

Article

Would You Mind Sharing Your Opinion About the Covid-19 Vaccination?

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Explaining Opinion Expression as a Form of Information Sharing

Elena Link¹ 

Department of Communication, Johannes Gutenberg University Mainz, Germany

Jule Scheper¹ , Paula Memenga 

Department of Journalism and Communication Research, University of Music, Drama and Media Hanover, Germany

Abstract

The present study investigates predictors of opinion expression about the Covid-19 vaccination. Health-related opinion expressions, which can be understood as a specific type of information sharing, are highly relevant since opinions are influential sources for individuals' health-related attitude formation and decision-making and shape public opinion about health topics. Guided by extensive research on political opinion expression and the current state of research addressing health information sharing, we apply theoretical assumptions of the risk information seeking and processing model (RISP) to opinion expression about vaccination in different social contexts. We conducted an online survey in Germany ($N = 833$) and empirically analysed our model using regression analyses. A higher likelihood to express one's opinion was contextual-independently facilitated by more positive attitudes towards sharing, injunctive norms, and sharing efficacy. Context-specific patterns were found for descriptive norms, cognitive risk perceptions, and information seeking. Our results revealed the RISP to be a step towards a theoretically sound framework explaining opinion expression, but demand more specific frameworks developed for opinion expression.

Keywords

Information sharing, opinion expression, risk information seeking and processing model, social environment, risk perception, social norms, Covid-19 vaccination.

¹ Both authors contributed equally to this work and therefore share first-authorship.

Corresponding author: Elena Link (elena.link@uni-mainz.de)

Whether it is about Covid-19, cancer screening, or health prevention, individuals are permanently passing health-related information from mass media, campaigns, health professionals, or family and friends to others (Fu et al., 2017; Monrose et al., 2017; Yang et al., 2014; Yang & Zhuang, 2020). Such interpersonally shared information is a type of social influence highly relevant for health-related decisions, for example, about vaccination (Latkin et al., 2021; Link, 2022). In addition, individuals' information sharing generates attention, forms attitudes such as trust in vaccines, improves knowledge (Yang et al., 2014), and contributes to a collective pool of knowledge (Yang & Zhuang, 2020). Shared information includes knowledge and facts but also opinions and experiences that serve informational support (Kye et al., 2019; Lee & Ma, 2012; Liu et al., 2019; Oh & Syn, 2015; Savolainen, 2017). Particularly, opinion expression is a specific form of information sharing that is characterised by sharing more personal judgments and preferences about health issues.

Although opinion expression is part of many definitions of information sharing, it has not yet been further considered in the context of health information sharing. Nevertheless, opinion expression seems to be a particularly relevant type of sharing, as it is both, highly consequential and risky: By expressing their opinions, for example, about the Covid-19 vaccination, individuals provide orientation and give advice particularly crucial for others' opinion-forming processes, informed decision-making, and health behaviours (Huisman et al., 2020), and shape the public opinion about health topics. However, by expressing one's opinion, individuals are at particular risk of social sanctions (Neubaum & Krämer, 2018): Revealing individuals' innermost subjective opinions makes individuals more vulnerable to attack and social isolation than sharing knowledge and facts, for example when the majority holds a different opinion about the Covid-19 vaccination (Noelle-Neumann, 1974).

As the widely applied perceived climate of opinion postulated by the spiral of silence theory (Noelle-Neumann, 1974) revealed only limited explanatory power for explaining opinion expression (for an overview see Matthes et al., 2018), it is the first objective of the present study to apply theoretical assumptions of information sharing to opinion expression (Hilverda & Kuttschreuter, 2018; Lin et al., 2013; Yang et al., 2014; Yang & Zhuang, 2020). Focusing on health communication, our examination of health-related opinion expressions is guided by the risk information seeking and processing (RISP) model (Griffin et al., 1999). This model has been used effectively for explaining information behaviours and processing such as information sharing, understood as a behavioural aspect of information processing (Yang et al., 2014; Yang & Zhuang, 2020; Yang et al., 2021). Following the RISP, we aim to examine whether opinion expression is associated with the attitude towards sharing, social norms, sharing efficacy, information insufficiency, risk perceptions, and affective risk responses as well as information seeking. Second, as health is a sensitive and highly personal issue, we consider the social context of opinion expression to determine whether the relevance of predictors differs if opinions are expressed to rather close or more distant reference groups, e.g., friends and family compared to unknown persons. Thus, the second aim is to investigate different targets of opinion expression (for an overview, see Matthes et al., 2018) and compare two social contexts of opinion expression.

Both objectives are addressed in the context of the Covid-19 vaccination. Against the background of vaccinations' potential to combat the Covid-19 pandemic (World Health Organization, 2020), it is relevant to consider that opinion expression promotes the visibility and strength of opinions (Scherer, 2020) and influences the opinion formation of others (Matthes et al., 2010), which is crucial for decision-making about getting vaccinated. Opinion

expression thus is relevant because it will influence individual attitudes towards the Covid-19 vaccination, the decision whether individuals will get vaccinated, and in the long run, the public opinion about the Covid-19 vaccination. Our research provides insights into which predictors influence opinion expression, which is relevant for strategic communication efforts to promote a dialogue about health issues and consider influences of individuals' social surroundings.

Theoretical Background

Information Sharing and Opinion Expression

In the tradition of information seeking and processing research, the phenomenon of information sharing is understood as a behavioural aspect of information processing that follows information seeking in the process chain (Galarce et al., 2011; Yang, Kahlor et al., 2014). It has its origin in organisational research focusing on knowledge sharing (e.g., Hsu et al., 2007; Hung et al., 2011; Mesmer-Magnus & DeChurch, 2009; Wittenbaum et al., 2004), but has been increasingly studied in a societal context in recent years (Hilverda & Kuttschreuter, 2018; Lin et al., 2013; Yang et al., 2014; Yang & Zhuang, 2020; Yang et al., 2021). In this broader sense, information sharing is understood as an "individual's contribution of information to a collective pool of knowledge" (Yang & Zhuang, 2020, p. 1055) that may include knowledge, resources, and news as well as personal opinions and experiences (Lee & Ma, 2012; Oh & Syn, 2015; Savolainen, 2017).

The present study focused on the expression of personal opinions as a specific type of information sharing. Opinion expression seems to be a particularly relevant form of information sharing, as individuals' expression contributes to the visibility and thus to the strength of an opinion (Scherer, 2020). More visible opinions are more likely to influence others in their attitudes, decisions, and behaviour (Noelle-Neumann, 1974). However, opinion expression seems to be a risky type of information sharing: By expressing one's opinion, especially less popular opinions, individuals risk social sanctions (Neubaum & Krämer, 2018), such as becoming socially isolated (Noelle-Neumann, 1974) or being verbally attacked (Neubaum & Krämer, 2018). Social sanctions are assumed to be more severe for opinion expressions than for sharing other forms of information, i.e., neutral facts about certain vaccines, as these are not as personal as an opinion.

The contexts of opinion expression are enhanced by the online environment. Opinions can no longer be expressed only in front of close reference groups, such as friends and family, but also in front of more distant reference groups, such as unknown persons (see Matthes et al., 2018; Yang & Zhuang, 2020).

Identifying Predictors of Opinion Expression

To examine what drives an individual's opinion expression, we rely on the RISP model and its iterations (Griffin et al., 1999; Kahlor, 2007; 2010), which is grounded, among others, in the theory of planned behavior (TPB) that has proven fruitful in explaining opinion expression (Ajzen, 1991; Neuwirth & Frederick, 2004; see also Yang et al., 2014; Yang & Zhuang, 2020; Yang et al., 2021). The RISP model was developed with the purpose of explaining psychosocial factors relevant to information seeking and processing behaviours. It can be applied to information sharing and opinion expression as scholars propose that information seeking and information sharing behaviours are intertwined (Yang & Zhuang, 2020), and the first evidence

suggests that the predictors subsumed in the RISP (Griffin et al., 1999) are relevant for explaining information sharing (Yang, Kahlor, et al., 2014; Yang & Zhuang, 2020; Yang et al., 2021).

Key predictors of opinion expression derived from the RISP (Griffin et al., 1999; Kahlor, 2007, 2010) are attitudes towards sharing, social norms, sharing efficacy, information insufficiency, risk perceptions, and affective risk responses, which will be explained in more detail below. Concerning our understanding of information sharing as a behavioural aspect of information processing, causing that information sharing is interdependent with information seeking (Yang, Kahlor et al., 2014), information seeking was included as an additional potential predictor of opinion expression.

Attitudes Towards Information Sharing. Attitudes towards a particular behaviour are known predictors considered in the planned risk information seeking model (PRISM) (Kahlor, 2010), which is an iteration of the RISP as well as the theories underlying the RISP such as the TPB (Ajzen, 1991). These attitudes refer to instrumental and affective evaluations of a particular behaviour, such as opinion expression and its consequences (Dunwoody & Griffin, 2015; Lin et al., 2013). Whereas current research indicates that attitudes towards seeking are one of the strongest predictors of information seeking (Yang et al., 2014) and first evidence suggests that attitudes towards seeking are known predictors of information sharing (Yang & Zhang, 2020), attitudes towards information sharing are seldom examined (Lin et al., 2013). However, the overall view of the role of attitudes mentioned above suggests a positive association between attitudes towards information sharing and opinion expression. Thus, we postulated the following hypothesis:

H1: Attitudes towards information sharing are positively related to opinion expression on the COVID-19 vaccination.

Perceived Social Norms. Considering the influences of the social environment on certain behaviours is particularly relevant related to decision-making about the Covid -19 vaccination, as perceived social responsibilities are important motives for getting vaccinated (Betsch et al., 2018). Social influences may also influence individuals' willingness to share their opinion and beliefs to help themselves and others with decision-making about whether to get vaccinated or not. The concept of perceived social norms accounts for the social motivations of information sharing (Yang et al., 2021). Perceived social norms are group identity-based codes of conduct — considered in various theories including the RISP, PRISM, and TPB — that guide individuals' behaviours (Cialdini & Trost, 1998).

Perceived social norms referring to information sharing reflect an individual's expectations that the value of information is high and others are equipped with information. The belief that important others share information about the Covid-19 vaccination refers to descriptive norms. The expectations of important others to share information about the Covid-19 vaccination are known as injunctive norms (Cialdini et al., 1990; Rimal & Real, 2003). Past research has found that descriptive and injunctive sharing norms are related to information seeking (Yang et al., 2014) as well as information sharing (Yang & Zhuang, 2020). Based on the rationale outlined above, we expected injunctive and descriptive sharing norms to be positively associated with opinion expression and derived the following hypotheses:

H2: (a) Injunctive and (b) descriptive sharing norms are positively related to opinion expression on the Covid-19 vaccination.

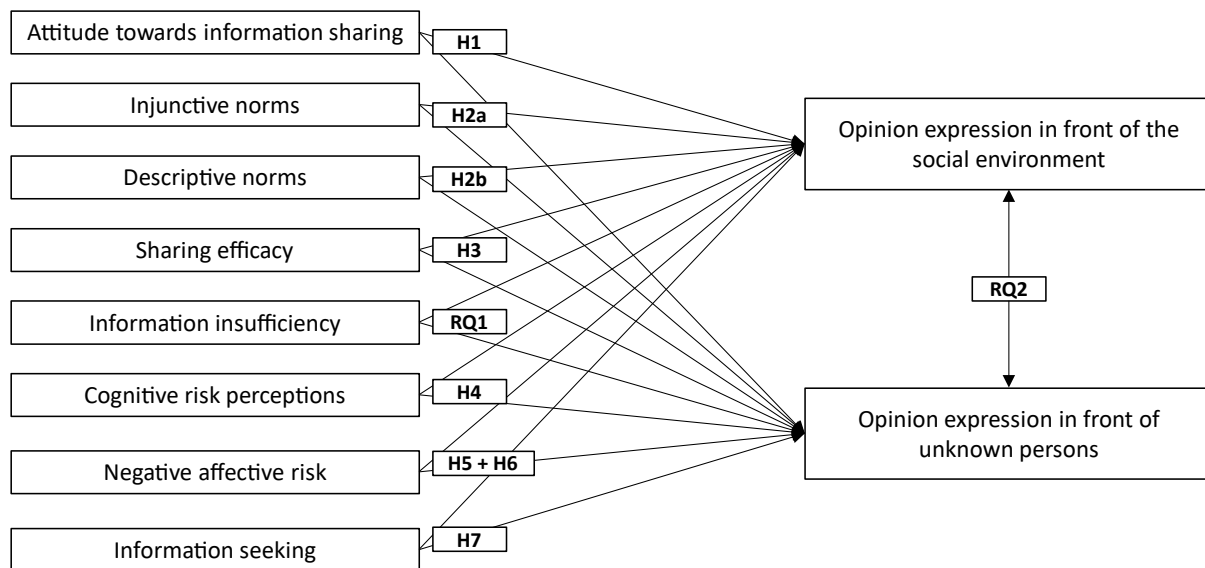


Figure 1. Overview of Our Research Interest

Sharing Efficacy. The RISP and its iterations postulate that information seeking and processing behaviours are also related to individuals’ capacity to implement a behaviour. Required competencies are covered by the concepts of perceived information-gathering capacity (Griffin et al., 1999) or perceived seeking control (Kahlor, 2010). Instead of focusing on these concepts referring to information seeking behaviours, we followed the TPB’s principle of compatibility, postulating that relevant psychosocial predictors should refer to the behaviour under investigation. Therefore, sharing efficacy was understood as a behaviour-specific notion of competencies relevant to sharing information and expressing opinions. Consistent with the original proposition of the TPB and the RISP, we postulated sharing efficacy to be positively related to opinion expression:

H3: Sharing efficacy is positively related to opinion expression on the Covid-19 vaccination.

Information Insufficiency. The RISP claims that individuals’ desired level of confidence in their knowledge motivates their information seeking behaviours (Griffin et al., 1999, 2008; Kahlor, 2010). This assumption is based on the accuracy or epistemic motivation (Chen & Chaiken, 1999; De Dreu et al., 2008) which is understood as an individual’s willingness to achieve a sufficient understanding of information, accurate attitude formation, and decision-making. In models such as the RISP, accuracy motivation is pictured by information insufficiency (Eagly & Chaiken, 1993; Griffin et al., 1999; Kahlor, 2010) which is the gap between the current level of knowledge and the desired level of knowledge for sufficient understanding, attitude-formation, and decision-making. When individuals perceive a gap between both levels, they are postulated to seek information (Griffin et al., 2012).

Concerning information sharing, however, there is disagreement about whether information insufficiency is associated with more or less information sharing. On the one hand, it can be assumed, that information insufficiency is positively related to information sharing, as the exchange with others provides the chance to achieve social approval or to justify individuals’ opinions as dimensions of accuracy motivation. This assumption is supported by extant research, indicating that individuals with a higher information insufficiency are more willing

to share information with others (Yang & Zhuang, 2020; Liao et al., 2018). On the other hand, however, it is discussed whether a lack of information might lead to less information sharing, as individuals may feel too insecure and therefore prefer not to share information (Yang et al., 2014). Moreover, the high complexity of an issue – as in the case of Covid-19 vaccination – may lead individuals to prefer not to share information (Yang et al., 2014). This assumption is in line with the findings of Yang et al. (2014) who found a negative association between information insufficiency and information sharing. Based on these contradictory assumptions, we developed the following research question:

RQ1: What is the relationship between information insufficiency and opinion expression on the Covid-19 vaccination?

Risk Perception and Negative Affective Risk Responses. The RISP (Griffin et al., 1999) also considers perceived hazard characteristics, focusing on risk perceptions and affective risk responses. Risk perceptions represent the perceived likelihood that a certain risk such as side effects of vaccinations will occur, as well as the perceived severity and magnitude of this specific risk (Brewer et al., 2007; Kahlor et al., 2019). Negative affective risk responses refer to affective responses to a perceived hazard such as worry, anger, or anxiety (Kahlor, 2010). Both risk perceptions and affective risk responses are related to the perceived importance of the information about the Covid-19 vaccination and are known to motivate not only communication behaviours such as information seeking and avoidance (Griffin et al., 1999; Kahlor, 2010; Link, 2021) but also information sharing (Yang et al., 2014). If an individual assumes that the Covid-19 vaccination is very likely to pose a risk, that this risk will be very severe (cognitive risk perception) and triggers negative affective responses, the importance of that issue will probably increase opinion expression and motivate a person to express an opinion, for example, to cope with the perceived risk. This assumption is in line with the findings of related fields. A study by Luminet et al. (2000) suggests that more intense negative emotions lead to more sharing of those emotions with others, and Yang et al. (2014) found that people who were more concerned, worried, and anxious about climate change, were more likely to share information.

Thus, in the context of the Covid-19 vaccination, we postulated that individuals who have a higher risk perception and sense more negative affective risk responses are more likely to share their opinion with others. Opinion expression may serve individuals' coping by voicing out concerns, fears, and anxiety or alerting others to the risks of the Covid-19 vaccination. We, therefore, predicted the following:

H4: Risk perceptions are positively related to opinion expression on the Covid-19 vaccination.

H5: Negative affective risk responses are positively related to opinion expression on the Covid-19 vaccination.

Related to information sharing, findings by Yang, Kahlor et al. (2014) suggest that affective risk responses are more influential and activate behaviours more effectively than risk perceptions. Thus, the following hypothesis was developed:

H6: Negative affective risk responses are more influential than cognitive risk perceptions for opinion expression on the Covid-19 vaccination.

Information Seeking. The RISP predictors outlined above were supplemented by former information seeking about the Covid-19 vaccination. In line with the assumption that information sharing is a behavioural aspect of information processing (Yang, Kahlor et al., 2014), information seeking can serve as a preparation for information sharing such as opinion expression by enhancing an individual's knowledge relevant for attitude formation and decision-making as well as establishing networks for opinion exchange about interesting issues (Yang, Kahlor et al., 2014). Thus, we propose the following hypothesis:

H7: Information seeking about the Covid-19 vaccination is positively related to opinion expression on the Covid-19 vaccination.

The Target of Opinion Expression

Focusing on the role of opinion expression for public opinions on the Covid-19 vaccination as well as informed decision-making within one's social surroundings, it seems crucial to consider the social situation of opinion expression. Even though the relevance of social situations is emphasised in the state of research (Matthes et al., 2018), there is still a lack of studies that explore the social situation in more detail (Neubaum & Krämer, 2018). The social situation is strongly related to the channel through which an opinion expression takes place.

It will differ, for example, if an individual uses a private channel and accordingly knows exactly who will see the expressed opinion. If, on the other hand, an individual uses a public channel, he or she must also expect the presence of strangers and often cannot estimate the size of the audience. Due to the different channel characteristics, and the resulting different situations, individuals are sometimes more and sometimes less willing to express an opinion - for example, they are less willing to express an opinion, when a larger number of strangers is present (Chen, 2018), when they expect that the opinion expressed is persistent (Neubaum, 2021) or when they cannot assess who sees the public expression of opinion (Fox & Holt, 2018). Further, they are more willing to express an opinion when they perceive themselves as less identifiable, for example, because of the possibility to act anonymously in the online context (Lane, 2020; Neubaum & Krämer, 2018).

To integrate the situation, the current study focuses on a situational characteristic that is attributed particular importance in the state of research: the target of opinion expression (Matthes et al., 2018). Based on recent studies (Matthes et al., 2018; Neubaum & Krämer, 2018), we assumed that predictors of opinion expression may vary in relevance depending on whether the expression takes place in front of close reference groups, i.e., the social environment, compared to more distant reference groups, i.e., unknown persons. For example, in a recent meta-analysis of studies referring to the spiral of silence theory, Matthes et al. (2018) found that the negative effect of minority perception is stronger when individuals express their opinions to friends and family members than when they express their opinions to unknown persons. The authors found a rationale for this in social sanctions, which may be perceived to be more severe for close reference groups than for more distant reference groups (Matthes et al., 2018). Further, the motivation to comply is more pronounced for friends and family members than for strangers, which can make a difference (Schulz & Rössler, 2013). For our study, this could mean that perceived social norms have a stronger effect when peers are present than when strangers are present. Referring to these empirical results and thoughts to our theoretical framework, we asked whether the theoretically derived predictors differ in

relevance depending on whether the opinion expression takes place in front of the social environment or unknown persons. We, therefore, developed the following research question:

RQ2: To what extent do the predictors of opinion expression differ depending on the target of opinion expression comparing individuals' social environment to unknown persons?

Method

To test our hypotheses and answer our research questions, we conducted an online survey ($N = 833$) in July 2021. Participants were recruited via the German online access Social Sciences' (SoSci) Panel. Respondents were aged between 18 and 90 years ($M = 47.78$, $SD = 15.68$), 55% were female, 2.5% completed junior high school, 13.6% had a general certificate of upper secondary education, and 83.8% had at least Abitur. The questionnaire started with an introductory part and informed consent, followed by the relevant constructs (see Appendix, Tables A1 and A2) and demographic questions. Five participants were excluded due to the plausibility check, resulting in a final sample of $N = 828$. According to German standards, no ethical approval was required for this type of data collection. We complied with the General Data Protection Regulation (GDPR), informed consent was guaranteed, only non-identifiable data was provided, and the participants were free to cancel participation or refuse to answer questions.

Measures

Opinion Expression. For opinion expression, we measured an individual's likelihood to express one's own opinions on the Covid-19 vaccination in front of the social environment ($M = 5.56$, $SD = 1.62$) and in front of unknown persons ($M = 3.57$, $SD = 1.93$). As common in research on opinion expressions (for an overview see Matthes et al., 2018), we used single items for opinion expression in front of unknown persons ("How likely would you participate in a discussion if opinions about Covid-19 vaccination were shared and unknown persons are present [e.g., a discussion on social media, a conversation in a pub, comments under a newspaper article, or a conversation on a train]?") and in front of the social environment ("And how likely would you participate in a discussion about Covid-19 vaccination if only persons from your social environment are present [e.g., private Messenger messages, at dinner with family or friends]?") For opinion expression in front of the social environment and in front of unknown persons, the likelihood was captured on a Likert-type scale ranging from 1 (*very unlikely*) to 7 (*very likely*).

Predictors of Opinion Expression. Attitudes towards information sharing were adapted from Kahlor (2010), consisting of six differential pairs describing respondents' attitudes towards information sharing (e.g., *good – bad*; see Appendix, Table A1). Each pair was rated on a 7-point scale. The measure showed a high internal consistency ($\alpha = .94$) and was compressed to a mean index, with high values indicating a positive attitude towards information sharing ($M = 5.17$, $SD = 1.47$).

Following Geber et al. (2019), injunctive sharing norms ($M = 3.32$, $SD = 2.03$) were determined by the single item "Most people whose opinion I value would approve of my sharing information about the Covid-19 vaccination". Descriptive sharing norms ($M = 4.26$, $SD = 1.98$) were captured by the single item "Most people who are important to me share

information about the Covid-19 vaccination”. Both items ranged from 1 (*strongly disagree*) to 7 (*strongly agree*).

Inspired by perceived seeking control (Kahlor, 2010) and behavioural control beliefs (Griffin et al., 1999), we developed a five-item measure for information sharing efficacy, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). An example item is “I know how to share information about the Covid-19 vaccination” (see Appendix, Table A2). The items showed a high internal consistency ($\alpha = .78$) and were compressed to a mean index, with high values indicating a high sharing efficacy ($M = 5.13$, $SD = 1.19$).

Information insufficiency about the Covid-19 vaccination was adapted from Kahlor (2010). For perceived current knowledge, participants rated their knowledge about the Covid-19 vaccination from 0 (*no knowledge at all*) to 100 (*knowing everything*). For the perceived desired state of knowledge, participants rated how much knowledge would be needed to adequately deal with the decision to get the Covid-19 vaccination from 0 (*need to know nothing*) to 100 (*need to know everything*). For information insufficiency, perceived current knowledge was subtracted from the desired state of knowledge ($M = -13.87$, $SD = 25.83$, $Min = -100$, $Max = 80$).

A three-item measure of cognitive risk perceptions was adapted from Kahlor et al. (2020). The items capture the perceived overall height, severity, and likelihood of risks associated with the Covid-19 vaccination (e.g., “How serious are the current risks posed to you personally by the Covid-19 vaccination?”, see Appendix, Table A1). All items were assessed on a 7-point Likert-type scale, ranging from 1 (*not at all high/serious/likely*) to 7 (*extremely high/serious/likely*). The items received a high internal consistency ($\alpha = .87$) and were compressed to a mean index ($M = 2.62$, $SD = 1.58$).

Negative affective risk responses were determined with three items adapted from Kahlor (2010). On a 7-point Likert-type scale we measured how concerned, worried, and anxious an individual was about the Covid-19 vaccination (see Appendix, Table A1). Again, items were compressed to a mean index ($M = 2.36$, $SD = 1.63$) with a high internal consistency ($\alpha = .88$).

Vaccination information seeking was captured in line with the Health Information National Trends Survey (HINTS), asking participants how frequently they searched for information on the Covid-19 vaccination in the past 30 days. The scale ranged from 1 (*never*) to 6 (*several times a day*) ($M = 2.80$, $SD = 1.36$).

Data Analysis

Data were analysed using two separate multivariate linear regression analyses to explain the likelihood of opinion expression in front of individuals’ social environments and in front of unknown persons. To distinguish between both behaviours was justified as the correlation between the two dependent variables was in the medium range (Pearson’s $r = .50$). Attitudes towards information sharing, injunctive and descriptive norms, perceived information sharing efficacy, information insufficiency, risk perceptions, negative affective risk responses as well as information seeking were included as independent variables. The results were considered statistically significant at $p \leq .05$.

Table 1. Results of Multiple Linear Regressions for Predicting Opinion Expression

Predictors	Model 1			Model 2		
	Opinion Expression: Social Environment			Opinion Expression: Unknown Persons		
	<i>b</i>	<i>SE</i>	<i>b</i> *	<i>b</i>	<i>SE</i>	<i>b</i> *
Attitudes towards information sharing	0.23	0.04	0.18***	0.22	0.05	0.20***
Injunctive norms	0.07	0.03	0.08*	0.09	0.04	0.12*
Descriptive norms	0.09	0.04	0.12*	0.02	0.05	0.02
Sharing efficacy	0.19	0.05	0.14***	0.37	0.06	0.23***
Information insufficiency	0.00	0.00	-0.02	0.00	0.00	-0.08
Cognitive risk perceptions	-0.10	0.04	-0.10*	0.08	0.06	0.07
Negative affective risk responses	0.02	0.04	0.01	-0.03	0.05	-0.03
Information seeking	0.16	0.04	0.14***	0.09	0.05	0.07
<i>R</i> ² (corr)	.23			.17		
<i>F</i>	30.03***			20.81***		

Note. Multiple linear regressions; $n = 779$. * $p < .05$, ** $p < .01$, *** $p < .001$.

Results

We aimed to examine predictors of opinion expression in front of individuals' social environments and in front of unknown persons. Overall, our models explained 23% of the variance for the likelihood of opinion expression in front of the social environment ($F(8,771) = 30.03$, adj. $R^2 = .230$, $p \leq .001$) and 16.9% for the likelihood of opinion expression in front of unknown persons ($F(8,771) = 20.81$, adj. $R^2 = .169$, $p \leq .001$).

H1 assumed that attitudes towards information sharing are positively related to opinion expression on the Covid-19 vaccination. In line with this assumption, we found that more positive attitudes towards information sharing on the Covid-19 vaccination were associated with a more pronounced likelihood for opinion expression on the Covid-19 vaccination in front of the social environment ($t(771) = 5.83$, $b^* = 0.18$, $p \leq .001$) as well as in front of unknown persons ($t(771) = 4.53$, $b^* = 0.20$, $p \leq .001$). Thus, H1 was supported.

H2 referred to the assumption that injunctive (H2a) and descriptive (H2b) sharing norms are positively related to opinion expression on the Covid-19 vaccination. More pronounced injunctive sharing norms were found to result in a higher likelihood of opinion expression on the Covid-19 vaccination in front of the social environment (cf. H2a; $t(771) = 2.17$, $b^* = 0.08$, $p = .030$) and in front of unknown persons (cf. H2a, $t(771) = 2.19$, $b^* = 0.12$, $p = .029$). Thus, the perceived expectation of important others to share information about the Covid-19 vaccination was associated with more frequent opinion expression on the Covid-19 vaccination. Therefore, H2a was supported. Regarding descriptive sharing norms, the results were inconsistent. While more pronounced descriptive sharing norms were significantly related to a higher likelihood for opinion expression in front of the social environment (cf. H2b, $t(771) = 2.58$, $b^* = 0.12$, $p = .010$), there was no significant association between descriptive sharing norms and opinion expressed in front of unknown persons (cf. H2b, $t(771) = 0.52$, $b^* = 0.02$, $p = .600$). Thus, H2b was only partially supported.

Table 2. Results of Hypotheses Testing

Hypothesis	Predictor	Target of Opinion Expression	b^*	p -value	Supported
H1	Attitude towards information sharing	Social environment	0.18	$\leq .001$	Supported
		Unknown persons	0.20	$\leq .001$	
H2a	Injunctive norms	Social environment	0.08	.030	Supported
		Unknown persons	0.12	.029	
H2b	Descriptive norms	Social environment	0.12	.010	Partially Supported
		Unknown persons	0.02	.600	
H3	Sharing efficacy	Social environment	0.14	$\leq .001$	Supported
		Unknown persons	0.23	$\leq .001$	
RQ1	Information insufficiency	Social environment	-0.02	.564	
		Unknown persons	-0.08	.057	
H4	Cognitive risk perceptions	Social environment	-0.10	.024	Not Supported
		Unknown persons	0.07	.137	
H5	Negative affective risk responses	Social environment	0.01	.683	Not Supported
		Unknown persons	-0.03	.572	
H6	Negative affective risk > cognitive risk perceptions	Social environment Unknown persons			Not Supported
H7	Information seeking	Social environment	0.14	$\leq .001$	Partially Supported
		Unknown persons	0.07	.061	

We further expected that sharing efficacy is positively related to opinion expression on the Covid-19 vaccination (H3). Consistent with this hypothesis, our results showed that both, opinion expression in front of the social environment ($t(771) = 3.98$, $b^* = 0.14$, $p \leq .001$) as well as in front of unknown persons ($t(771) = 6.33$, $b^* = 0.23$, $p \leq .001$), were significantly associated with individuals' more pronounced sharing efficacy. Thus, H3 was supported.

RQ1 asked for the association between information insufficiency and opinion expression on the Covid-19 vaccination. The findings revealed no significant associations between opinion expression and information insufficiency (social environment ($t(771) = -0.58$, $b^* = -0.02$, $p = .564$); unknown persons ($t(771) = -1.91$, $b^* = -0.08$, $p = .057$). Thus, the sense of information insufficiency on the Covid-19 vaccination was not linked to the likelihood of opinion expression on the Covid-19 vaccination.

For risk perceptions (H4) as well as negative affective risk responses (H5), we expected a positive association with opinion expression on the Covid-19 vaccination. In contrast to these hypotheses, our findings showed that more pronounced risk perceptions were associated with a lower likelihood for opinion expression in front of the social environment (cf. H5; $t(771) = -2.26$, $b^* = -0.10$, $p = .024$). Further, we did not find a significant association between risk perception and opinion expression in front of unknown persons (cf. H5; $t(771) = 1.49$, $b^* = 0.07$, $p = .137$). Thus, H4 was not supported. Regarding negative affective risk responses, our findings showed no significant association between affective risk response and

opinion expression on the Covid-19 vaccination (cf. H6; social environment: $t(771) = 0.41$, $b^* = 0.01$, $p = .683$; unknown persons: $t(771) = -0.57$, $b^* = -0.03$, $p = .572$). Thus, H5 was not supported. Since we did not find the assumed relationship between risk perception, negative affective risk responses, and opinion expression, the assumption that negative affective risk responses were more influential than cognitive risk perceptions (cf. H6) could not be supported.

Lastly, we assumed that information seeking about the Covid-19 vaccination is positively related to opinion expression on the Covid-19 vaccination (H7). Our findings illustrated that more pronounced information seeking was positively associated with a higher likelihood for opinion expression in front of the social environment (cf. H7; $t(771) = 4.04$, $b^* = 0.14$, $p \leq .001$) but not in front of unknown persons (cf. H8; $t(771) = 1.87$, $b^* = 0.07$, $p = .061$). Therefore, H7 was partially supported. Table 2 provides an overview of all hypotheses and research questions.

In RQ2, we asked to what extent the predictors of opinion expression differ related to the target of opinion expression comparing an individual's social environment to unknown persons. We found the most remarkable differences concerning descriptive norms, risk perceptions, and information seeking, which were significantly associated with opinion expression in front of the social environment but not in front of unknown persons (see results above). Furthermore, our findings showed that sharing efficacy was associated with both opinion expression in front of the social environment and in front of unknown persons, but the association with unknown persons was twice as strong as the association with the social environment.

Discussion

Key Findings on the Predictors of Opinion Expression

As predictors of opinion expression are not well understood (Yang, Kahlor et al., 2014; Matthes et al., 2018), the current study transferred established predictors of the RISP model to health-related opinion expression and provided a differentiated view on various target groups. Overall, our study revealed that the RISP model provides an alternative basis to predict opinion expression on the Covid-19 vaccination. The subsumed predictors were able to explain 23% of the variance in opinion expression in front of an individual's social environment and almost 17% of the variance of opinion expression in front of unknown persons.

Focusing on general patterns across both social contexts under consideration, a higher likelihood to express one's opinion on the Covid-19 vaccination was facilitated by more positive attitudes towards sharing, more pronounced injunctive norms, and higher sharing efficacy. All three factors can be interpreted as contextual-independent predictors. Further, the associations between attitudes towards information sharing, sharing efficacy, and opinion expression were the strongest ones. Our results on attitudes towards information sharing are in line with studies on information seeking (Yang et al., 2014) and information sharing (Yang & Zhuang, 2020), highlighting attitudes towards a behaviour as one of the most important predictors of this behaviour. Besides supporting the role of sharing efficacy, our findings were consistent with studies suggesting that the role of self-efficacy varies in various contexts (e.g., Link et al., 2021). The association of sharing efficacy with opinion expression in front of unknown persons was twice as strong as the association with opinion expression in front of the social environment.

A possible explanation might be that expressing opinions in front of unknown persons is an unfamiliar and less assessable situation for individuals depending on a higher sense of confidence. If individuals perceive to have high capacities and competencies for information sharing, they might be more motivated to tackle this challenging situation. In contrast, expressing an opinion in a social environment may be perceived as familiar and depends less on individuals' competencies. Regarding injunctive sharing norms, the current study extends extant research showing the relevance of social norms for information behaviours (Yang et al., 2014) and highlights the relevance of distinguishing injunctive and descriptive norms.

There were also context-independent patterns regarding the absence of associations. The missing link between information insufficiency and opinion expression contradicted preliminary findings that a higher information insufficiency is associated with a higher willingness to share information with others (Liao et al., 2018; Yang, Kahlor, et al., 2014; Yang & Zhuang, 2020; Yang et al., 2021). We suggest that the accuracy motivation is less relevant for opinion expression. Opinions may be such a specific, subjective form of information that they are not perceived as useful for improving knowledge on a certain topic. However, the results may also be related to the topic of the Covid-19 vaccination. This topic was omnipresent in mass media and interpersonal communication – probably individuals did not need to actively reach out to express an opinion to make up for their information insufficiency. Further, we did not find the hypothesised associations between negative affective risk responses and opinion expression. In contrast to preliminary findings suggesting that information sharing is triggered by negative affective risk responses (Luminet et al., 2000, Yang, Kahlor, et al., 2014; Yang & Zhuang, 2020), we found that opinion expression did not serve individuals' coping with concerns, fears, and anxiety regarding the Covid-19 vaccination. This indicates a relevant difference to information seeking and suggests that opinion expression serves other functions than seeking information.

Context-specific patterns were found for descriptive norms, cognitive risk perceptions, and information seeking. All were exclusively related to opinion expression in front of individuals' social environment. We assume an explanation for the context-specific association of descriptive sharing norms and opinions expressed in our understanding of descriptive norms. Descriptive norms refer to the belief that important others, presumable persons from the social environment, share information about the Covid-19 vaccination. It seems reasonable, that the perceived behaviour of persons from the social environment is associated with an individual's behaviour in front of exactly those people, and perceptions about important others do not automatically tell anything about the behaviour of unknown persons (Park et al., 2009) – which may explain the missing association between descriptive norms and expression of opinions in front of unknown persons. Concerning cognitive risk perceptions, the findings were contrary to our hypothesis as we found a significantly negative association between risk perceptions and opinion expression in front of the social environment. Thus, opinion expression was not used to alert others to the risks of the Covid-19 vaccination, instead, high-risk perceptions might determine to stay silent and avoid interpersonal discussions (Link, 2022).

For the association with information seeking, our findings are in line with former research on information sharing (Yang, Kahlor, et al., 2014) only concerning the social environment. Individuals who frequently seek information may be looking for an exchange of reliable information as well as information and opinions that fit their views. This is what they may expect as an outcome of exchanging opinions in their social environment. Especially in the context of the Covid-19 vaccination, where an overload of information, including lots of

misinformation, is prevalent (Gallotti et al., 2020; Soroya et al., 2021), individuals may reflect on seeking information in the safe haven of the social environment. In contrast, opinion expression with unknown persons, who are less trusted than persons from the social environment, is likely to be perceived as less rewarding and instead risky – especially for a sensitive topic such as the Covid-19 vaccination.

Limitations and Resulting Tasks for Future Research

The present study involves some limitations and provides starting points for further research. First, opinion expression was captured by the hypothetical likelihood of expressing one's opinion. Despite the criticism of hypothetical approaches (e.g., Hayes et al., 2001), this is an appropriate step to provide first systematic evidence about predictors of opinion expression understood as a specific type of information sharing. Further research could use observational experiments to test whether our findings also apply to real-life situations of opinion expression. Second, for the measurement of opinion expression, respondents were asked to indicate how likely they would participate in a conversation. By describing the conversation as an exchange of opinions, it was assumed that respondents were sufficiently implied that participating in the conversation would also mean expressing an opinion. However, we cannot exclude that respondents who indicated that they would participate in the conversation would use avoidance strategies such as lying, making arguments for different sides, or using neutral information (Neubaum & Krämer, 2018). This calls for a more precise measurement of opinion expression. Third, since our study is based on cross-sectional data, causality statements are solely based on theoretical assumptions. We would like to encourage future research to use longitudinal or experimental designs to analyse causal relationships. Fourth, this study is limited to a sample consisting predominantly of highly educated persons. Of course, this limits the generalisability of our results to individuals with lower education and should be critically assessed as opinion expression might be more likely among highly educated individuals. Fifth, the amount of explained variance indicates that further predictors should be considered in future research.

Instead of focusing on risk perceptions and negative affective risk responses, future research should also include benefit perceptions as well as positive affective responses (Song, 2014). Also, outcome expectations and expected sanctions seem to be promising approaches for further research. By including these predictors, differences between opinion expression in front of the social environment and in front of unknown persons could be better explained. Concerning social norms, not only peer norms but also societal norms could be included to differentiate between expressions of opinion in front of the social environment and expressions of opinion in front of unknown persons. Characteristics of an individual such as fear of isolation or communication can be considered to explain opinion expression (e.g., Neubaum & Krämer, 2018). Lastly, particularly for health-related opinion expression, it might be crucial to further explore which types of opinions are shared for what reasons such as to convince others or to correct misinformation (e.g., Duncan et al., 2020).

Conclusion and Theoretical Implications

To the best of our knowledge, this study is one of the first guided by the RISP model, focusing on health-related opinion expression as a specific type of information sharing. Overall, our results indicated that many predictors of the RISP model, which have already been tested in various contexts related to information seeking, information avoidance, and information

sharing, are appropriate for predicting opinion expression. Moreover, our results support the importance of attitudes towards information sharing, injunctive norms, and sharing efficacy and highlight that these factors are of context-independent relevance. Furthermore, our approach to differentiate the social context of opinion expression proved fruitful in the health context. Some factors were context-independent predictors of opinion expression; others depended on the social context. Based on this study, the RISP model seems to be the first step towards a theoretically sound framework explaining health-related opinion expression but demands more specific frameworks that consider further motivational factors. For example, outcome expectations and perceived social sanctions seem to be promising predictors that could be included in future research.

Ethical Approval

The type of data collection reported in the manuscript, according to German standards, was considered exempt from needed ethical approval. According to the provisions for good scientific practice released by the German Research Foundation (DFG), approval of planned research by an ethics committee is required if a study imposes any risk on participants, imposes any physical or emotional burden on participants, and/or does not inform participants about the purpose and procedure of the study to a full extent (e.g., omission of study-related information or intentional deception over study goals to ensure naïve responses). Hence, for studies that do not match any of these criteria, approval by an ethics committee is not mandatory for social science studies in Germany. However, the reported research was conducted following the declaration of Helsinki, the German National Communication Association (DGPK) and the German Research Foundation (DFG). All participants were asked for informed consent at the beginning of the survey and were advised of their right to cancel participation.

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Conflict of Interest

We confirm that no known conflicts of interest exist for this publication.

Supplementary Material

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References

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)

- Betsch, C., Schmid, P., Heinemeier, D., Korn, L., Holtmann, C., & Böhm, R. (2018). Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination. *PLOS ONE*, 13(12), Article e0208601. <https://doi.org/10.1371/journal.pone.0208601>
- Carpini, M. X. D., Cook, F. L., & Jacobs, L. R. (2004). Public deliberation, discursive participation, and citizen engagement: A review of the empirical literature. *Annual Review of Political Science*, 7, 315-344. <https://doi.org/10.1146/annurev.polisci.7.121003.091630>
- Chen, S., Duckworth, K., & Chaiken, S. (1999). Motivated heuristic and systematic processing. *Psychological Inquiry*, 10(1), 44-49. https://doi.org/10.1207/s15327965pli1001_6
- Cialdini, R. B., & Trost, M. R. (1998). Social influence: Social norms, conformity and compliance. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (pp. 151–192). McGraw-Hill.
- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, 58(6), 1015–1026. <https://doi.org/10.1037/0022-3514.58.6.1015>
- De Dreu, C. K. W., Nijstad, B. A., & van Knippenberg, D. (2008). Motivated information processing in group judgment and decision making. *Personality and Social Psychology Review*, 12, 22-49. <https://doi:10.1177/1088868307304092>
- Duncan, M., Pelled, A., Wise, D., Ghosh, S., Shan, Y., Zheng, M., & McLeod, D. (2020). Staying silent and speaking out in online comment sections: The influence of spiral of silence and corrective action in reaction to news. *Computers in Human Behavior*, 102, 192-205. <https://doi.org/10.1016/j.chb.2019.08.026>
- Dunwoody, S., & Griffin, R. J. (2015). Risk information seeking and processing model. In H. Cho, T. Reimer, & K. McComas (Eds.), *The SAGE handbook of risk communication* (pp. 102-116). SAGE.
- Eagly, A. H., & Chaiken, S. (1993). The psychology of attitudes. Harcourt brace Jovanovich college publishers. *Journal of Loss Prevention in the Process Industries*, 8(5), 299-305.
- Fu, H., Dong, D., Da Feng, He, Z., Tang, S., Fu, Q., & Feng, Z. (2017). To share or not to share: A cross-sectional study on health information sharing and its determinants among Chinese rural chronic patients. *Journal of Health Communication*, 22(10), 800–807. <https://doi.org/10.1080/10810730.2017.1360414>
- Galarce, E. M., Ramanadhan, S., Weeks, J., Schneider, E. C., Gray, S. W., & Viswanath, K. (2011). Class, race, ethnicity and information needs in post-treatment cancer patients. *Patient Education and Counseling*, 85(3), 432-439. <https://doi.org/10.1016/j.pec.2011.01.030>
- Gallotti, R., Valle, F., Castaldo, N., Sacco, P., & Domenico, M. de (2020). Assessing the risks of “infodemics” in response to Covid-19 epidemics. *Nature Human Behaviour*, 4, 1285–1293. <https://doi.org/10.1038/s41562-020-00994-6>
- Geber, S., Baumann, E., & Klimmt, C. (2019). Where do norms come from? Peer communication as a factor in normative social influences on risk behavior. *Communication research*, 46(5), 708-730. <https://doi.org/10.1177/0093650217718656>
- Gibson, R., & Cantijoch, M. (2013). Conceptualizing and measuring participation in the age of the internet: Is online political engagement really different to offline? *The Journal of Politics*, 75(3), 701-716. <https://doi.org/10.1017/S0022381613000431>

- Gil de Zúñiga, H., Jung, N., & Valenzuela, S. (2012). Social media use for news and individuals' social capital, civic engagement and political participation. *Journal of computer-mediated communication*, 17(3), 319-336. <https://doi.org/10.1111/j.1083-6101.2012.01574.x>
- Glynn, C. J., Hayes, A. F., & Shanahan, J. (1997). Perceived support for one's opinions and willingness to speak out: A meta-analysis of survey studies on the "spiral of silence". *Public Opinion Quarterly*, 61(3), 452-463. <http://www.jstor.org/stable/2749581>
- 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:10.1006/enrs.1998.3940>
- Hayes, A. F., Shanahan, J., & Glynn, C. J. (2001). Willingness to express one's opinion in a realistic situation as a function of perceived support for that opinion. *International Journal of Public Opinion Research*, 13(1), 45-58. <https://doi.org/10.1093/ijpor/13.1.45>
- Hilverda, F., & Kuttschreuter, M. (2018). Online information sharing about risks: The case of organic food. *Risk Analysis*, 38(9), 1904-1920. <https://doi.org/10.1111/risa.12980>
- Hsu, M. H., Ju, T. L., Yen, C. H., & Chang, C. M. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. *International Journal of Human-Computer Studies*, 65(2), 153-169. <https://doi.org/10.1016/j.ijhcs.2006.09.003>
- Huisman, M., Biltreyst, D., & Joye, S. (2020). Sharing is caring: The everyday informal exchange of health information among adults aged fifty and over. *Information Research*, 25(1), Article 848. <https://biblio.ugent.be/publication/8650515>
- Hung, S. Y., Lai, H. M., & Chang, W. W. (2011). Knowledge-sharing motivations affecting R&D employees' acceptance of electronic knowledge repository. *Behaviour & Information Technology*, 30(2), 213-230. <https://doi.org/10.1080/0144929X.2010.545146>
- Kahlor, L. (2007). An augmented risk information seeking model: The case of global warming. *Media Psychology*, 10(3), 414-435. <https://doi:10.1080/15213260701532971>
- Kahlor, L. (2010). PRISM: A planned risk information seeking model. *Health Communication*, 25(4), 345-356. <https://doi:10.1080/10410231003775172>
- Kahlor, L. A., Yang, J., Li, X., Wang, W., Olson, H. C., & Atkinson, L. (2020). Environmental risk (and benefit) information seeking intentions: The case of carbon capture and storage in Southeast Texas. *Environmental Communication*, 14(4), 555-572. <https://doi.org/10.1080/17524032.2019.1699136>
- Kye, S. Y., Shim, M., Kim, Y. C., & Park, K. (2019). Sharing health information online in South Korea: Motives, topics, and antecedents. *Health Promotion International*, 34(2), 182-192. <https://doi.org/10.1093/heapro/dax074>
- Lasorsa, D. L. (1991). Political outspokenness: Factors working against the spiral of silence. *Journalism Quarterly*, 68(1-2), 131-140. <https://doi.org/10.1177/107769909106800114>
- Latkin, C., Dayton, L., Yi, G., Konstantopoulos, A., & Boodram, B. (2021). Trust in a Covid-19 vaccine in the U.S.: A social-ecological perspective. *Social Science & Medicine*, 270, 113684. <https://doi.org/10.1016/j.socs.cimed.2021.113684>
- Lee, C. S., & Ma, L. (2012). News sharing in social media: The effect of gratifications and prior experience. *Computers in Human Behavior*, 28(2), 331-339. <https://doi.org/10.1016/j.chb.2011.10.002>

- Liao, W., Yuan, Y. C., & McComas, K. A. (2018). Communal risk information sharing: Motivations behind voluntary information sharing for reducing interdependent risks in a community. *Communication Research*, 45(6), 909–933. <https://doi.org/10.1177/0093650215626981>
- Lin, X., Featherman, M., & Sarker, S. (2013). Information sharing in the context of social media: An application of the theory of reasoned action and social capital theory. *SIGHCI 2013 Proceedings*, Article 17. <http://aisel.aisnet.org/sighci2013/17>
- Link, E., Baumann, E., & Klimmt, C. (2021). Explaining online information seeking behaviors in people with different health statuses: German representative cross-sectional survey, Article e25963. *Journal of Medical Internet Research*, 23(12). <https://doi.org/10.2196/25963>
- Link, E. (2021). Information avoidance during health crises: Predictors of avoiding information about the COVID-19 pandemic among German news consumers. *Information Processing & Management*, 58(6), Article 102714. <https://doi.org/10.1016/j.ipm.2021.102714>
- Link, E. (2022). Avoidance of interpersonal discussions about the COVID-19 vaccination: Applying the theory of motivated information management. *Health Communication*, 38(13), 2843–2853. <https://doi.org/10.1080/10410236.2022.2124055>
- Liu, M., Yang, Y., & Sun, Y. (2019). Exploring health information sharing behavior among chinese older adults: A social support perspective. *Health Communication*, 34(14), 1824–1832. <https://doi.org/10.1080/10410236.2018.1536950>
- Luminet, O., Bouts, P., Delie, F., Manstead, A. R., & Rimé, B. (2000). Social sharing of emotion following exposure to a negatively valenced situation. *Cognition & Emotion*, 14(5), 661–688. <https://doi.org/10.1080/02699930050117666>
- Matthes, J., Knoll, J., & Von Sikorski, C. (2018). The “spiral of silence” revisited: A meta-analysis on the relationship between perceptions of opinion support and political opinion expression. *Communication Research*, 45(1), 3–33. <https://doi.org/10.1177/0093650217745429>
- Matthes, J., Rios Morrison, K., & Schemer, C. (2010). A spiral of silence for some: Attitude certainty and the expression of political minority opinions. *Communication Research*, 37(6), 774–800. <https://doi.org/10.1177/0093650210362685>
- Mesmer-Magnus, J. R., & DeChurch, L. A. (2009). Information sharing and team performance: A meta-analysis. *Journal of Applied Psychology*, 94(2), 535–546. <https://doi.org/10.1037/a0013773>
- Monrose, E., Ledergerber, J., Acheampong, D., & Jandorf, L. (2017). Cancer screening information at community health fairs: What the participants do with information they receive. *Journal of Public Health Research*, 6(2), 866. <https://doi.org/10.4081/jphr.2017.866>
- Neubaum, G., & Krämer, N. C. (2018). What do we fear? Expected sanctions for expressing minority opinions in offline and online communication. *Communication Research*, 45(2), 139–164. <https://doi.org/10.1177/0093650215623837>
- Neuwirth, K., & Frederick, E. (2004). Peer and social influence on opinion expression: Combining the theories of planned behavior and the spiral of silence. *Communication Research*, 31(6), 669–703. <https://doi.org/10.1177/0093650204269388>
- Noelle-Neumann, E. (1974). The spiral of silence: A theory of public opinion. *Journal of Communication*, 24(2), 43–51. <https://doi.org/10.1111/j.1460-2466.1974.tb00367.x>

- Oh, S., & Syn, S. Y. (2015). Motivations for sharing information and social support in social media: A comparative analysis of Facebook, Twitter, Delicious, YouTube, and Flickr. *Journal of the Association for Information Science and Technology*, 66(10), 2045-2060. <https://doi.org/10.1002/asi.23320>
- Park, H. S., Klein, K. A., Smith, S., & Martell, D. (2009). Separating subjective norms, university descriptive and injunctive norms, and US descriptive and injunctive norms for drinking behavior intentions. *Health Communication*, 24(8), 746-751. <https://doi.org/10.1080/10410230903265912>
- Porten-Che e, P., & Eilders, C. (2015). Spiral of silence online: How online communication affects opinion climate perception and opinion expression regarding the climate change debate. *Studies in Communication Sciences*, 15(1), 143-150. <https://doi.org/10.1016/j.scoms.2015.03.002>
- Rimal, R. N., & Lapinski, M. K. (2015). A re-explication of social norms, ten years later. *Communication Theory*, 25(4), 393-409. <https://doi.org/10.1111/comt.12080>
- Rimal, R. N., & Real, K. (2003). Understanding the influence of perceived norms on behaviors. *Communication Theory*, 13(2), 184-203. <https://doi.org/10.1111/j.1468-2885.2003.tb00288.x>
- Roessing, T. (2009). * ffentliche Meinung - die Erforschung der Schweigespirale [Public opinion - exploring the spiral of silence]*. Nomos Verlagsgesellschaft.
- Salmon, C. T., & Neuwirth, K. (1990). Perceptions of opinion “climates” and willingness to discuss the issue of abortion. *Journalism Quarterly*, 67(3), 567-577. <https://doi.org/10.1177/107769909006700312>
- Savolainen, R. (2017). Information sharing and knowledge sharing as communicative activities. *Information Research*, 22(3). <https://files.eric.ed.gov/fulltext/EJ1156371.pdf>
- Scherer, H. (2020). Raus aus der Wanne oder nur Schweigen ist auch keine L sung [Out of the tub or just silence is not a solution either]. In N. Jakob, O. Quiring, & M. Maurer (Eds.), *Traditionen und Transformationen des Oeffentlichen [Traditions and transformations of the public sphere]* (pp. 181-204). Springer.
- Schulz, A., & R ssler, P. (2013). *Schweigespirale Online. Die Theorie der  ffentlichen Meinung und das Internet [Spiral of silence online. The theory of public opinion and the internet]*. Nomos Verlagsgesellschaft.
- Song, G. (2014). Understanding public perceptions of benefits and risks of childhood vaccinations in the United States. *Risk Analysis*, 34(3), 541-555. <https://doi.org/10.1111/risa.12114>
- Soroya, S. H., Farooq, A., Mahmood, K., Isoaho, J., & Zara, S.-E. (2021). From information seeking to information avoidance: Understanding the health information behavior during a global health crisis. *Information Processing & Management*, 58(2), 102440. <https://doi.org/10.1016/j.ipm.2020.102440>
- World Health Organization. (2020). Coronavirus disease (COVID-19): *Vaccines*. [https://www.who.int/news-room/q-a-detail/coronavirus-disease-\(covid-19\)-vaccines](https://www.who.int/news-room/q-a-detail/coronavirus-disease-(covid-19)-vaccines)
- Wittenbaum, G. M., Hollingshead, A. B., & Botero, I. C. (2004). From cooperative to motivated information sharing in groups: Moving beyond the hidden profile paradigm. *Communication Monographs*, 71(3), 286-310. <https://doi.org/10.1080/0363452042000299894>
- 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>

- Yang, Z. J., Kahlor, L. A., & Griffin, D. J. (2014). I share, therefore I am: A US– China comparison of college students' motivations to share information about climate change. *Human Communication Research*, 40(1), 112-135. <https://doi.org/10.1111/hcre.12018>
- Yang, J. Z., & Wong, J. (2021). Information seeking and information sharing during the COVID-19 pandemic, *Communication Quarterly*, 70(1), 1-21. <https://doi.org/10.1080/01463373.2021.1995772>
- Yang, J. Z., & Zhuang, J. (2020). Information seeking and information sharing related to hurricane Harvey. *Journalism & Mass Communication Quarterly*, 97(4), 1054-1079. <https://doi.org/10.1177/1077699019887675>

Author Contributions

Conceptualisation (main idea, theory): Elena Link, Jule Scheper, & Paula Memenga

Funding acquisition: -

Project administration: Elena Link

Methodology (design, operationalisation): Elena Link, Jule Scheper, & Paula Memenga

Data collection: Elena Link, Jule Scheper, & Paula Memenga

Data analysis: Jule Scheper

Writing – original draft: Elena Link & Jule Scheper

Writing – review & editing: Elena Link, Jule Scheper, & Paula Memenga

Author Biographies

Elena Link is an assistant professor at the Department of Communication at the Johannes Gutenberg University Mainz, Germany. Her research interests include health and science communication as well as research methods. She is particularly interested in information-seeking and avoidance behaviors.

Jule Scheper is a research associate at the Department of Journalism and Communication Research at the University of Music, Drama and Media Hanover, Germany. Her research interests focus on media effects, political communication, especially opinion expression and public opinion, as well as (computational) research methods.

Paula Memenga is a research associate at the Department of Journalism and Communication Research at the University of Music, Drama, and Media Hanover, Germany. Her research interests focus on health communication, particularly on vaccination communication and the use of digital health information services.