them (Hwang & Jeong, 2016). For example, research has shown that information seeking about cancer leads to more cancer prevention behaviours (Shim et al., 2006). However, information seeking requires much effort and for that reason, people need to have sufficient motivation to seek and process information (Hwang & Jeong, 2016). The Risk Information Seeking and Processing Model (RISP) is a theoretical framework for predicting information seeking and processing based on an individual's sufficiency motivation. The model proposes that seven factors influence the extent to which an individual seeks and processes information about health, namely

individual characteristics, perceived hazard characteristics, affective response to the risk, felt social pressures to possess relevant information, information sufficiency, perceived information gathering capacity and beliefs about the usefulness of the information in various channels (Griffin et al., 1999). The RISP model draws from other theoretical concepts like the heuristic-systematic model (HSM) by Chaiken (1980) and the theory of planned behaviour (TPB) by Ajzen (1991). It features important HSM concepts, i.e., heuristic information processing, systematic information processing, and the sufficiency principle.

Systematic processing refers to deliberate and effortful processing of risk information, whereas heuristic processing indicates less effortful processing based on cognitive shortcuts such as judgmental rules or heuristics (Chen & Chaiken, 1999). According to Yang et al. (2014), in the RISP model systematic information seeking and active processing are primarily motivated by one's psychological need for information. This need for information is conceptualized as information sufficiency which is the difference between *perceived* current knowledge and the amount of knowledge someone feels would be sufficient to deal adequately with the risk (sufficiency threshold) (Kahlor, 2010). The concept of information sufficiency is rooted in the sufficiency principle described by Eagly and Chaiken (1993). It says that people seek a sufficient degree of confidence to make judgments and exercise the effort that is required to attain that level of judgmental confidence. Subsequently, if the sufficiency threshold is higher than the perceived knowledge one will engage in more systematic information seeking and active processing. It is important to note that it is not about the actual knowledge about a risk topic but rather about the knowledge someone believes to have (perceived knowledge).

Yang et al. (2014) revealed in their meta-analysis that an individual's perceived current knowledge is a better predictor of information seeking and systematic processing than the sufficiency threshold. According to the researchers, the reason for this could be the difficulty in assessing how much information someone needs to manage a risk (sufficiency threshold) compared to estimating how much one knows about a potential risk (perceived knowledge). The meta-analytic results further showed that perceived knowledge is one of the two key variables in the RISP model, next to informational subjective norms (Yang et al., 2014). However, until today, no study has tried to manipulate perceived knowledge directly to explore whether this central concept really matters when it comes to information-seeking behaviour.

1.1.2 Ease-of-retrieval effect. Historically, classical models of decision-making focused mainly on content information as the primary source of judgment and decision-making. Individuals were assumed to make judgments by systematically evaluating all available and relevant content information in a rational and unbiased manner (Greifeneder et al., 2011). Psychological research in the past decades has challenged these "rational" theories of decision-making by showing that people often base their decisions and judgments on feelings and heuristics when recalling information from memory (Weingarten & Hutchinson, 2018). One famous example is the feeling of ease or difficulty

introduced by Schwarz et al. (1991). As outlined above, participants made judgments about their assertiveness based on the feeling of ease or difficulty when recalling examples of their own assertive behaviours. The crucial result of the experiment was that although the participants in the "few" condition had less evidence to support high assertiveness than those in the "many" condition, they rated themselves higher in assertiveness. They inferred high assertiveness from the ease they experienced during the recalling of examples (Schwarz et al., 1991; Weingarten & Hutchinson, 2018).

This finding can be explained by the availability heuristic by Tversky and Kahneman (1973). According to the availability heuristic, people estimate the frequency of an event by availability - or in other words – by the ease with which relevant instances come to mind (Tversky & Kahneman, 1973). The underlying belief is "that the higher the population of events in memory, the easier the recall of any one event from this population. Therefore, when people find an event easy to recall, they make the reverse inference, believing that the event is drawn from a larger population in memory" (Raghubir & Menon, 2005, p. 821). This implies for the experiment by Schwarz et al. (1991), that the participants inferred (consciously or unconsciously) from the ease of recalling assertive behaviours in the "few"-condition that these behaviours are drawn from a larger population of past assertive behaviours. Consequently, they rated their own assertiveness higher than the participants in the "many"-condition. The ease-of-retrieval paradigm has been highly influential and the manipulation has been applied in a wide range of contexts like experiments examining the attitude towards sending humans to Mars or childhood pleasantness (Winkielman & Schwarz, 2001; Weick & Guinote, 2008).

However, even though the reliance on subjective ease for making judgments is the dominant explanation for the ease-of-retrieval effect, the conditions under which feelings are more likely to be relied on are not fully explored yet (Greifeneder et al., 2011). Greifeneder et al. (2011) argue that it is important to consider variables that moderate the influence of cognitive feelings on judgments (so-called second and third-generation research). According to the researchers it is necessary to clarify "when feelings are likely to influence judgments, thereby delineating the prevalence of such effects outside psychological laboratories" (Greifeneder & Keller, 2012, p. 339). According to the review by Greifeneder et al. (2011) one category of moderators of the reliance on feelings for judgments is the disposition-related *relevance* of feelings for the judgment.

1.1.3 Regulatory Focus Theory (RFT). One of these dispositional factors which influence the *relevance* of feelings on judgments is an individual's regulatory orientation. According to the Regulatory Focus Theory (RFT), there are two motivational systems of goal pursuit beyond the hedonic principle to approach pleasure and to avoid pain (Higgins, 1997). People approach pleasure and avoid pain in different ways. The first one, the promotion focus, originates in the motivation to attain nurturance, growth, and advancement from the status quo to better states by adopting eager strategies. The primary goal of promotion-focused people is the achievement of ideals, hopes, and aspirations (Higgins & Cornwell, 2016). Self-regulation with a prevention focus is associated with safety, security, and the maintenance of the status quo against falling to worse states by adopting

vigilant strategies. The primary goal of prevention-focused people is the achievement of oughts, duties, and obligations (Higgins & Cornwell, 2016). It is important to note that RFT "moves beyond the sheer valence that is reflected in the classic approach-avoidance duality" (Keller & Bless, 2007, p. 189) in which approach is related to positive reference points and avoidance is related to negative reference points. Rather, in RFT, both the promotion focus and the prevention focus are primarily approach-based strategic orientations with different kinds of desired end-states and needs (e.g., nurturance and safety, gain and non-loss) (Higgins & Cornwell, 2016).

These two modes of self-regulation are shown to have diverging preferences for making judgments. In a series of studies, Pham and Avnet (2009) showed that promotion-focused participants rely more on affect as a heuristic of judgment and decision making than prevention-oriented participants. This was observed in several judgment contexts, including person-impression formation, product evaluations and social recommendations (Pham & Avnet, 2009). According to the researchers, the greater reliance of promotion-focused participants on affect presumably occurs because they tend to find affective inputs more diagnostic than prevention-focused participants - who rely more on cognitive assessment. This is based on findings such as that holistic processing fits a promotion focus and local processing fits prevention focus (Förster & Higgins, 2005) or that promotion-focused people favour speed over accuracy (Förster et al., 2003). Building on these findings, Greifeneder and Keller (2012) predicted that promotion-focused people rely more on the feeling of ease as heuristic to form judgments than prevention-focused people.

Greifeneder and Keller (2012) conducted two experiments in which participants were asked to evaluate an airport extension after experiences of ease or difficulty were created by the ease-of-retrieval manipulation. The researchers indeed found that the reliance on subjective ease was more pronounced among individuals with a promotion-focused self-regulation (Greifeneder & Keller, 2012). This was indicated by more positive evaluation scores of the airport extension after recalling few as compared with many arguments for the extension. However, they did not find an overall ease-of-retrieval main effect but only a simple main effect of ease-of-retrieval for predominant promotion-focused participants. This was explained by the concept of regulatory fit.

Regulatory fit occurs when people engage in activities that are in line with their regulatory orientation (Aaker & Lee, 2006). It can be conceptualized "as the increased motivational intensity that results when there is a match between the manner in which a person pursues a goal and his or her goal orientation" (Aaker & Lee, 2006, p.15). When regulatory fit takes place, people can experience an "it-just-feels-right"-experience which leads to more intense reactions to whatever an individual is evaluating. For example, if there is regulatory fit, people's confidence in their judgment strengthens or a product's value increases or decreases (Aaker & Lee, 2006). In the study by Greifeneder and Keller (2012), promotion-focused individuals may have experienced regulatory fit as the task was to list arguments in *favour* of the airport extension. Prevention-focused individuals may not experience this "feeling right" which leads to a non-significant main effect of ease-of-retrieval in this study.

The moderating effect of self-regulatory orientation on the ease-of-retrieval effect has never been tested in other judgmental contexts in which for example prevention-focused people experience regulatory fit and promotion-focused do not feel regulatory fit. Forming a judgment about the own knowledge about *precautions* against tropical diseases could be such a topic where it is less likely for promotion-focused people to experience regulatory fit. As stated above, prevention-focused people are more concerned about safety and security and maintain the status quo against falling to worse states. Therefore, they presumably feel a high level of regulatory fit when it comes to taking preventive measures to protect their own health to maintain the status quo and not fall into worse health states. Furthermore, a moderating role of self-regulatory orientation has never been tested on perceived knowledge which is a central predictor of information seeking in the RISP model.

1.2 Current study

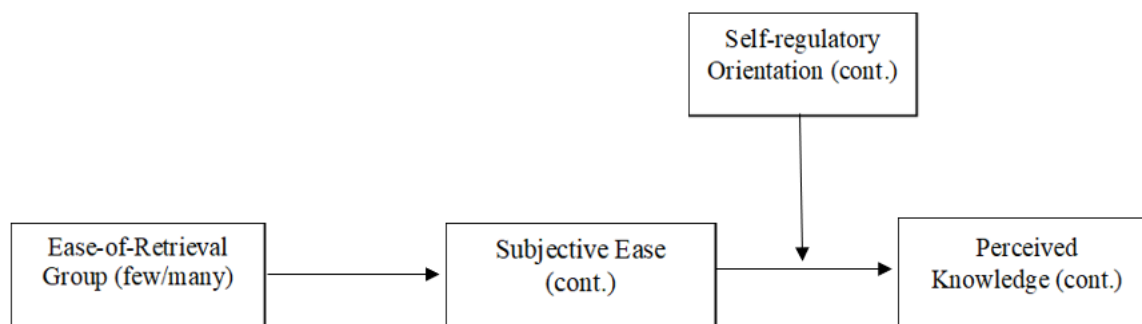
In this study, perceived knowledge is expected to be influenced by the ease-of-retrieval manipulation. The participants are hypothesized to use the subjective ease of generating examples as the primary source of building a judgment about their knowledge. This indirect effect of the ease-of-retrieval manipulation on perceived knowledge via subjective ease is expected to be moderated by self-regulatory orientation. Individuals with promotion-focused orientation are expected to rely more on the cognitive feeling of ease and therefore experience higher perceived knowledge. Individuals with a prevention-focused orientation are expected to rely less on the cognitive feeling of ease and subsequently experience lower perceived knowledge. Furthermore, the assumption is tested if the perceived knowledge of an individual influences further information-seeking behaviour about tropical disease prevention. Individuals who believe to be knowledgeable about the topic of precautions against tropical diseases are presumably less likely to seek additional information.

H1: The ease-of-retrieval manipulation (few/many) influences the perceived knowledge of an individual via subjective ease. The reliance on the subjective ease is more pronounced among individuals characterized by a predominantly promotion-focused as compared with a prevention-focused self-regulatory orientation. This is reflected in higher perceived knowledge for promotion- than for prevention-focused individuals.

H2: Higher perceived knowledge leads to less information-seeking behaviour.

Figure 1

Proposed model for hypothesis 1



2. Method

2.1 Participants and Design

A one-factor experimental design was used to test the direct and indirect effects of the dichotomous independent variable Ease-of-Retrieval Group (few/many) on the dependent variable Perceived Knowledge through the mediator Subjective Ease. Furthermore, this indirect effect was tested on differing levels of the moderator Self-regulatory Orientation (see Figure 1). Also, the association between Perceived Knowledge and the dichotomous independent variable Information-seeking Behaviour (Yes/No) was examined. All participants were selected with a non-probability convenience sampling technique. 30 subjects were recruited through the test subject pool system SONA of the University of Twente and the other 144 subjects in the social environment of the researchers. People who participated via SONA system were rewarded with SONA credits. People from the social environment of the researchers were recruited by sending the survey link via WhatsApp and Instagram. 36 out of 174 people were excluded from analyses because they did not finish the survey, left out important items or did not give informed consent. Inclusion criteria for the survey were a minimum age of 18 years and sufficient English skills to understand the survey. The study was approved by the BMS ethical committee of the University of Twente on the 14th of April 2022.

The age of the 138 respondents, who were included in the analysis, ranged from 18 to 70 years with a mean age of 27.38 ($SD = 11.44$). 68 respondents were in the "few" ease-of-retrieval condition and 70 participants in the "many"-condition. The sample included 83 women (60%) and 55 men (40%). A very high proportion of the sample was German (78%). Furthermore, 13 participants were Dutch (9%) and 17 participants indicated their nationality as 'Other' (12%). The 17 respondents who indicated their nationality as 'Other' were, i.e., Turkish, French, American, Colombian, Mexican, Polish, Greek and Italian. A high proportion of the sample were students (69%) or employees (24%). Moreover, it was a highly educated sample with 67 participants possessing as highest education a high school degree (49%), 40 participants a bachelor's degree (29%), 18 participants a master's degree (13%) and one participant a PhD degree (1%).

2.2 Procedure

The participants either took part online in the experiment via the SONA system of the University of Twente or directly via the online survey software Qualtrics. First entering the survey, the participants were informed about the data processing and storage, and the contact details of the researchers. However, they were given *incomplete* information about the aim and procedure of the study to avoid biasing the ease-of-retrieval manipulation. Also, the participants were asked to give active consent before continuing the study. After the consent page, the participants were asked for general demographic information about the participant's age, nationality, gender, occupation, academic background and travel experience. The participants then filled out three questionnaires, namely the General Regulatory Focus Measure (GRFM) by Lockwood et al. (2002), the Uncertainty Avoidance Index by Hofstede (2011) and the HLS-Q12 short version of the European Health Literacy Survey Questionnaire by Finbråten et al. (2018) to test study-specific hypotheses of each researcher.

The survey continued with the ease-of-retrieval manipulation. The participants were randomly assigned to one of the two experimental groups (few/many). They either had to name two or six examples of possible precautions against tropical diseases when travelling abroad. Thereafter, the experienced subjective ease and perceived knowledge were assessed. On the next page, participants needed to indicate if they would like to seek more information about possible precautions by answering the question: "Would you like to receive more information about tropical disease prevention?". Participants could either select topics and websites related to tropical disease prevention, e.g., travel vaccinations, food and water safety, travel pharmacy or World Health Organization (WHO), and enter their e-mail address to receive a *one-time* e-mail about tropical disease prevention. This indicated information-seeking behaviour. Or they could choose "I am not interested" which indicated *no* information-seeking behaviour. If a participant selected "I am not interested", the reason was assessed (i.e., no time, enough knowledge, no travel plans).

Lastly, participants were debriefed about the aim of the study and the reason why they got incomplete information at the beginning of the study. They were also informed about the fact that they would not receive an e-mail with information about tropical disease prevention, as this was only used by the researchers as an indicator for information-seeking behaviour. An overview of the online experiment setup can be found in the Appendix A.

2.3 Measures of the continuous variables

2.3.1 Self-regulatory orientation. The self-regulatory orientation of the participants was assessed by the General Regulatory Focus Measure (GRFM). The measure was designed to assess people's orientation towards their goals. It has 18 items using a 9-point scale (1 = *not at all true for me* to 9 = *very true for me*) with two sub-scales measuring the prevention and promotion focus of an individual (Lockwood et al., 2002). Both the prevention ($\alpha = .83$) and the promotion ($\alpha = .88$) subscales were found to be reliable in previous studies (e.g., Lockwood et al., 2005). In this study, the

9-point scale was changed to a 7-point scale and a full definition of the response options was given to ensure the interpretability of the measure for the participants (1 = *very untrue* to 7 = *very true*) (see Appendix A). Nine items capture the prevention focus (e.g., I am anxious that I will fall short of my responsibilities and obligations) and nine items the promotion focus (e.g., I see myself as someone who is primarily striving to reach my “ideal self”- to fulfill my hopes, wishes, and aspirations). Higher scores on the prevention sub-scale indicate a preference for avoiding undesirable outcomes and viewing goals as oughts. Higher scores on the promotion sub-scale indicate a preference for pursuing desirable outcomes and viewing goals as ideals (Lockwood et al., 2002). The two sub-scales had good internal consistencies in the current study with Cronbach's alpha values of $\alpha = .84$ and Guttman's lambda-2 values of $\lambda = .85$ for both scales. Like in previous research, prevention items and promotion items were separately averaged (Greifeneder & Keller, 2012; Yeo & Park, 2016). Thereafter, the promotion average was subtracted from the prevention average and the result centered to get each participant's *dominant* regulatory orientation. Consequently, negative scores indicated a dominant *promotion* focus and positive scores a dominant *prevention* focus.

2.3.2 Subjective ease. Three adapted items by Greifeneder and Keller (2012) were used to assess the subjective ease experienced during the ease-of-retrieval manipulation. The three items were "How easy or difficult was it to list precautions against tropical diseases?", "How easy would it have been for you to list even more precautions?" and "How easy was it to list the last precaution?". Answers were given on 7-point scale from 1 = *extremely difficult* to 7 = *extremely easy*. Higher scores on this measure indicate higher experienced ease. The Cronbach's alpha and lambda-2 was high at $\alpha = .84$ and $\lambda = .84$.

2.3.3 Perceived knowledge. Perceived Knowledge was tested using three adjusted items by Radecki and Jaccard (1995) and one item created by the researchers of this study. Three items were assessed on a 5-point scale, including the items "I don't know much about precautions against tropical diseases" (reversed coded) and "In general, I am quite knowledgeable about possible precautions against tropical diseases". The three items were scaled from 1 = *strongly disagree* to 5 = *strongly agree*. For the item "How much do you think you know about the topic of precautions against tropical diseases?" a 7-point scale was used with answers from 1, *not at all knowledgeable*, to 7, *extremely knowledgeable*. The item using the 7-point scale was later recoded into a 5-point scale to ensure a balanced weighing of the items on the overall variable Perceived Knowledge. Higher scores indicated higher perceived knowledge ($\alpha = .87$, $\lambda = .87$).

2.3.4 Travel experience. Participants were asked to answer five questions about their travel experience. Two of the items read, "If you have traveled internationally before, how many times have you traveled to tropical destinations?" and "If you have traveled internationally before, how many times have you traveled outside of Europe?" with four answer options rated by frequency (Never, 1-2 times, 3-5 times, more than 5 times). The five items were summed and averaged to get the variable Travel Experience which had a good internal consistency ($\alpha = .79$, $\lambda = .83$). Nevertheless, two items

about travel companions and travel areas were excluded to improve the internal consistency further ($\alpha = .92, \lambda = .92$). Higher scores on the measure indicate more travel experience.

3. Results

3.1 Bivariate correlations

Descriptives of and bivariate correlations between the main variables as well as demographical variables were measured (see Table 1). 22 significant correlations (out of 54 correlations) were assessed by means of Pearson's r coefficient, ranging from weak to strong correlations. A medium-sized positive correlation was detected between Subjective Ease and Perceived Knowledge ($r(136) = .48, p < .001$). This indicates that higher Subjective Ease is related to higher Perceived Knowledge in this sample. Moreover, low negative correlations between Subjective Ease and Promotion Focus ($r(136) = -.18, p < .05$) and Subjective Ease and Ease-of-Retrieval Group ($r(136) = -.31, p < .001$) were found. This reflects that higher Subjective Ease corresponds with lower scores on the Promotion Focus subscale and being in the "few" Ease-of-Retrieval group. Higher subjective ease for participants in the "few"-condition was also reflected in the higher mean of Subjective Ease compared to the mean in the "many"-condition (Few: $M = 4.45, SD = 1.54$; Many: $M = 3.50, SD = 1.35$). Perceived Knowledge was weakly negatively correlated with Prevention Focus ($r(136) = -.25, p < .01$) and weakly positively correlated with Travel Experience and Age (both: $r(136) = .29, p < .01$). These correlations indicate that participants scoring high on Perceived Knowledge report lower levels of Prevention Focus and higher levels of Travel Experience and Age. Furthermore, a low positive correlation between Promotion Focus and Information-seeking Behaviour was detected reflecting that higher Promotion Focus is associated with actual Information-seeking behaviour ($r(136) = .22, p < .01$).

Table 1

Descriptives of and Pearson Correlations between main variables and demographical variables

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11
1. Subjective ease	3.98	0.88	-	.48*	-.06	-.18*	.07	.15	-.31*	.00	.27*	.00	.14
2. Perceived knowledge	2.56	0.97		-	-.25*	-.03	-.18*	.29*	.01	.00	.29*	-.13	.19*
3. Prevention focus	4.12	1.14			-	-.07	.80*	-.22*	-.15	.06	-.25*	.24*	-.38*
4. Promotion focus	5.23	0.88				-	-.65*	-.10	.06	.22*	-.06	-.11	-.04
5. Dominant focus	-1.12	1.49					-	-.11	-.15	-.09	-.15	.25*	-.26*
6. Travel experience	2.14	0.96						-	.00	-.10	.22*	-.16	.29
7. EoR-group ^a									-	-.08	.07	.00	-.02
8. Information seeking										-	.01	.02	-.01
9. Age											-	-.03	.38*
10. Gender												-	-.26*
11. Highest education													-

Note. * $p < .05$

^a 1 = few, 2 = many.

3.2 Hypotheses testing

3.2.1 Moderated mediation analysis. To test hypothesis 1, a moderated mediation model was conducted using the PROCESS macro in SPSS (Hayes, 2017; model 14) to estimate the direct and indirect effects of the Ease-of-Retrieval Group (few/many) on Perceived Knowledge through Subjective Ease as moderated by *dominant* Self-Regulatory Orientation. The significance of the direct and indirect effects was tested using 5000 bootstrap samples to create bias-corrected 95% confidence intervals. The index of moderated mediation (IMM) was used to test if the indirect effects differ depending on different levels of dominant Self-Regulatory Orientation (-1SD, Mean, +1SD). Before running the analysis, all continuous predictor variables were centered.

Ease-of-Retrieval Group emerged as a significant predictor of Subjective Ease indicating that Subjective Ease was higher for participants in the "few" Ease-of-Retrieval Group than for participants in the "many" Ease-of-Retrieval Group ($b = -0.95, SE = 0.25, p < .001$). The effect of Subjective Ease on Perceived Knowledge was positive and statistically significant ($b = 0.34, SE = 0.05, p < .001$) showing that participants with higher Subjective Ease had higher Perceived Knowledge. These effects indicate a significant indirect effect of the Ease-of-Retrieval Group on Perceived Knowledge through the mediator Subjective Ease. A significant direct effect between Ease-of-Retrieval Group and Perceived Knowledge could not be detected ($b = 0.29, SE = 0.15, p = .06$). Together, the significant indirect effect and non-significant direct effect imply an indirect-only mediation via Subjective Ease. The effect of Self-regulatory Orientation on Perceived Knowledge was negative and statistically significant ($b = -0.12, SE = 0.05, p < .05$). This shows that participants with a dominant *promotion* Self-regulatory Orientation had higher Perceived Knowledge. Overall, the predictors accounted for a significant variation in Perceived Knowledge ($R^2 = 0.30; F(4, 133) = 13.97, p < .001$).

However, the dominant Self-regulatory Orientation did not moderate the effect between Subjective Ease and Perceived Knowledge ($b = -0.04, SE = 0.03, p = .26$). Moreover, the Index of Moderated Mediation (IMM) was .04; the bootstrap 95% CI = [-.06, .16]. Since zero fell between the lower and upper bound of the confidence interval, which indicates a non-significant moderation effect, the overall moderated mediation model was not supported by the IMM. Subsequently, hypothesis 1 had to be rejected. A statistical diagram with the results of the moderated mediation analysis can be found in Appendix B.

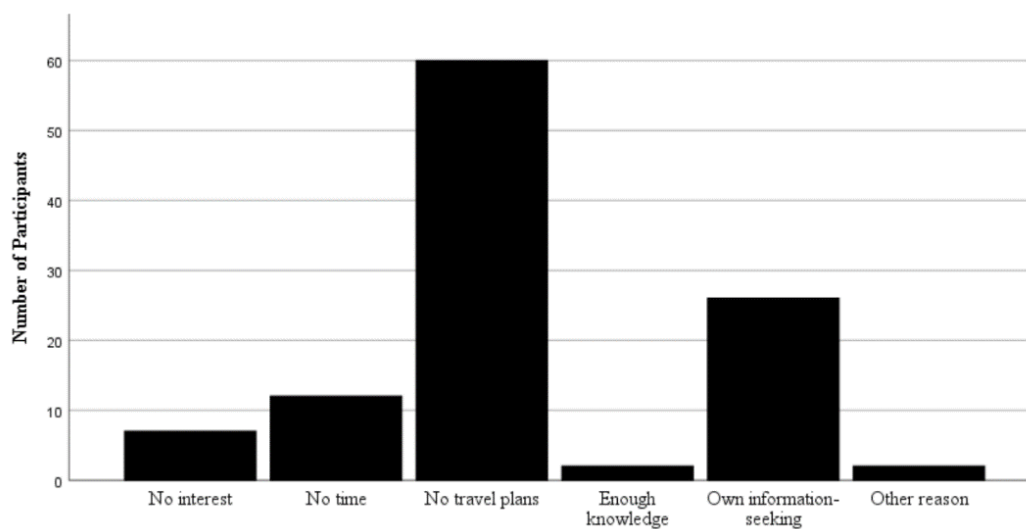
3.2.2 Logistic regression. A logistic regression analysis was conducted to test hypothesis 2. Thereby, it was investigated if Perceived Knowledge predicts Information-seeking behaviour (no/yes). The logistic regression model was not statistically significant. The unstandardized B weight for the constant was, $b = -1.14, SE = 0.59, \chi^2(1, 138) = 5.13, p < .05$. The unstandardized B weight for the predictor variable was, $b = .01, SE = 0.22, \chi^2(1, 138) = 0.00, p = .98$. Therefore, hypothesis 2 had to be rejected.

3.3 Additional analysis

Frequency analysis of the variable Information-seeking Behaviour indicated that 109 participants (79%) did not show seeking behaviour. 60 participants (55%) stated as the reason for "No" information-seeking behaviour "I will not travel to tropical areas anytime soon". Furthermore, 26 participants (24%) specified that they will seek more information by themselves.

Figure 2

Count numbers for reasons of "No" information-seeking behaviour given by the participants



4. Conclusions and discussion

4.1 Central outcomes

This study aimed to investigate the impact of the ease-of-retrieval manipulation on perceived knowledge and information-seeking behaviour. It was further explored if subjective ease mediates the ease-of-retrieval effect and if this reliance on the feeling of ease differs for people with different self-regulatory orientations. The results indeed showed that subjective ease mediated the ease-of-retrieval effect. Participants in the two manipulation groups (few/many) experienced different levels of subjective ease and this resulted in differences in perceived knowledge. More specific, participants in the "few"-condition experienced higher subjective ease while recalling examples of precautions against tropical diseases and consequentially higher perceived knowledge. Participants in the "many"-condition experienced lower subjective ease and lower perceived knowledge.

Other than expected, this indirect effect was not conditional on the self-regulatory orientation of an individual. The reliance on the subjective ease was not more pronounced for individuals characterized by a predominantly promotion-focused orientation as compared to individuals with a prevention-focused self-regulatory orientation. However, analyses showed a significant relationship between *dominant* self-regulatory orientation and perceived knowledge indicating that promotion-focused individuals experienced higher perceived knowledge. Furthermore, it was tested if higher

perceived knowledge leads to less information-seeking behaviour. Such an effect could not be detected in the current study. Additional frequency analysis showed that only a minority of the participants exhibited information-seeking behaviour.

4.2 Discussion

In the current study, a significant indirect effect of the Ease-of-Retrieval group (few/many) on Perceived Knowledge via Subjective Ease was found. Interestingly, no direct effect of the Ease-of-Retrieval Group on Perceived Knowledge was detected. This suggests an indirect-only mediation in this sample. It should be noted that mediation was tested by performing a single significance test in line with recommendations by Hayes (2017), rather than using a multiple-testing strategy like the causal steps approach by Baron and Kenny (1986), to be able to continue the testing in the absence of a significant direct effect between Ease-of-retrieval group and Perceived Knowledge.

The finding of an indirect-only mediation differs from the conclusions of the meta-analysis by Weingarten and Hutchinson (2018) who found indirect and direct effects of similar sizes. The researchers concluded that subjective ease is a robust mediator of the ease-of-retrieval paradigm but emphasize that the direct effect is equally robust as the indirect effect. They claim that subjective ease is "far from the whole story" and suggest exploring alternative explanations to better understand the processes underlying the ease-of-retrieval effect. Nevertheless, the indirect-only mediation in this study indicates that the participants relied heavily on the subjective ease to form a judgment about their current knowledge. An explanation could be the relevance of the health issue used for the ease-of-retrieval manipulation. In an ease-of-retrieval experiment by Rotliman and Schwarz (1998) the perceived self-relevance of a health issue determined whether participants relied on the feeling of ease or the recalled content during the manipulation. When the health topic of heart disease was considered self-relevant for the participants, they used systematic processing and relied on the content of the information recalled. When the health topic was not considered self-relevant, the participants used a heuristic judgment strategy (by relying on subjective ease). The same could have occurred in the current study, meaning that the topic of tropical disease prevention was not that self-relevant and participants therefore used the heuristic judgment strategy. Tropical disease prevention was presumably not self-relevant because many participants had no travel plans to tropical areas anytime soon.

Against expectations, the effect of the ease-of-retrieval manipulation on perceived knowledge via subjective ease was not moderated by self-regulatory orientation. This result differs from the findings by Greifeneder and Keller (2012) who found a moderating role. Interestingly, as stated above, Greifeneder and Keller (2012) only found a simple ease-of-retrieval effect for promotion-focused people and no significant ease-of-retrieval main effect for all participants. In the current study, an ease-of-retrieval effect was found via subjective ease but the self-regulatory orientation did not influence this effect. This could be due to methodological differences in testing the moderating effect

of self-regulatory orientation. In the study by Greifeneder and Keller (2012), the moderating role was tested between the Ease-of-Retrieval Group and the dependent variable "evaluation of airport extension". In this study, it was directly tested if the relevance of the feeling of ease was different for promotion- and prevention-focused people. To test this, the moderating role of self-regulatory orientation between the mediator Subjective Ease and the dependent variable Perceived Knowledge was examined in a moderated mediation model. This model has the advantage that the total ease-of-retrieval effect can be decomposed into an indirect and direct effect. Furthermore, moderators can be more precisely related to the indirect and direct effects (Weingarten & Hutchinson, 2018). According to Miles et al. (2015) "this rigorous method allows for a more accurate evaluation of associations between multiple variables thus resulting in more robust conclusions" (p. 24). Therefore, in this study, it was for the first time precisely tested if the *feeling of ease* was interpreted differently by participants with dominant promotion or prevention self-regulatory focus. In the study by Greifeneder and Keller (2012), it was tested if self-regulatory focus moderates the direct effect of the ease-of-retrieval manipulation.

The assumption of the RISP model that perceived knowledge is an important predictor of information-seeking behaviour was not confirmed. An explanation for this could be a floor effect of information-seeking behaviour. Most participants did not show seeking behaviour which indicates that they were not motivated to seek further information regardless of their level of perceived knowledge about tropical disease prevention. By far the most stated reason for "No" information-seeking behaviour was that participants have no travel plans to tropical areas anytime soon. This could indicate that the personal relevance of the topic was not high enough to lead to seeking behaviour. Even so the perceived current knowledge is an important predictor for information-seeking behaviour, there are more factors of the RISP model that predict behaviour. One factor that could be important to explain the results in this study is perceived hazard characteristics (PHC). PHC can also be referred to as the cognitive evaluation of the risk. Two important measures of PHC are subjective perceptions of the probability of personal harm that could come from the risk (perceived probability) and the perceptions of the seriousness of the harm (perceived severity) (Griffin et al., 2004). According to the RISP model this risk judgment further influences affective responses such as worry. In the current sample, the perceived probability of personal harm from the risk of tropical diseases was presumably not high enough to induce affective responses and promote information-seeking behaviour.

Interestingly, the moderated mediation and correlation analyses showed that dominant regulatory orientation influenced perceived knowledge directly instead of affecting the ease-of-retrieval effect. Higher scores in perceived knowledge correlated with lower scores on the prevention focus sub-scale. Also, a significant negative effect between dominant self-regulatory orientation and perceived knowledge in the moderated mediation analysis was found. These results suggest that prevention-focused participants rated their knowledge lower than promotion-focused participants independent of the influence of the ease-of-retrieval manipulation. A reason for this could be that

prevention-focused people tend to maintain the status quo and avoid errors and making mistakes which could lead to a more conservative self-assessment of the own knowledge.

4.3 Limitations and strengths

One limitation could be the measure of self-regulatory orientation. In this study, the General Regulatory Focus Measure (GRFM) by Lockwood et al. (2002) was used which assesses regulatory orientation in relation to academic achievements (accomplishing academic goals). Ferrer et al. (2017) developed a measure to assess health regulatory focus. They argue that goal pursuit in health and academics differs in many ways for prevention- and promotion-focused people. Future research which assesses regulatory focus in a health context (like the current study) should therefore better use a health-specific scale that has for example higher face validity as it tests motivations to promote health and prevent diseases instead of academically-focused motivations.

A strength of the study is its sample size. Weingarten and Hutchinson (2018) recommended a sample size of 58 participants per experimental group to achieve a power of .8. This recommendation was exceeded in this study with 68 participants in the "few"-condition and 70 participants in the "many"-condition. Even so the power was not explicitly tested in the current study, high statistical power and valid results can be assumed based on the findings by Weingarten and Hutchinson (2018). Another strength is the good reliability of the used measures. All measures, including the measure of perceived knowledge, had lambda-2 values higher than .83. This indicates adequate internal consistencies of the used measures in the current sample.

In a broader context, this study was the first one in which it was directly tested if the reliance on subjective ease is conditional on the self-regulatory orientation. This contributed to the exploration of the conditions that moderate the ease-of-retrieval paradigm and added to the second-and third-generation research in this field. Even so no moderating effect was found, a future direction for research is mentioned below. Furthermore, it was never tested before if the confidence in the own knowledge, which is a central predictor of information-seeking behaviour in the RISP model, can be influenced by the ease-of-retrieval manipulation. For the first time, it was proven that the manipulation can undermine one's perceived knowledge about a health-related topic. This could be of practical use for, e.g., tailoring health communication and campaigns. However, as perceived knowledge did not emerge as a predictor of information seeking, the importance of perceived knowledge for the RISP model could not be proved.

4.4 Future directions

Based on the findings of this study it seems like the self-regulatory orientation of an individual does not influence the reliance on the feeling of ease. Nevertheless, due to the findings by Greifeneder and Keller (2012), a moderating role through other paths than subjective ease cannot be dismissed. Subjective ease is the dominant explanation for the ease-of-retrieval effect and acts as a robust

mediator in many studies including this one. However, as stated above, other paths still need to be identified because only one third to a half of the total effect is normally explained by subjective ease (Weingarten & Hutchinson, 2018). Therefore, self-regulatory orientation could still moderate the ease-of-retrieval through other paths than those examined in this study. Such an additional path was suggested by Tormala et al. (2007). Across several experiments, they found that the more difficult it was for people to retrieve a specific type of cognition, the more likely it was to generate unrequested cognitions. These unrequested cognitions further affected their judgments. For example, when participants were asked to retrieve positive thoughts about an issue, they generated unrequested cognitions of negative thoughts about that issue as well and this effect was stronger for participants in the "many"-condition. This process played a mediating role in the ease-of-retrieval effect by leading to less positive judgments in the "many"-condition through the generation of more negative unrequested cognitions. Tormala et al. (2007) assume that "the struggle to complete the ... retrieval task in the difficult condition is what creates unrequested cognitions, whereas the subjective feeling of ease or difficulty affects the confidence people have in their requested cognitions. Both processes are important" (p. 154). In future research the mediator "unrequested cognitions" could be further explored as an addition to the standard explanation, the feeling of ease, of the ease-of-retrieval paradigm. It could be tested if self-regulatory orientation moderates this process, e.g., by prevention-focused people experiencing more unrequested cognitions than promotion-focused people through a stronger focus on cognitive content.

As stated above, the perceived probability of personal harm from the risk of tropical diseases was presumably not high enough to induce affective responses and promote information-seeking behaviour. This is in line with findings by Yang et al. (2014) who argue that the RISP model is better applicable to research which examines risks that are personally relevant to the participants, e.g., risks related to food consumption and specific health threats. Since many participants indicated to have no travel plans, the topic of tropical disease prevention was presumably not personally relevant to them which could explain the floor effect of information-seeking behaviour. Future research testing the importance of perceived knowledge in predicting information seeking should use a topic with a higher probability of personal harm and higher relevance for most people in their everyday life, e.g., precautions against skin cancer. A methodological improvement for future research could be to include three items by Hovick et al. (2021) to measure the perceived hazard characteristics of a topic, e.g., "How likely is [risk topic] to negatively impact your health in your lifetime?".

4.5 Conclusion

The current study aimed at answering the two research questions, "Can the ease-of-retrieval manipulation influence perceived knowledge and promote further information-seeking behaviour?" and "Does the ease-of-retrieval manipulation work differently for people with promotion and prevention self-regulatory orientations?". The ease-of-retrieval manipulation indeed led to different

levels of perceived knowledge via the mediator subjective ease. However, perceived knowledge did not predict information-seeking behaviour presumably due to a floor effect of the outcome variable. Furthermore, the ease-of-retrieval effect did not work differently for people with promotion and prevention self-regulatory orientation. It was hypothesized that self-regulatory orientation influences how people rely on the feeling of ease. This hypothesis had to be rejected but the possibility that self-regulatory orientation influences the ease-of-retrieval effect in other ways cannot be conclusively dismissed. Future research could focus on other possible mediators like unrequested cognitions or moderators of the ease-of-retrieval effect to better understand under which conditions people make use of feelings as information to form judgments. Moreover, the importance of perceived knowledge for the RISP model could be tested in another context than topical disease prevention to ensure a higher personal relevance for the participants. In sum, the ease-of-retrieval effect was replicated but the manipulation of perceived knowledge did not affect information-seeking behaviour.

References

- Aaker, J. L., & Lee, A. Y. (2006). Understanding regulatory fit. *Journal of marketing research*, 43(1), 15-19. <https://doi.org/10.1509/jmkr.43.1.15>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, 51(6), 1173-1182.
- Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of personality and social psychology*, 39(5), 752. <https://doi.org/10.1037/0022-3514.39.5.752>
- Chen, S., & Chaiken, S. (1999). The heuristic-systematic model in its broader context. In S. Chaiken & Y. Trope (Eds.), *Dual-process theories in social psychology* (pp. 73–96). The Guilford Press.
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Harcourt brace Jovanovich college publishers.
- Ferrer, R. A., Lipkus, I. M., Cerully, J. L., McBride, C. M., Shepperd, J. A., & Klein, W. M. (2017). Developing a scale to assess health regulatory focus. *Social Science & Medicine*, 195, 50-60. <https://doi.org/10.1016/j.socscimed.2017.10.029>
- Finbråten, H. S., Wilde-Larsson, B., Nordström, G., Pettersen, K. S., Trollvik, A., & Guttersrud, Ø. (2018). Establishing the HLS-Q12 short version of the European Health Literacy Survey Questionnaire: latent trait analyses applying Rasch modelling and confirmatory factor analysis. *BMC Health Services Research*, 18(1), 506. <https://doi.org/10.1186/s12913-018-3275-7>
- Förster, J., & Higgins, E. T. (2005). How global versus local perception fits regulatory focus. *Psychological science*, 16(8), 631-636. <https://doi.org/10.1111/j.1467-9280.2005.01586.x>
- Förster, J., Higgins, E. T., & Bianco, A. T. (2003). Speed/accuracy decisions in task performance: Built-in trade-off or separate strategic concerns?. *Organizational behavior and human decision processes*, 90(1), 148-164. [https://doi.org/10.1016/S0749-5978\(02\)00509-5](https://doi.org/10.1016/S0749-5978(02)00509-5)
- Glaesser, D., Kester, J., Paulose, H., Alizadeh, A., & Valentin, B. (2017). Global travel patterns: an overview. *Journal of Travel Medicine*, 24(4). <https://doi.org/10.1093/jtm/tax007>
- Greifeneder, R., Bless, H., & Pham, M. T. (2011). When do people rely on affective and cognitive feelings in judgment? A review. *Personality and Social Psychology Review*, 15(2), 107-141. <https://doi.org/10.1177/1088868310367640>
- Greifeneder, R., & Keller, J. (2012). Habitual self-regulatory orientation and ease-of-retrieval: Regulatory focus qualifies the impact of subjective experiences in judgment. *Motivation and Emotion*, 36(3), 338-348. <https://doi.org/10.1007/s11031-011-9251-8>
- Griffin, R. J., Dunwoody, S., & Neuwirth, K. (1999). Proposed model of the relationship of risk information seeking and processing to the development of preventive behaviors. *Environmental research*, 80(2), 230-245. <https://doi.org/10.1006/enrs.1998.3940>

- Griffin, R. J., Neuwirth, K., Dunwoody, S., & Giese, J. (2004). Information sufficiency and risk communication. *Media psychology*, 6(1), 23-61.
https://doi.org/10.1207/s1532785xmep0601_2
- Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford publications.
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, 52(12), 1280–1300.
<https://doi.org/10.1037/0003-066X.52.12.1280>
- Higgins, E. T., & Cornwell, J. F. (2016). Securing foundations and advancing frontiers: Prevention and promotion effects on judgment & decision making. *Organizational Behavior and Human Decision Processes*, 136, 56-67. <http://dx.doi.org/10.1016/j.obhdp.2016.04.005>
- Hovick, S. R., Bigsby, E., Wilson, S. R., & Thomas, S. (2021). Information seeking behaviors and intentions in response to environmental health risk messages: A test of a reduced risk information seeking model. *Health communication*, 36(14), 1889-1897.
<https://doi.org/10.1080/10410236.2020.1804139>
- Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture*, 2(1). <https://doi.org/10.9707/2307-0919.1014>
- Huurne, E. T., & Gutteling, J. (2008). Information needs and risk perception as predictors of risk information seeking. *Journal of risk research*, 11(7), 847-862.
<https://doi.org/10.1080/13669870701875750>
- Hwang, Y., & Jeong, S. H. (2016). Information insufficiency and information seeking: An experiment. *Science Communication*, 38(6), 679-698.
<https://doi.org/10.1177/1075547016673200>
- Kahlor, L. (2010). PRISM: A planned risk information seeking model. *Health communication*, 25(4), 345-356. <https://doi.org/10.1080/10410231003775172>
- Kahlor, L. A., Wang, W., Olson, H. C., Li, X., & Markman, A. B. (2019). Public perceptions and information seeking intentions related to seismicity in five Texas communities. *International journal of disaster risk reduction*, 37. <https://doi.org/10.1016/j.ijdr.2019.101147>
- Kain, D., Findlater, A., Lightfoot, D., Maxim, T., Kraemer, M. U., Brady, O. J., ... & Bogoch, I. I. (2019). Factors affecting pre-travel health seeking behaviour and adherence to pre-travel health advice: a systematic review. *Journal of travel medicine*, 26(6).
<https://doi.org/10.1093/jtm/taz059>
- Keller, J., & Bless, H. (2008). When positive and negative expectancies disrupt performance: Regulatory focus as a catalyst. *European Journal of Social Psychology*, 38(2), 187-212.
<https://doi.org/10.1002/ejsp.452>
- Kievik, M., ter Huurne, E. F., & Gutteling, J. M. (2012). The action suited to the word? Use of the framework of risk information seeking to understand risk-related behaviors. *Journal of risk research*, 15(2), 131-147. <https://doi.org/10.1080/13669877.2011.601318>
- Lockwood, P., Jordan, C. H., & Kunda, Z. (2002). Motivation by positive or negative role models: Regulatory focus determines who will best inspire us. *Journal of personality and social psychology*, 83(4), 854. <https://doi.org/10.1037/0022-3514.83.4.854>
- Lockwood, P., Chasteen, A. L., & Wong, C. (2005). Age and regulatory focus determine preferences for health-related role models. *Psychology and aging*, 20(3), 376.
<https://doi.org/10.1037/0882-7974.20.3.376>

- Miles, J. N., Kulesza, M., Ewing, B., Shih, R. A., Tucker, J. S., & D'Amico, E. J. (2015). Moderated mediation analysis: An illustration using the association of gender with delinquency and mental health. *Journal of criminal psychology, 5*(2), 99–123. <https://doi.org/10.1108/JCP-02-2015-0010>
- Pham, M. T., & Avnet, T. (2009). Contingent reliance on the affect heuristic as a function of regulatory focus. *Organizational Behavior and Human Decision Processes, 108*(2), 267-278. <https://doi.org/10.1016/j.obhdp.2008.10.001>
- Rack, J., Wichmann, O., Kamara, B., Günther, M., Cramer, J., Schönfeld, C., ... & Jelinek, T. (2005). Risk and spectrum of diseases in travelers to popular tourist destinations. *Journal of travel medicine, 12*(5), 248-253. <https://doi.org/10.2310/7060.2005.12502>
- Radecki, C. M., & Jaccard, J. (1995). Perceptions of knowledge, actual knowledge, and information search behavior. *Journal of experimental social psychology, 31*(2), 107-138. <https://doi.org/10.1006/jesp.1995.1006>
- Raghubir, P., & Menon, G. (2005). When and why is ease of retrieval informative?. *Memory & cognition, 33*(5), 821-832. <https://doi.org/10.3758/BF03193077>
- Rotliman, A. J., & Schwarz, N. (1998). Constructing perceptions of vulnerability: Personal relevance and the use of experiential information in health judgments. *Personality and Social Psychology Bulletin, 24*(10), 1053-1064. <https://doi.org/10.1177/01461672982410003>
- Schwarz, N., Bless, H., Strack, F., Klumpp, G., Rittenauer-Schatka, H., & Simons, A. (1991). Ease of retrieval as information: Another look at the availability heuristic. *Journal of Personality and Social psychology, 61*(2), 195. <https://doi.org/10.1037/0022-3514.61.2.195>
- Shim, M., Kelly, B., & Hornik, R. (2006). Cancer information scanning and seeking behavior is associated with knowledge, lifestyle choices, and screening. *Journal of Health Communication, 11*(1), 157–172. <https://doi.org/10.1080/10810730600637475>
- Tormala, Z. L., Falces, C., Brinol, P., & Petty, R. E. (2007). Ease of retrieval effects in social judgment: The role of unrequested cognitions. *Journal of Personality and Social Psychology, 93*(2), 143. <https://doi.org/10.1037/0022-3514.93.2.143>
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive psychology, 5*(2), 207-232. [https://doi.org/10.1016/0010-0285\(73\)90033-9](https://doi.org/10.1016/0010-0285(73)90033-9)
- United Nations World Tourism Organization (2011). World Tourism Barometer. *UNWTO World Tourism Barometer and Statistical Annex, 9*(6). <https://doi.org/10.18111/wtobarometereng>
- Weick, M., & Guinote, A. (2008). When subjective experiences matter: Power increases reliance on the ease of retrieval. *Journal of personality and social psychology, 94*(6), 956. <https://doi.org/10.1037/0022-3514.94.6.956>
- Weingarten, E., & Hutchinson, J. W. (2018). Does ease mediate the ease-of-retrieval effect? A meta-analysis. *Psychological Bulletin, 144*(3), 227–283. <https://doi.org/10.1037/bul0000122>
- Winkielman, P., & Schwarz, N. (2001). How pleasant was your childhood? Beliefs about memory shape inferences from experienced difficulty of recall. *Psychological Science, 12*(2), 176-179.
- World Health Organization (2012). *International travel and health: situation as on 1 January 2012*. WHO.
- World Tourism Organization (2011). *Tourism towards 2030: global overview*. UNWTO. <https://doi.org/10.18111/9789284414024>

- Yang, Z. J., Aloe, A. M., & Feeley, T. H. (2014). Risk information seeking and processing model: A meta-analysis. *Journal of Communication, 64*(1), 20-41. <https://doi.org/10.1111/jcom.12071>
- Yeo, J., & Park, J. (2006). Effects of parent-extension similarity and self regulatory focus on evaluations of brand extensions. *Journal of consumer psychology, 16*(3), 272-282. https://doi.org/10.1207/s15327663jcp1603_9
- Zimmermann, R., Hattendorf, J., Blum, J., Nüesch, R., & Hatz, C. (2013). Risk perception of travelers to tropical and subtropical countries visiting a swiss travel health center. *Journal of travel medicine, 20*(1), 3-10. <https://doi.org/10.1111/j.1708-8305.2012.00671.x>

Appendix A

Online experiment set-up

1. Informed Consent

2. Demographics

3. Study-specific questionnaires

3.1 General Regulatory Focus Measure (GRFM)

For each statement, please select the answer that most closely represents what you believe to be true for yourself.

1 = very untrue, 2 = untrue, 3 = somewhat untrue, 4 = neutral, 5 = somewhat true, 6 = true, 7 = very true

1. In general, I am focused on preventing negative events in my life.
2. I am anxious that I will fall short of my responsibilities and obligations.
3. I frequently imagine how I will achieve my hopes and aspirations.
4. I often think about the person I am afraid I might become in the future.
5. I often think about the person I would ideally like to be in the future.
6. I typically focus on the success I hope to achieve in the future.
7. I often worry that I will fail to accomplish my academic goals.
8. I often think about how I will achieve academic success.
9. I often imagine myself experiencing bad things that I fear might happen to me.
10. I frequently think about how I can prevent failures in my life.
11. I am more oriented toward preventing losses than I am toward achieving gains.
12. My major goal in school right now is to achieve my academic ambitions.
13. My major goal in school right now is to avoid becoming an academic failure.
14. I see myself as someone who is primarily striving to reach my “ideal self”—to fulfill my hopes, wishes, and aspirations.
15. I see myself as someone who is primarily striving to become the self I “ought” to be—to fulfill my duties, responsibilities, and obligations.
16. In general, I am focused on achieving positive outcomes in my life.
17. I often imagine myself experiencing good things that I hope will happen to me.
18. Overall, I am more oriented toward achieving success than preventing failure.

3.2 HLS-Q12 short version

3.3 Uncertainty Avoidance Index

4. Ease-of-Retrieval manipulation

In the following, we ask you to name 2 (6) precautions that people can take to protect their health against tropical diseases before traveling abroad.

Note: Please take your time and try to name as many precautions as you can come up with (max. 6). However, if you cannot come up with 6 precautions, that is fine as well. Name as many as you can and proceed to the next section.

- 'Few' condition: Name 2 precautions
- 'Many' condition: Name 6 precautions

5. Subjective Ease

Please answer the following questions based on how easy or difficult you perceived the previous task to be.

On a scale from 1= extremely difficult to 7= extremely easy.

- How easy was it to list precautions against tropical diseases?
- How easy would it have been for you to list even more precautions?
- How easy was it to list the last precaution?

6. Perceived Knowledge

We ask you to rate your knowledge on tropical disease prevention. On a scale from 1= not knowledgeable at all to 7= extremely knowledgeable.

- How much do you think you know about the topic of precautions against tropical diseases?

On a scale from 1= strongly disagree to 5= strongly agree, how much do you agree with the following statements?

- I don't know much about precautions against tropical diseases.
- In general, I am quite knowledgeable about possible precautions against tropical diseases.
- I'm confident in my own knowledge about precautions against tropical diseases.

7. Information-seeking behaviour

Would you like to receive more information about tropical disease prevention?

If yes, you would receive a one-time email (no spam) with information from websites and about topics of your choice. Your email address will not be used for other purposes.

If you would like to receive further information, please select the topic(s) and/or website you would like to receive information from (multiple answers possible) and enter your email address below.

If you do not wish to receive further information, please select "I am not interested".

8. Reasons for 'No' information-seeking behaviour

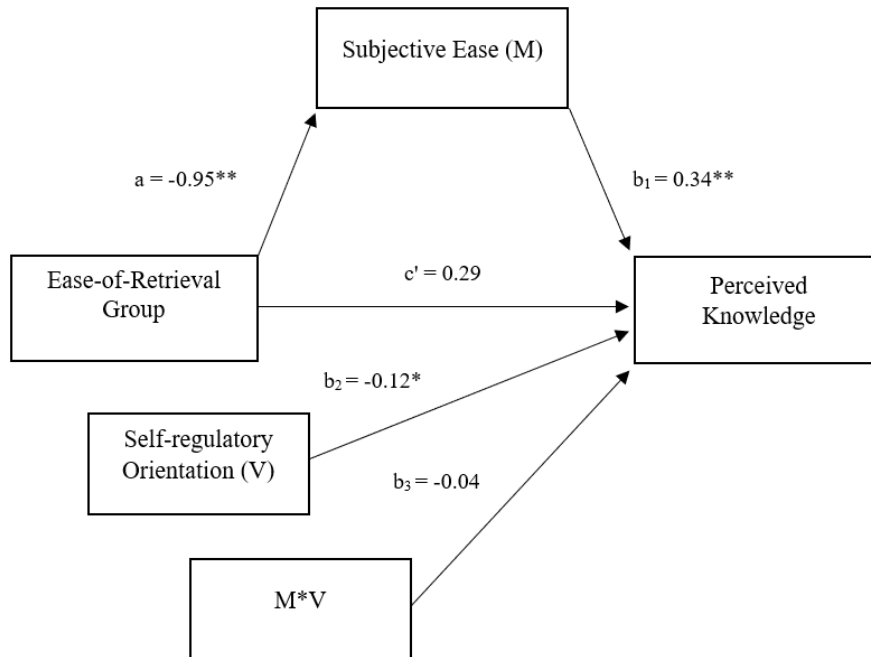
What reason describes best why you do not want to receive information about tropical disease prevention?

9. Debriefing

Appendix B

Statistical diagram

Results of the moderated mediation analysis. Conditional indirect effect of X on Y through $M = a(b_1 + b_3V)$ and direct effect of X on $Y = c'$



Note. * $p < .05$, ** $p < .001$