Routledge
Taylor & Francis Group

Health Communication

ISSN: 1041-0236 (Print) 1532-7027 (Online) Journal homepage: www.tandfonline.com/journals/hhth20

Explaining Seeking, Scanning, and Avoidance of Information About the Mammography-Screening: Results of a Two-Wave Online Survey with a Stratified Sample of Women

Elena Link, Paula Stehr & Constanze Rossmann

To cite this article: Elena Link, Paula Stehr & Constanze Rossmann (2025) Explaining Seeking, Scanning, and Avoidance of Information About the Mammography-Screening: Results of a Two-Wave Online Survey with a Stratified Sample of Women, Health Communication, 40:6, 1030-1040, DOI: 10.1080/10410236.2024.2385782

To link to this article: https://doi.org/10.1080/10410236.2024.2385782

© 2024 The Author(s). Published with license by Taylor & Francis Group, LLC.

View supplementary material

Published online: 02 Aug 2024.

Submit your article to this journal

Article views: 1488

View related articles

View Crossmark data

Citing articles: 1 View citing articles

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=hhth20

HEALTH COMMUNICATION
2025, VOL. 40, NO. 6, 1030–1040
https://doi.org/10.1080/10410236.2024.2385782

Routledge
Taylor & Francis Group

OPEN ACCESS Check for updates

Explaining Seeking, Scanning, and Avoidance of Information About the Mammography-Screening: Results of a Two-Wave Online Survey with a Stratified Sample of Women

Elena Link[a], Paula Stehr[b], and Constanze Rossmann[b]

[a]Department of Communication, Johannes Gutenberg University Mainz; [b]Department of Media and Communication, Ludwig-Maximilians-Universitat Munchen

ABSTRACT

Whether individuals engage with or avoid health information and which sources are used is crucial for informed decision-making about mammography. Therefore, we aim to develop a typology of mammography-related information behaviors and explore their determinants, which were derived from the Theory of Motivated Information Management (TMIM). Based on a two-wave online survey of a sample of German women aged 40 to 69 years ($N = 1,138$), a cluster analysis resulted in five person-centric types of information behavior that cover respondents' variety of engagement with mammography-related information: The *seekers*, the *scanners*, the *avoiders*, the *involved*, and the *inactive*. The types indicated that most individuals possess a high preference for one strategy of information behavior. Looking at the determinants of belonging to a particular type of information behavior, it becomes apparent that the factors of the TMIM have only limited explanatory power. The most relevant factors in distinguishing the types of information behaviors are benefit perceptions, worry, interest, avoidance efficacy, seeking, and avoidance-related outcome expectancies. *Scanners* and *seekers* had higher benefit perceptions. *Seekers* were further motivated by greater worries, while *involved* ones felt more interested and held stronger expectancies. *Avoiders* were more anxious and had a higher avoidance efficacy. The study suggests that *inactive individuals* and *avoiders* are highly prevalent and relevant target groups for health interventions that support informed decision-making. To facilitate informed decision-making, women should be encouraged to weigh benefits and harms of their options and to address negative emotions, such as anxiety, that may exist or arise during decision-making.

Introduction

The benefit of mammography is detecting cancer at an earlier, most likely curable stage (Hendrick et al., 1997; Wong, 2012). However, mammography can also result in harm, such as false-positive results, or overtreatment (Shi et al., 2021). To acknowledge the benefits and harms, informed decision-making about mammography is required (Hersch et al., 2017). To support women's decision process, in Germany, the biennial invitation for mammography of women aged between 50 to 69 is supplemented with information describing the benefits and harms of mammography. As both are stressed, the information can be perceived as inconsistent, complex, or ambiguous. These are features associated with women's need to manage their level of uncertainty through information behaviors such as seeking and avoidance (Barbour et al., 2012).

So far, it remains fairly unclear, how invited women manage mammography-related information (Kuang, 2018; Shi et al., 2021). Focusing health information behaviors of women in general, extant research suggests that women are highly interested in health information, more frequently seek than avoid health information, and turn to a wider set of sources (Link et al., 2023). Particularly the age group between 36 to 55 years seems most active in acquiring health information (Bachl et al., 2024). Learning more about those behaviors related to mammography is crucial as information seeking and scanning facilitates informed decision-making (Swoboda et al., 2021; Zhuang & Guan, 2022), whereas information avoidance is related to information deficits impeding informed decision-making (Chae et al., 2020; Link & Baumann, 2022). Thus, whether individuals are willing to acquire or avoid information is crucial for informed decision-making about mammography (Hovick et al., 2014; Wong, 2012; Zhuang & Guan, 2022).

Against this background, our study aims to contribute to to the existing literature by capturing and explaining the complexity of information behaviors in higher granularity. We address two objectives: First, supplementing past studies that focus on information seeking or examining repertoires considering the diversity of sources used (Fisse et al., 2023; Hasebrink & Domeyer, 2012), we aim to capture the complexity of women's types of information behaviors focusing the variety of used strategies and sources (Swoboda et al., 2021). This enables the exploration and uncovering of the inherent patterns of information behaviors considering whether certain

CONTACT Elena Link elena.link@uni-mainz.de Department of Communication, Johannes Gutenberg University Mainz, Jakob-Welder-Gebäude 16, Mainz 55128, Germany

Supplemental data for this article can be accessed online at https://doi.org/10.1080/10410236.2024.2385782

© 2024 The Author(s). Published with license by Taylor & Francis Group, LLC.
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

behaviors co-occur – which prevents misinterpretations because, for example, outcomes of information seeking might be limited by information avoidance, and vice versa (Hasebrink & Domeyer, 2012; Link et al., 2023). Second, we aim to explain the exploratively identified person-centric types of information behaviors. Due to assumed uncertainties prevailing concerning mammography, we refer to the tradition of uncertainty management describing how people cope with complex or ambiguous information. As a first step toward theory-guided modeling of person-centric types, we relied on predictors suggested by the Theory of Motivated Information Management (TMIM) (Afifi & Weiner, 2004). The TMIM is rooted in the uncertainty management literature (e.g., Brashers, 2001). It is intended to provide a detailed framework of influencing factors explaining active information management attempts such as information seeking and avoidance (e.g., Afifi & Afifi, 2009; Afifi & Weiner, 2004, 2006; Link, 2023). The TMIM organizes the influencing factors in an information management process from perceiving a state of uncertainty to deciding to manage this uncertainty using a certain information behavior (Fowler & Afifi, 2011; for an overview of the comprehensive model, see; Afifi & Weiner, 2004). Instead of depicting the detailed theoretical explication of the information management process, we aimed to explore whether the factors are able to distinguish person-centric types of information behaviors. Building on our findings, further research should consider the complex and dynamic relationships between the influencing factors more comprehensively.

Person-centric types of information behaviors

Person-centric types of information behavior cover the use of multiple strategies and sources as a response to health-related uncertainties by one person. Those types provide a portrayal of the entire information reality of individuals (Hasebrink & Domeyer, 2012; Hasebrink & Popp, 2006). This corresponds to the assumptions of the repertoire approach, where repertoires are understood as the composition of using different sources by individuals ("cross-media practice;" Hasebrink & Popp, 2006). It can be understood as a user-centric approach mapping the entirety of sources used by an individual for example for health purposes (Bachl & Mangold, 2017; Fisse et al., 2023). In addition, we cover not only the sources but also the deployed strategies of information behaviors to manage uncertainty perceptions in a subjectively useful way (Barbour et al., 2012; Brashers, 2001). The TMIM distinguishes the strategies of information seeking and avoidance. Information seeking is a purposeful mode of information acquisition and describes individuals' efforts to obtain information from selected sources (Johnson & Meischke, 1993). It occurs when the actual level of uncertainty is higher-than-desired, which is a state associated with negative emotions that should be reduced (Brashers, 2001). Information avoidance is understood as a purposeful decision to prevent the acquisition of available, personally relevant but potentially unwanted information (Link & Baumann, 2022; Sweeny et al., 2010). When information is perceived as threatening or individuals' actual level of uncertainty is appraised as a positive state of not knowing (Kuang & Wilson, 2017), information avoidance can serve as a coping mechanism (Barbour et al., 2012). Beyond these two active strategies, information scanning is also associated with screening behaviors (Jones et al., 2006; Kelly et al., 2010). It is a less intentional, more frequent mode of information acquisition when individuals come across certain information during routine media use (Hornik et al., 2013; Lee et al., 2016; Lewis et al., 2022; Niederdeppe et al., 2007).

In addition to the strategies of information behaviors, a source-oriented description as suggested in the repertoires approach (Fisse et al., 2023; Hasebrink & Domeyer, 2012) is crucial because the variety of sources can be used in various ways (Swoboda et al., 2021) or avoided to varying degrees (Link, 2021). To get a complete overview of individuals' information behavior, the co-occurrence of all three information behaviors concerning several sources needs to be examined (Link et al., 2022; Nelissen et al., 2017; Shim et al., 2006). Whereas other studies identified typologies of information behaviors by examining whether information-seeking and scanning co-occur or not (Shim et al., 2006) or how frequently information is acquired (Link et al., 2022), we choose a cluster analytic approach to identify person-centric types of information behaviors considering various strategies of information behaviors and a broad range of sources. Our first research question asks:

RQ1: Which person-centric types of information behaviors about mammography screening can be identified?

Influencing factors of types of cancer information behaviors

Based on the TMIM, the process underlying attempts of uncertainty and information management is determined by uncertainty discrepancies, emotional responses to uncertainty discrepancies, efficacy assessments, and outcomes expectancies (Afifi & Weiner, 2004, 2006). Although these influencing factors can be organized in a processual order, we first aim to identify relevant influencing factors – disregarding their interrelations for the time being – as our study adopted a person-centric instead of a behavior-centric view on information behaviors. The considered influencing factors will be described in more detail in the following.

The TMIM (Afifi & Weiner, 2004) describes that uncertainty triggers information behaviors when an individual perceives a discrepancy between the amount of uncertainty an individual has about an issue such as breast cancer or mammography and the amount of certainty the individual desires. In our study, uncertainty is understood as the knowledge gap between the desired and actual level of knowledge (Osimani, 2012). Particularly, the benefits and harms of mammography can result in uncertainty discrepancies linked to a woman's perception that she has more or less information than she desires for decision-making (Brashers, 2001; Link, 2023). Besides the uncertainty discrepancy, also the emotional appraisal of this uncertainty discrepancy motivates information behaviors (Afifi & Weiner, 2004). Based on the revised TMIM (Afifi & Morse, 2009; Lazarus, 2001), a variety of negative and positive discrete emotions impact information

behaviors. Whether and how an emotion serves as a motivational force of information behavior is determined by its qualitatively distinguishable appraisal pattern (Lazarus, 2001). The original focus of the TMIM is anxiety (Afifi & Weiner, 2004). This response to an uncertain, existential threat (Lazarus, 1991) is one of the best-supported influencing factors of information seeking (Fowler & Afifi, 2011; Fowler et al., 2018; Kuang & Wilson, 2021; Rauscher & Hesse, 2014). Instead of an explorative analysis of various discrete emotions prevalent in the TMIM tradition (Fowler & Afifi, 2011; Fowler et al., 2018; Rauscher & Hesse, 2014), we supplemented the considered emotions regarding two criteria: we selected discrete emotions known to be related to information seeking or avoidance as well as emotions that are likely to occur in the context of mammography. As a first addition, we aim to examine the role of worry. This perception of mental distress and agitation was shown to drive information-seeking (Chae, 2015; Kahlor et al., 2020; Vrinten et al., 2018; Yang et al., 2014). In addition, particularly cancer worry was shown to be positively associated with participating in cancer screenings (e.g., Consedine et al., 2004). Further, we aim to observe the role of hope (Kahlor et al., 2020; Link, 2023) postulated to be a reason for information avoidance when uncertainty discrepancies were positively appraised (Barbour et al., 2012). Hope is a pleasant state that goes along with coping potential for a threatening situation such as mammography (Lazarus, 1999, 2001). We also consider interest already explored in studies applying the revised TMIM (Rauscher & Hesse, 2014). The appraisal structure of the knowledge emotion of interest is novelty and coping potential (Silvia, 2005, 2008) resulting in its function to motivate learning and exploration relevant to acquiring information about mammography (Smith & Ellsworth, 1985).

The TMIM (Afifi & Weiner, 2004) further stresses cognitive assessments to be relevant to explain information behaviors. It distinguishes between outcomes expectancies and a set of self- and target-related efficacy assessments. Outcome expectancies are individuals' assessment of the outcome- and process-related benefits and costs of information behaviors (Afifi & Weiner, 2004). To assess these expectancies comprehensively, we consider acquisition-related and avoidance-related outcome expectancies. Efficacy assessments describe individuals' beliefs about being able to enact information behaviors (Afifi & Weiner, 2004). In line with current research guided by the TMIM (Link, 2023), we supplemented the original distinguished efficacy assessments called communication, coping, and target efficacy with avoidance efficacy. Thus, communication efficacy is substantiated by avoidance efficacy, which describes individuals' perception of possessing the ability to successfully enact both purposeful types of information behaviors (Afifi & Weiner, 2004). The third type of efficacy assessment is coping efficacy, which deals with women's resources to manage outcomes expected from information behaviors (Afifi & Weiner, 2004; Hua & Howell, 2022). The fourth efficacy called target efficacy refers to whether a woman believes that she has access to a sufficient level of mammography-related information (Li et al., 2020).

In addition to the predictors derived from the TMIM, we specified hazard characteristics. We consider a two-fold risk assessment of both screening and cancer (Moon et al., 2022; Shi et al., 2021). Risk perceptions can be conceptualized as motivational factors resulting from a cognitive response to a threat, which is assumed to have severe consequences and increase the need for protection (Rimal et al., 1999; So, 2013; Wong, 2012). Although there is evidence that risk perceptions facilitated information seeking and scanning (Griffin et al., 1999; Kahlor, 2010; Yang et al., 2014), some individuals at high risk also choose to avoid anxiety-provoking information (Wong, 2012). Risks are often weighted against benefits when making a judgment (Alhakami & Slovic, 1994; Bearth & Siegrist, 2016), which has also an impact on information-seeking behaviors (Bessette et al., 2019; Kahlor et al., 2020; Shi et al., 2021).

Focusing on individual characteristics, higher levels of education are associated with more frequent information acquisition (Arora & Gustafson, 2008; Kelly et al., 2010; Nelissen et al., 2017; Rutten et al., 2006) and less pronounced information avoidance (Emanuel et al., 2015; Link & Baumann, 2022; Ramanadhan & Viswanath, 2006). The association between information behaviors and age is inconsistent (Emanuel et al., 2015; Link & Baumann, 2022; Nelissen et al., 2017). Also, the experience with mammography is relevant to consider as it should be associated with lower uncertainty perception.

Against this background, we aim to investigate the role of the theory-driven selected predictors for person-centric types of information behaviors. Since these types are identified exploratively, we remain with a research question instead of hypotheses:

RQ2: How do individual characteristics, hazard characteristics, uncertainty perceptions and responses, outcome expectancies, and efficacy assessments explain the person-centric types of information behaviors?

Method

We conducted a two-wave online survey with a quoted sample of women aged between 40 and 69 years ($M = 52.57$; $SD = 8.86$). The respondents were recruited via the German commercial online access panel Bilendi & respondi, which has a strong market presence in Germany. Panelists in the selected online access panel were monetary incentivized to participate in online surveys. The quotes considered age and education. Age was important as we wanted to cover not only women who were over the age of 50 and were already invited to the mammography but also women without experience with the biennial invitation for mammography as this might impact their management of mammography-related information. Additionally, there is a public debate about whether to lower the age cutoff, which highlights the need to examine this group more closely. The same number of women had already received an invitation for mammography (50–69 years) or had not yet received one (40–49 years). Regarding their education, the distribution was based on a representative German sample. Both surveys took place in 2021 at an interval of two weeks. The analysis was limited to 1,138 of the 1,400 respondents who completed both surveys. To determine the panel attrition, the

comparison of the initial and final sample showed that most of the invited women participated a second time in the survey (81.3%) and the composition of the sample showed high similarities (see Table A2). The study protocol was approved by the Joint Ethics Committee of Leibniz University Hannover and the Hanover University of Music, Drama, and Media.

Procedure and measures

At the beginning of the first survey, the women saw the official invitation letter to mammography and were asked to put themselves in the situation to decide about their participation. Afterward, the influencing factors of information behaviors were surveyed. At the end of the first survey, they were invited to the second survey and asked to prepare for decision-making and report on their decision in the second survey. After two weeks, the women were asked about their information behaviors in the period between the waves. All measures are reported in the Appendix, Table A1.

Information behaviors

Information behaviors were measured by the frequency of each behavior during the two weeks between the online surveys. They were only measured in the second survey. To capture information seeking and scanning, 16 sources were distinguished (Link et al., 2021, 2022). As the individual sources were used in a low frequency and the measures showed a low variance, we dichotomized and summarized them and only distinguished whether or not women used *mass media* like newspapers (seeking: $M = .07$, $SD = .27$; scanning: $M = .13$, $SD = .33$), or *online media* such as search engines (seeking: $M = .15$, $SD = .36$; scanning: $M = .14$, $SD = .35$), talked to *interpersonal sources* such as family and friends (seeking: $M = .13$, $SD = .34$; scanning: $M = .15$, $SD = .35$), or *health professionals* (seeking: $M = .08$, $SD = .28$; scanning: $M = .08$, $SD = .27$). Information avoidance was measured with a supplemented version of the information opt-out scale (McQueen et al., 2014). Avoidance of *mass media* ($M = .19$, $SD = .40$), *online media* ($M = .24$, $SD = .42$), *and interpersonal sources* were summarized ($M = .22$, $SD = .41$).

Uncertainty discrepancy

Instead of the TMIM tradition of calculating differences between Likert-type scales for the current and desired state of knowledge and asking explicitly whether the respondents know more or less than they want to, we decided to use a difference score only. To better correlate the two answers in terms of the metric query, a scale from 0 to 100 was used instead of a 7-point scale (Link et al., 2022). The discrepancy between the actual ($M = 74.02$; $SD = 24.23$) and desired level of uncertainty about the mammography ($M = 69.05$; $SD = 25.17$; on a scale from 0 to 100) was assessed by subtracting the actual from the desired level of knowledge ($M = -4.97$; $SD = 30.77$).

Emotional responses to uncertainty discrepancy

Anxiety, worry, hope, and interest were each measured by three items adopted from the German Differential Emotions Scale (DES) (Merten & Krause, 1993). The internal consistency of all constructs was evaluated as satisfying and mean indices were computed (anxiety: $\alpha = .87$, $M = 1.86$, $SD = .99$; worry: $\alpha = .86$, $M = 2.14$, $SD = 1.12$; hope: $\alpha = .87$, $M = 3.54$, $SD = 1.12$; interest: $\alpha = .85$, $M = 3.36$; $SD = 1.12$; see Appendix, Table A1).

Efficacy assessments

Seeking and avoidance efficacy were captured using four-item measures adapted from the perceived behavioral control measure (Kahlor et al., 2019; Link, 2023). The internal consistency of both scales was satisfying (seeking efficacy: $\alpha = .87$, $M = 4.18$, $SD = .80$; avoidance efficacy: $\alpha = .87$, $M = 3.03$, $SD = 1.19$). Coping efficacy was measured using a four-item index ($\alpha = .86$, $M = 4.07$, $SD = .85$) (Afifi & Afifi, 2009). A measure of Li et al. (2020) was adapted to capture women's target efficacy ($\alpha = .86$, $M = 4.12$, $SD = .88$).

Outcome expectancies

To measure outcome expectancies, statements about the positive and negative consequences (Fowler & Afifi, 2011) were supplemented by goals of information behaviors adopted from the GAINS instrument (Chasiotis et al., 2020). We used a ten-item measure for acquisition and a four-item measure for avoidance (acquisition: $\alpha = .94$, $M = 3.50$, $SD = 1.06$; avoidance: $\alpha = .98$, $M = 2.41$, $SD = 1.24$).

Hazard characteristics

The women were asked if they ever had mammography performed (yes/no). Further, we asked the participants whether they assess mammography as risky/beneficial and to what extent they agree to four risks (Adams et al., 2004; Braga et al., 2020; Pahlevan Sharif et al., 2018) and four benefits (Anagnostopoulos et al., 2012; McCaul & Tulloch, 1999). Mean indices for risk ($\alpha = .79$, $M = 2.65$, $SD = .96$) and benefit perceptions ($\alpha = .88$, $M = 4.47$, $SD = .79$) showed a high internal consistency. Cancer risk perception was measured with a two-item index considering the severity and susceptibility of breast cancer (Spearman-Brown $r_s = .77$, $\alpha = .75$, $M = 2.67$, $SD = .96$).

Data analysis

To identify types of information behaviors (RQ1), we performed a hierarchical cluster analysis with the ward's method considering the 11 combinations of strategies related to different sources of information behaviors. The number of clusters was narrowed down by the elbow method suggesting shortlisting the two to five-cluster solution (Mooi & Sarstedt, 2011). Comparing the cluster centroids of the occurrence or absence of strategies and sources in terms of interpretability, we found that the five-cluster solution was conceptually best distinguishable. The labeling of the clusters was based on the characteristics of the individual cluster-forming variables. We performed a k-means cluster analysis to reduce the within-cluster variation by re-assigning objects to clusters. Only minor changes in the clusters' composition suggest that the initial clustering solution was stable. To answer RQ2, we applied a multinomial, hierarchical logistic regression model, in which we compared four types of information behaviors with the fifth type (the inactive) as the reference category, which was the largest type. As independent variables, we

included individual and hazard characteristics in the first step and predictors derived from TMIM in the second step. All analyses have been conducted using IBM's SPSS® 28.

Results

A typology of information behaviors (RQ1)

The identified five clusters are presented in Table 1 and described in the following.

The seekers

The first cluster was defined as the *seekers* of mammography-related information ($n = 88$; 7.7%). Seekers scored high on information seeking using mass media ($M = .26$; $SD = .44$), online media ($M = .89$; $SD = .32$), family and friends ($M = .58$; $SD = .50$), and health professionals ($M = .35$; $SD = .48$). In comparison to the other types, the seekers showed low pronounced information scanning and avoidance.

The avoiders

The second cluster was defined as the *avoiders* of mammography-related information ($n = 246$; 21.6%). The *avoiders* only rarely to never acquired information and most pronounced avoided information (see Table 1). They avoided online media ($M = .75$; $SD = .43$) more frequently than mass media ($M = .63$; $SD = .48$) or interpersonal communication ($M = .64$; $SD = .48$).

The scanners

The third type – the *scanners* ($n = 115$; 10,1%) – were characterized by paying attention to mammography as part of their habitual information behaviors using mass media ($M = .68$; $SD = .47$), online media ($M = .70$; $SD = .46$), communicating with family and friends ($M = .72$; $SD = .45$) and consulting health professionals ($M = .32$; $SD = .47$). Their avoidance behavior was average, while they rarely searched for mammography-related information (see Table 1).

The involved

The fourth type was called the *involved* ($n = 88$; 7.7%). They most frequently acquired and rather frequently avoided information. Active searches using mass media ($M = .63$; $SD = .49$), family and friends ($M = .94$; $SD = .23$), as well as information seeking and scanning referring to health professionals (seeking: $M = .67$; $SD = .47$; scanning: $M = .60$; $SD = .49$) were most frequent.

The inactives

The fifth cluster, named the *inactive*, was the largest group ($n = 601$; 52.8%). They neither searched, scanned, nor avoided information about mammography (see Table 1).

Influencing factors of the person-centric types of information behaviors

The results of the multinomial logistic regression model examining the factors associated with belonging to the types are depicted in Tables 2 and 3. The strength of the association between each predictor and the outcome is expressed by odds ratios (*OR*), indicating the expected change in the likelihood of observing the outcome (i.e., being a *seeker*, a *scanner*, an *avoider*, or an *involved* compared to being inactive) when the respective predictor changes by one unit.

The considered predictors explained 22.2% of the membership to one type. The individual and hazard characteristics explained 8.5% of the variance, whereas the TMIM-predictors explained 13.7% of the variance. The overall model fit is quite well, as indicated by the goodness-of-fit test

Table 1. Characteristics of seekers, avoiders, scanners, involved, and inactive.

	Seekers ($n = 88$) *M (SD)*	Avoiders ($n = 246$) *M (SD)*	Scanners ($n = 115$) *M (SD)*	Involved ($n = 88$) *M (SD)*	Inactive ($n = 601$) *M (SD)*	Total *(N = 1,138)* *M (SD)*	Difference (*F*-statistics)
Information seeking							
Mass media	0.26 (0.44)	0.04 (0.19)	0.00 (0.00)	0.63 (0.49)	0.00 (0.00)	0.08 (0.26)	F (4, 1133) = 108.47, $p \leq .001$, $\eta^2 = .424$
Online media	0.89 (0.32)	0.06 (0.23)	0.00 (0.00)	0.95 (0.21)	0.00 (0.00)	0.15 (0.36)	F (4, 1133) = 1344.79, $p \leq .001$, $\eta^2 = .826$
Interpersonal communication	0.58 (0.50)	0.07 (0.25)	0.02 (0.13)	0.94 (0.23)	0.00 (0.00)	0.13 (0.34)	F (4, 1133) = 570.25, $p \leq .001$, $\eta^2 = .668$
Health professionals and experts	0.35 (0.48)	0.02 (0.14)	0.01 (0.09)	0.67 (0.47)	0.00 (0.00)	0.08 (0.28)	F (4, 1133) = 265.02, $p \leq .001$, $\eta^2 = .483$
Information scanning							
Mass media	0.01 (0.11)	0.01 (0.09)	0.68 (0.47)	0.70 (0.46)	0.00 (0.00)	0.13 (0.33)	F (4, 1133) = 490.89, $p \leq .001$, $\eta^2 = .634$
Online media	0.00 (0.00)	0.01 (0.11)	0.70 (0.46)	0.91 (0.29)	0.00 (0.00)	0.14 (0.35)	F (4, 1133) = 860.54, $p \leq .001$, $\eta^2 = .752$
Interpersonal communication	0.05 (0.21)	0.02 (0.14)	0.72 (0.45)	0.86 (0.35)	0.00 (0.00)	0.15 (0.35)	F (4, 1133) = 678.46, $p \leq .001$, $\eta^2 = .705$
Health professionals and experts	0.01 (0.11)	0.00 (0.09)	0.32 (0.47)	0.60 (0.49)	0.00 (0.00)	0.08 (0.27)	F (4, 1133) = 208.93, $p \leq .001$, $\eta^2 = .425$
Information avoidance							
Mass media	0.03 (0.18)	0.63 (0.48)	0.23 (0.43)	0.43 (0.50)	0.00 (0.00)	0.20 (0.40)	F (4, 1133) = 215.26, $p \leq .001$, $\eta^2 = .432$
Online media	0.14 (0.35)	0.75 (0.43)	0.24 (0.43)	0.49 (0.50)	0.00 (0.00)	0.24 (0.42)	F (4, 1133) = 300.54, $p \leq .001$, $\eta^2 = .515$
Interpersonal communication	0.23 (0.42)	0.64 (0.48)	0.24 (0.43)	0.48 (0.50)	0.00 (0.00)	0.22 (0.41)	F (4, 1133) = 194.00, $p \leq .001$, $\eta^2 = .406$

Note. $N = 1,138$; univariate ANOVAS with information sources as dependents variables and cluster as independent variable.

Table 2. Predictors' unique contribution in the Multinomial Logistic Regression.

Predictor		χ^2	*df*	*p*
Socio-demographics and attitudes toward the screening	Age	7.35	4	.119
	Education	9.83	4	.278
	Participation in mammography	7.35	4	.118
	Risk perception mammography	3.92	4	.417
	Benefit perception mammography	14.66**	4	.005
	Risk perception cancer	4.95	4	.293
Predictors of information behaviors	Uncertainty discrepancy	2.81	4	.590
	Anxiety	7.90	4	.095
	Worry	13.22**	4	.010
	Hope	9.09	4	.059
	Interest	23.44***	4	≤.001
	Acquisition-related outcome expectancies	15.81**	4	.003
	Avoidance-related outcome expectancies	16.80**	4	.002
	Seeking efficacy	3.37	4	.497
	Avoidance efficacy	19.62***	4	≤.001
	Target efficacy	1.95	4	.744
	Coping efficacy	5.74	4	.219

Note. *$p < .05$, ** p ≤ .01, *** p ≤ .001.

Table 3. Results of the multinomial logistic regression Model (DV: type of information-seeking behaviors [a]).

	Seekers vs. Inactive		Scanners vs. Inactive		Avoiders vs. Inactive		Involved vs. Inactive	
Determinants	B (SE)	OR [95% CI]	B (SE)	OR [95% CI]	B (SE)	OR [95% CI]	B (SE)	OR [95% CI]
Socio-demographics and attitudes toward the screening								
Age	−.00	.99 [.96; 1.03]	.02	1.02 [.99; 1.05]	.02	1.02 [1.00; 1.04]	−.03	.97 [.93; 1.01]
Education (Ref. high)								
low	.15	1.17 [.52; 2.59]	−.40	.67 [.31; 1.47]	−.47	.62 [.36; 1.08]	.39	1.48 [.63; 3.45]
medium	−.13	.88 [.48; 1.61]	−.16	.86 [.52; 1.41]	−.49	.61** [.42; .89]	.03	1.03 [.55; 1.93]
Participation in mammography	.36	1.44 [.79; 2.60]	.28	1.33 [.79; 2.24]	0.04	1.04 [.71; 1.52]	.76	2.15* [1.16; 3.96]
Risk perception mammography	.26	1.30 [.95; 1.79]	.08	1.08 [.82; 1.43]	−0.01	0.99 [.81; 1.21]	.21	1.23 [.88; 1.71]
Benefit perception mammography	.88	2.41** [1.25; 4.64]	.41	1.51* [1.00; 2.27]	−0.06	0.95 [.75; 1.20]	−.17	0.85 [.55; 1.30]
Risk perception cancer	.00	1.00 [.77; 1.31]	−.03	0.97 [.77; 1.22]	−0.14	0.87 [.73; 1.04]	.18	1.19 [.90; 1.58]
Predictors of information behaviors								
Uncertainty discrepancy	−.00	1.00 [.99; 1.01]	.00	1.00 [.99; 1.01]	−.00	1.00 [.99; 1.01]	−.01	0.99 [.98; 1.00]
Anxiety	−.19	0.83 [.54; 1.28]	.02	1.02 [.68; 1.53]	.35	1.42* [1.06; 1.91]	.18	1.20 [.76; 1.91]
Worry	.59	1.81*** [1.26; 2.59]	.17	1.19 [.84; 1.68]	−.06	0.95 [.73; 1.23]	.33	1.40 [.93; 2.09]
Hope	.05	1.05 [.77; 1.44]	.12	1.12 [.86; 1.46]	−.03	0.97 [.81; 1.17]	−.44	0.65** [.47; .89]
Interest	.23	1.26 [.95; 1.66]	.16	1.18 [.93; 1.49]	.07	1.08 [.91; 1.28]	.75	2.12*** [1.52; 2.96]
Acquisition-related outcome expectancies	.16	1.18 [.85; 1.62]	−.09	0.92 [.71; 1.19]	.20	1.22 [1.00; 1.49]	.63	1.88*** [1.29; 2.75]
Avoidance-related outcome expectancies	.01	1.01 [.83; 1.22]	−.13	0.88 [.73; 1.05]	.02	1.02 [.89; 1.17]	.33	1.39*** [1.15; 1.68]
Seeking efficacy	.29	1.23 [.82; 2.21]	.23	1.25 [.82; 1.91]	−.08	.92 [.68; 1.25]	−.13	.88 [.51; 1.52]
Avoidance efficacy	−.15	.86 [.70; 1.06]	−.03	.97 [.80; 1.17]	.17	1.18* [1.02; 1.36]	−.32	.73* [.58; .90]
Target efficacy	.05	1.05 [.67; 1.64]	−.07	.94 [.64; 1.36]	−.02	.99 [.75; 1.29]	.31	1.37 [.84; 2.25]
Coping efficacy	−.04	.96 [.64; 1.43]	−.13	.88 [.62; 1.24]	−.03	.97 [.75; 1.25]	.46	1.58* [1.02; 2.46]

Note: Missing cases were deleted listwise, resulting in $n = 1{,}311$. OR = Odds Ratio; 95% CI = Confidence Interval.
* $p < .05$ ** p ≤ .01 ***$p \leq .001$ (two-tailed tests).
[a]Coding of the dependent variable: 0 = inactive (Reference category); 1 = seekers; 2 = scanners; 3 = avoiders; 4 = involved ones.
Block 1 (sociodemographics and attitudes toward the screening): Nagelkerke's $\Delta R^2 = .085$***, Block 2 (predictors of information behaviors): Nagelkerke's $\Delta R^2 = .137$***.

comparing the full model with the empty model (2670.06, χ^2 = 259.70, df = 72; $p \leq .001$).

Focusing on the impact of women's characteristics, the analysis revealed that the influence of age was not significant. Education was found to be an inhibiting factor in comparing the *avoiders* with the *inactives*. A medium level compared to a high level of education decreased the likelihood of belonging to the *avoiders* (*OR* = .62, $p = .011$).

Concerning hazard characteristics, we found that benefit perceptions were a promoting factor of information acquisition. When respondents perceive more benefits, they more likely belong to the type of *seekers* (*OR* = 2.41, $p = .008$) or *scanners* (*OR* = 1.51, $p = .050$). Prior experience with mammography was a promoting factor of belonging to the involved (*OR* = 2.15, $p = .015$). Neither type of perceived risk influenced the type of information behavior.

Regarding the influencing factors derived from the TMIM, belonging to the *seekers* was determined by greater worry (*OR* = 1.81, $p \leq .001$). For the *scanners*, none of the variables was shown to be a significant influencing factor. Feeling more anxious (*OR* = 1.42, $p = .019$) and possessing a more pronounced avoidance efficacy (*OR* = 1.18, $p = .024$) resulted in a higher likelihood of belonging to the *avoiders*. Feeling less hopeful (*OR* = .65, $p = .007$), being more interested (*OR* = 2.12, $p \leq .001$), expecting more seeking- and avoidance-related outcomes (seeking: *OR* = 1.88, $p \leq .001$; avoidance: *OR* = 1.39, $p \leq .001$), possessing more pronounced coping efficacy (*OR* = 1.58; $p = .042$) and less pronounced avoidance efficacy (*OR* = .73; $p = .004$) significantly impacted women's belonging to the *involved* ones.

Discussion

The current study aims to construct a person-centric typology of women's mammography-related information behaviors (RQ1) and identify their influencing factors (RQ2). Our results regarding RQ1 revealed that the strategies of seeking, scanning, and avoidance each dominantly form one person-centric type suggesting that groups of women either seek, scan, or avoid information. This evident person-bound preferences for certain strategies can either be understood in terms of a personality tendency comparable to the coping styles monitoring and blunting (Case et al., 2005; Roussi & Miller, 2014), or it can indicate more ritualized forms of information behavior (Kessler & Zillich, 2019). However, the fact that the involved individuals used various strategies also underlines that the strategies of information behaviors co-occur in the process of decision-making as the participants reported seeking, scanning, and avoiding mammography-related and decision-relevant information during the studied period of two weeks. That individuals do not always seek, scan, or avoid information shows the temporal, situational nature of information behaviors (Barbour et al., 2012; Link, 2024; Nelissen et al., 2017). This is in line with scholars describing information-seeking and avoidance behaviors as a balancing act (Barbour et al., 2012; Brashers, 2001) stressing the relevance of examining the relationship between the strategies more comprehensively (Link et al., 2023). If different strategies coexist, it is important to ask whether they refer to different aspects of the topic (e.g., seeking information on the benefits while simultaneously avoiding the harms of mammography) or whether they are causally related. It is conceivable, for example, that excessive information-seeking leads to information avoidance if the content is threatening.

The typology further illustrates that a high proportion of women are inactive within the period studied. This can be attributed to the well-informed sample of women, which is evident from the queried uncertainty discrepancy. However, this perception is in contrast to findings about a rather low actual knowledge about the benefits and harms of mammography (Berens et al., 2019; Dierks & Schmacke, 2014), indicating these biased perceptions might serve as barriers to informed decision-making. Consistent with prior research (Lambert et al., 2009; Link, 2024), the absence of information behaviors may be rooted in disinterest and low ascribed utility to the information. This can result in either a decision not to undergo mammography screening or an uninformed decision that does not consider the potential benefits and harms. Both stress the relevance of communication efforts targeting inactive women. However, the high proportion of inactive individuals can also be attributed to the scenario design where opinion formation was solicited but remained without consequences.

A closer look at the prevalence of the types also confirms that the *avoiders*, a group that has received less scholarly attention to date and is particularly vulnerable to health communication, are the second largest group (Deline & Kahlor, 2019; Link, 2023). Regarding the proportion of *seekers* and *scanners*, our findings revealed that routine scanning is more frequent than seeking (Niederdeppe et al., 2007; Wong, 2012).

Looking at the sources consistent patterns emerged, which contradicts studies stating differences between sources (Link, 2021; Swoboda et al., 2021). Individuals who generally turn more to mammography-related information do so across all sources. The same is true for avoidance. However, differences were found in the preferred sources, which could be considered in communication strategies. *Seekers* used online sources the most, which stresses that evidence-based online information should be easily accessible. *Scanners* were more likely to receive information from family and friends.

Regarding the influencing factors of the types of information behaviors (RQ2), our findings revealed that the factors derived from the TMIM had only a limited explanatory contribution to which type a woman belongs. This may be because corresponding models of information behavior focus only on specific strategies such as information seeking. Focusing on the relevance of the influencing factors, the individual comparisons showed that only some of the hypothesized determinants differentiate between the types. Above all, the most relevant factors include benefit perceptions, worry, interest, avoidance efficacy, and seeking and avoidance-related outcomes expectations. The role of benefit perceptions that motivate information acquisition underscores initial evidence that benefits are a useful extension of models of information behaviors (Bessette et al., 2019; Kahlor et al., 2020; Shi et al., 2021). Regarding the considered emotions, we found that the types of information behaviors are motivated by different emotions, which could be related to their appraisal patterns and action tendencies

(Lazarus, 1991). In line with the risk information-seeking literature (Chae, 2015; Kahlor et al., 2020; Yang et al., 2014), information-seeking behaviors serve to cope with worries. In contrast to the postulates of the TMIM, anxiety was not able to distinguish between the types of *inactive individuals* and *seekers* but drives the responses of *avoiders*. This suggests that if the information is perceived as an uncertain, existential threat (Lazarus, 1991) that is difficult to cope with, some individuals prefer to stay ignorant over gaining knowledge. The *involved* ones feel interested, which motivates learning and exploration (Silvia, 2005, 2008), but also less hopeful associated with less positive expectations and coping potentials (Lazarus, 1999). This state of mixed emotion suggests that the occurrence of information seeking, scanning and avoidance serve as a balancing act to increase or maintain positive feelings and decrease negative ones. In contrast, emotions do not play a role for those individuals belonging to the type of information *scanners* as it is a type of routine engagement (Niederdeppe et al., 2007). Acquisition-related outcome expectancies promoting information behavior of the information *seekers* as well as the *involved ones* is in line with the TMIM (Afifi & Weiner, 2004, 2006). Additionally, the current study is one of the first that also examined the role of avoidance-related outcome expectancies. We observed no influence on belonging to the group of *avoiders*, which might be related to low pronounced expectancies. Only *the involved* seem to weigh those expectancies. Future research should therefore investigate the significance of outcome expectations related to various information behaviors. Regarding the efficacy assessments, despite seeking and target efficacy being known factors promoting more frequent information seeking, both are not able to distinguish between person-centric types of information behaviors. Only coping efficacy and avoidance efficacy were relevant to distinguish the types (Hua & Howell, 2022; Link, 2023).

Limitations and tasks for future research

This study involves several limitations and provides starting points for further research. First, the high proportion of *inactive individuals* may be related to the fact that there was no immediate compulsion to act and no perceived uncertainty discrepancies triggering information needs in a scenario approach. Future studies could circumvent this limitation by focusing on women who have just received an official invitation. Second, the period between our waves was chosen to be short to ensure women's recall of their information behaviors. An alternative methodological approach, which could map the respective information behaviors in even more detail, would be a diary study. Third, only a limited explanatory power of the theory-based derived factors was revealed. Useful extensions could be made following models such as the Risk Information Seeking and Processing Model (Griffin et al., 1999) suggesting that also social norms or channel beliefs are meaningful predictors of information behaviors. Fourth, we provide a first step to identify influencing factors but not consider their mediating or moderating relationship, which will be a fruitful next step.

Conclusion

The study pursued two aims: The first one was to contribute to a better understanding of women's information behaviors as a response to an invitation to mammography. The study constructed types of information behaviors that indicate that some women seek, scan, or avoid information, whereas others combine the strategies or stay *inactive*. The co-occurrence of information behaviors is relevant to consider for theory development and raises the need to clarify the relationship between information behaviors. In line with Link et al. (2023), our findings suggest that individuals possess strong preferences for certain strategies of information behaviors, which is relevant for determining whether information behaviors are more person- or situation-bound and to account for their consequences. Focusing on practical implications, these general preferences and the prevalence of the types should be considered. Particularly, a general long-term preference to avoid health information increases the risks of missing novel information, biased risk perceptions, or lower willingness to participate in screening and preventive behaviors. The prevalence of the *inactives* and *avoiders* stresses the need for strategies examining and targeting these segments of women as they are generally not motivated or able to engage with the information and form an informed decision about mammography. Their barriers need to be understood more comprehensively. Our study provides first insights relevant to theory development but also strategic health communication. The acquisition of information behaviors was supported by benefits perceptions, worries, interests, and outcome expectancies. Whereas greater anxiety, lower hope, and avoidance efficacy were barriers to information acquisition. These factors should be considered during the development of health interventions such as public health campaigns. In particular, our findings stress the relevance of support offers and health messages addressing the awareness for weighing the benefits and risks of mammography, to develop and implement training programs to enable women to acquire, assess, and apply evidence-based information and communication strategies applying self-affirming messages to counteract negative emotions related to mammography. In addition, two-step communication strategies addressing one's social surroundings can be applied to reach particularly *inactive* and *avoiders* and trigger an interpersonal discourse on mammography.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The author(s) reported there is no funding associated with the work featured in this article.

ORCID

Elena Link http://orcid.org/0000-0001-6861-5288

References

Adams, M. L., Becker, H., Stout, P. S., Coward, D., Robertson, T., Winchell, M., & Carrington, C. (2004). The role of emotion in mammography screening of African-American women. *Journal of National Black Nurses' Association*, *15*(1), 17–23. https://pubmed.ncbi.nlm.nih.gov/15712816/

Afifi, W. A., & Afifi, T. D. (2009). Avoidance among adolescents in conversations about their parents' relationship: Applying the theory of motivated information management. *Journal of Social & Personal Relationships*, *26*(4), 488–511. https://doi.org/10.1177/0265407509350869

Afifi, W. A., & Morse, C. (2009). Expanding the role of emotion in the theory of motivated information management. In T. D. Afifi & W. A. Afifi (Eds.), *Uncertainty, information management, and disclosure decisions: Theories and applications* (pp. 87–105). Routledge.

Afifi, W. A., & Weiner, J. L. (2004). Toward a theory of motivated information management. *Communication Theory*, *14*(2), 167–190. https://doi.org/10.1111/j.1468-2885.2004.tb00310.x

Afifi, W. A., & Weiner, J. L. (2006). Seeking information about sexual health: Applying the theory of motivated information management. *Human Communication Research*, *32*(1), 35–57. https://doi.org/10.1111/j.1468-2958.2006.00002.x

Alhakami, A. S., & Slovic, P. (1994). A psychological study of the inverse relationship between perceived risk and perceived benefit. *Risk Analysis*, *14*(6), 1085–1096. https://doi.org/10.1111/j.1539-6924.1994.tb00080.x

Anagnostopoulos, F., Dimitrakaki, C., Fitzsimmons, D., Potamianos, G., Niakas, D., & Tountas, Y. (2012). Health beliefs and illness perceptions as related to mammography uptake in randomly selected women in Greece. *Journal of Clinical Psychology in Medical Settings*, *19*(2), 147–164. https://doi.org/10.1007/s10880-011-9272-1

Arora, N. K., & Gustafson, D. H. (2008). Perceived helpfulness of physicians´ communication behavior and breast cancer patients´ level of trust over time. *Journal of General Internal Medicine*, *24*(2), 252–255. https://doi.org/10.1007/s11606-008-0880-x

Bachl, M., Link, E., Mangold, F., & Stier, S. (2024). Search engine use for health-related purposes: Behavioral data on online health information-seeking in Germany. *Health Communication*, *39*(8), 1651–1664. https://doi.org/10.1080/10410236.2024.2309810

Bachl, M., & Mangold, F. (2017). Gesundheitsbezogene Informationsrepertoires: Ein nutzerorientierter Ansatz zur Analyse der Informationsnutzung im Gesundheitskontext [Health-related information repertoires: A user-centered approach to analyzing information use in a health context]. In C. Lampert & M. Grimm (Eds.), *Gesundheitskommunikation als transdisziplinäres Forschungsfeld* (1st ed. pp. 79–92). Nomos. 10.5771/9783845285290.79

Barbour, J. B., Rintamaki, L. S., Ramsey, J. A., & Brashers, D. E. (2012). Avoiding health information. *Journal of Health Communication*, *17*(2), 212–229. https://doi.org/10.1080/10810730.2011.585691

Bearth, A., & Siegrist, M. (2016). Are risk or benefit perceptions more important for public acceptance of innovative food technologies: A meta-analysis. *Trends in Food Science & Technology*, *49*(1), 14–23. https://doi.org/10.1016/j.tifs.2016.01.003

Berens, E. M., Kaucher, S., van Eckert, S., Reder, M., Kolip, P., & Spallek, J. (2019). Knowledge about mammography screening in Germany by education and migrant status: Results of a cross-sectional study. *Applied Cancer Research*, *39*(1). https://doi.org/10.1186/s41241-019-0076-1

Bessette, D., Zwickle, S., & Wilson, R. (2019). In the weeds: Distinguishing organic farmers who want information about ecological weed management from those who need it. *Renewable Agriculture and Food Systems*, *34*(5), 460–471. https://doi.org/10.1017/S1742170518000042

Braga, R., Costa, A. R., Pina, F., Moura-Ferreira, P., & Lunet, N. (2020). Prostate cancer screening in Portugal: Prevalence and perception of potential benefits and adverse effects. *European Journal of Cancer Prevention*, *29*(3), 248–251. https://doi.org/10.1097/CEJ.0000000000000539

Brashers, D. E. (2001). Communication and uncertainty management. *Journal of Communication*, *51*(3), 477–497. https://doi.org/10.1111/j.1460-2466.2001.tb02892.x

Case, D. O., Andrews, J. E., Johnson, J. D., & Allard, S. L. (2005). Avoiding versus seeking: The relationship of information seeking to avoidance, blunting, coping, dissonance, and related concepts. *Journal of the Medical Library Association*, *93*(3), 353–362. https://pubmed.ncbi.nlm.nih.gov/16059425/

Chae, J. (2015). A three-factor cancer-related mental condition model and its relationship with cancer information use, cancer information avoidance, and screening intention. *Journal of Health Communication*, *20*(10), 1133–1142. https://doi.org/10.1080/10810730.2015.1018633

Chae, J., Lee, C. J., & Kim, K. (2020). Prevalence, predictors, and psychosocial mechanism of cancer information avoidance: Findings from a national survey of U.S. adults. *Health Communication*, *35*(3), 322–330. https://doi.org/10.1080/10410236.2018.1563028

Chasiotis, A., Wedderhoff, O., Rosman, T., & Mayer, A. K. (2020). Why do we want health information? The goals associated with health information seeking (GAINS) questionnaire. *Psychology & Health*, *35*(3), 255–274. https://doi.org/10.1080/08870446.2019.1644336

Consedine, N. S., Magai, C., & Neugut, A. I. (2004). The contribution of emotional characteristics to breast cancer screening among women from six ethnic groups. *Preventive Medicine*, *38*(1), 64–77. https://doi.org/10.1016/j.ypmed.2003.09.030

Deline, M. B., & Kahlor, L. A. (2019). Planned risk information avoidance: A proposed theoretical model. *Communication Theory*, *29*(3), 272–294. https://doi.org/10.1093/ct/qty035

Dierks, M. L., & Schmacke, N. (2014). Mammografie-Screening und informierte Entscheidung. Mehr Fragen als Antworten [Mammography screening and informed choice. More questions than answers]. In J. Böcken, B. Braun & R. Meierjürgen (Eds.), *Gesundheitsmonitor 2014: Bürgerorientierung im Gesundheitswesen* (pp. 55–91). Bertelsmann Foundation.

Emanuel, A. S., Kiviniemi, M. T., Howell, J. L., Hay, J. L., Waters, E. A., Orom, H., & Shepperd, J. A. (2015). Avoiding cancer risk information. *Social Science & Medicine*, *147*(1982), 113–120. https://doi.org/10.1016/j.socscimed.2015.10.058

Fisse, T., Link, E., Schrimpff, C., Baumann, E., & Klimmt, C. (2023). Health information repertoires of implant patients: Toward a deeper understanding of multiple source use and the role of health-related motives. *Health Communication*. Advance Online Publication. 1–15. 10.1080/10410236.2023.2258597

Fowler, C., & Afifi, W. A. (2011). Applying the theory of motivated information management to adult children's discussions of caregiving with aging parents. *Journal of Social & Personal Relationships*, *28*(4), 507–535. https://doi.org/10.1177/0265407510384896

Fowler, C., Gasiorek, J., & Afifi, W. (2018). Complex considerations in couples' financial information management: Extending the theory of motivated information management. *Communication Research*, *45*(3), 365–393. https://doi.org/10.1177/0093650216644024

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 Pt 2), S230–S245. https://doi.org/10.1006/enrs.1998.3940

Hasebrink, U., & Domeyer, H. (2012). Media repertoires as patterns of behaviour and as meaningful practices: A multimethod approach to media use in converging media environments. *Participations*, *9*(2), 757–779. https://doi.org/10.2307/j.ctt46nrzt.12

Hasebrink, U., & Popp, J. (2006). Media repertoires as a result of selective media use. A conceptual approach to the analysis of patterns of exposure. *Communications*, *31*(3), 369–387. https://doi.org/10.1515/COMMUN.2006.023

Hendrick, R. E., Smith, R. A., Rutledge, J. H., & Smart, C. R. (1997). Benefit of screening mammography in women aged 40–49: A new meta-analysis of randomized controlled trials. *Journal of the National Cancer Institute Monographs*, *22*(22), 87–92. https://doi.org/10.1093/jncimono/1997.22.87

Hersch, J. K., Nickel, B. L., Ghanouni, A., Jansen, J., & McCaffery, K. J. (2017). Improving communication about cancer screening: Moving

towards informed decision making. *Public Health Research & Practice*, *27*(3), Article 2731728. https://doi.org/10.17061/phrp2731728

Hornik, R., Parvanta, S., Mello, S., Freres, D., Kelly, B., & Schwartz, J. S. (2013). Effects of scanning (routine health information exposure) on cancer screening and prevention behaviors in the general population. *Journal of Health Communication*, *18*(12), 1422–1435. https://doi.org/10.1080/10810730.2013.798381

Hovick, S. R., Liang, M. C., & Kahlor, L. A. (2014). Predicting cancer risk knowledge and information seeking: The role of social and cognitive factors. *Health Communication*, *29*(7), 656–668. https://doi.org/10.1080/10410236.2012.763204

Hua, J., & Howell, J. L. (2022). Coping self-efficacy influences health information avoidance. *Journal of Health Psychology*, *27*(3), 713–725. https://doi.org/10.1177/1359105320965664

Johnson, J. D., & Meischke, H. (1993). A comprehensive model of cancer-related information seeking applied to magazines. *Human Communication Research*, *19*(3), 343–367. https://doi.org/10.1111/j.1468-2958.1993.tb00305.x

Jones, K. O., Denham, B. E., & Springston, J. K. (2006). Effects of mass and interpersonal communication on breast cancer screening: Advancing agenda-setting theory in health contexts. *Journal of Applied Communication Research*, *34*(1), 94–113. https://doi.org/10.1080/00909880500420242

Kahlor, L. A. (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*, Article 101147. 101147. https://doi.org/10.1016/j.ijdrr.2019.101147

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

Kelly, B., Hornik, R., Romantan, A., Schwartz, J. S., Armstrong, K., DeMichele, A., Fishbein, M., Gray, S., Hull, S., Kim, A., Nagler, R., Niederdeppe, J., Ramírez, A. S., Smith McLallen, A., & Wong, N. (2010). Cancer information scanning and seeking in the general population. *Journal of Health Communication*, *15*(7), 734–753. https://doi.org/10.1080/10810730.2010.514029

Kessler, S. H., & Zillich, A. F. (2019). Searching online for information about vaccination: Assessing the influence of user-specific cognitive factors using eye-tracking. *Health Communication*, *34*(10), 1150–1158. https://doi.org/10.1080/10410236.2018.1465793

Kuang, K. (2018). Reconceptualizing uncertainty in illness: Commonalities, variations, and the multidimensional nature of uncertainty. *Annals of the International Communication Association*, *42*(3), 181–206. https://doi.org/10.1080/23808985.2018.1492354

Kuang, K., & Wilson, S. R. (2017). A meta-analysis of uncertainty and information management in illness contexts. *Journal of Communication*, *67*(3), 378–401. https://doi.org/10.1111/jcom.12299

Kuang, K., & Wilson, S. R. (2021). Theory of motivated information management: A meta-analytic review. *Communication Theory*, *31*(3), 463–490. https://doi.org/10.1093/ct/qtz025

Lambert, S. D., Loiselle, C. G., & Macdonald, M. E. (2009). An in-depth exploration of information-seeking behavior among individuals with cancer. Part 2: Understanding patterns of information disinterest and avoidance. *Cancer Nursing*, *32*(1), 26–36. https://doi.org/10.1097/01.NCC.0000343373.01646.91

Lazarus, R. S. (1991). Progress on a cognitive-motivational-relational theory of emotion. *The American Psychologist*, *46*(8), 819–834. https://doi.org/10.1037/0003-066X.46.8.819

Lazarus, R. S. (1999). Hope: An emotion and a vital coping resource against despair. *Social Research*, *66*(2), 653–678. https://www.jstor.org/stable/40971343

Lazarus, R. S. (2001). Relational meaning and discrete emotions. In K. R. Scherer, A. Schorr & T. Johnstone (Eds.), *Appraisal processes in emotion: Theory, methods, research* (pp. 37–67). Oxford University Press.

Lee, C. J., Zhao, X., & Pena-Y-Lillo, M. (2016). Theorizing the pathways from seeking and scanning to mammography screening. *Health Communication*, *31*(1), 117–128. https://doi.org/10.1080/10410236.2014.942769

Lewis, N., Rossmann, C., de Bruijn, G. J., & Martinez, L. S. (2022). Dual process models and information engagement: Testing effects of seeking, scanning, and trust in sources on attitudes toward marijuana. *Journal of Communication*, *72*(1), 59–82. https://doi.org/10.1093/joc/jqab024

Li, J. Y., Wen, J., Kim, J., & McKeever, R. (2020). Applying the theory of motivated information management to the context of conflicting online health information: Implications for childhood vaccination communication with parents. *International Journal of Strategic Communication*, *14*(5), 330–347. https://doi.org/10.1080/1553118X.2020.1817030

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. 102714. https://doi.org/10.1016/j.ipm.2021.102714

Link, E. (2023). 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

Link, E. (2024). Health information as "fodder for fears": A qualitative analysis of types and determinants of the nonuse of health information. In *Health communication*. Advance Online Publication. https://doi.org/10.1080/10410236.2024.2312611

Link, E., & Baumann, E. (2022). Explaining cancer information avoidance comparing people with and without cancer experience in the family. *Psycho-Oncology*, *31*(3), 442–449. https://doi.org/10.1002/pon.5826

Link, E., Baumann, E., & Aluttis, C. (2023). Ein geschlechterspezifischer Blick auf das gesundheitsbezogene Informationshandeln, seine Treiber und Barrieren [A gendered perspective of information behaviors, its drivers, and barriers. Results of an online survey of a sample stratified for the German population]. *Bundesgesundheitsblatt*, *66*, 1153–1162. https://doi.org/10.1007/s00103-023-03757-6

Link, E., Baumann, E., Czerwinski, F., Rosset, M., & Suhr, R. (2022). Of seekers and nonseekers: Characteristics of Covid-19-related information-seeking behaviors. *World Medical & Health Policy*, *14*(2), 276–294. https://doi.org/10.1002/wmh3.509

Link, E., Baumann, E., Linn, A., Fahr, A., Schulz, P., & Abuzahra, M. E. (2021). Influencing factors of online health information seeking in selected European countries. *European Journal of Health Communication*, *2*(1), 29–55. https://doi.org/10.47368/ejhc.2021.002

McCaul, K. D., & Tulloch, H. E. (1999). Cancer screening decisions. *Journal of the National Cancer Institute Monographs*, *1999*(25), 52–58. https://doi.org/10.1093/oxfordjournals.jncimonographs.a024209

McQueen, A., Swank, P. R., & Vernon, S. W. (2014). Examining patterns of association with defensive information processing about colorectal cancer screening. *Journal of Health Psychology*, *19*(11), 1443–1458. https://doi.org/10.1177/1359105313493649

Merten, J., & Krause, R. (1993). *DAS (Differentielle Affekt Skala) [Differential emotion scale]*. Arbeiten der Fachrichtung Psychologie, Universität des Saarlandes.

Mooi, E., & Sarstedt, M. (2011). *A concise guide to market research: The process, data, and methods using IBM SPSS statistics*. Springer.

Moon, W. K., Kahlor, L. A., Yang, J. Z., & Lim, H. S. (2022). Risk perception, affect, and information avoidance during the 2016 U.S. presidential election. *Journal of Risk Research*, *25*(2), 860–873. https://doi.org/10.1080/13669877.2022.2038247

Nelissen, S., van den Bulck, J., & Beullens, K. (2017). A typology of cancer information seeking, scanning and avoiding: Results from an exploratory cluster analysis. *Information Research*, *22*(2), Article 747. http://InformationR.net/ir/22-2/paper747.html

Niederdeppe, J., Hornik, R. C., Kelly, B. J., Frosch, D. L., Romantan, A., Stevens, R. S., Barg, F. K., Weiner, J. L., & Schwartz, J. S. (2007). Examining the dimensions of cancer-related information seeking and scanning behavior. *Health Communication*, *22*(2), 153–167. https://doi.org/10.1080/10410230701454189

Osimani, B. (2012). Risk information processing and rational ignoring in the health context. *The Journal of Socio-Economics*, *41*(2), 169–179. https://doi.org/10.1016/j.socec.2011.10.009

Pahlevan Sharif, S., Abaeian, V., & Khanekharab, J. (2018). Attitudes toward mammography: Questionnaire psychometric properties. *International Journal of Health Care Quality Assurance*, *31*(5), 391–399. https://doi.org/10.1108/IJHCQA-02-2017-0026

Ramanadhan, S., & Viswanath, K. (2006). Health and the information nonseeker: A profile. *Health Communication*, *20*(2), 131–139. https://doi.org/10.1207/s15327027hc2002_4

Rauscher, E. A., & Hesse, C. (2014). Investigating uncertainty and emotions in conversations about family health history: A test of the theory of motivated information management. *Journal of Health Communication*, *19*(8), 939–954. https://doi.org/10.1080/10810730.2013.837558

Rimal, R. N., Flora, J. A., & Schooler, C. (1999). Achieving improvements in overall health orientation: Effects of campaign exposure, information seeking, and health media use. *Communication Research*, *26*(3), 322–348. https://doi.org/10.1177/009365099026003003

Roussi, P., & Miller, S. M. (2014). Monitoring style of coping with cancer related threats: A review of the literature. *Journal of Behavioral Medicine*, *37*(5), 931–954. https://doi.org/10.1007/s10865-014-9553-x

Rutten, L. J. F., Squiers, L., & Hesse, B. (2006). Cancer-related information seeking: Hints from the 2003 health information national trends survey (HINTS). *Journal of Health Communication*, *11*(1), 147–156. https://doi.org/10.1080/10810730600637574

Shi, W., Nagler, R. H., Fowler, E. F., & Gollust, S. E. (2021). Predictors of women's awareness of the benefits and harms of mammography screening and associations with confusion, ambivalence, and information seeking. *Health Communication*, *36*(3), 303–314. https://doi.org/10.1080/10410236.2019.1687129

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

Silvia, P. J. (2005). What is interesting? Exploring the appraisal structure of interest. *Emotion*, *5*(1), 89–102. https://doi.org/10.1037/1528-3542.5.1.89

Silvia, P. J. (2008). Interest—the curious emotion. *Current Directions in Psychological Science*, *17*(1), 57–60. https://doi.org/10.1111/j.1467-8721.2008.00548.x

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality & Social Psychology*, *48*(4), 813–838. https://doi.org/10.1037/0022-3514.48.4.813

So, J. (2013). A further extension of the extended parallel process model (E-EPPM): Implications of cognitive appraisal theory of emotion and dispositional coping style. *Health Communication*, *28*(1), 72–83. https://doi.org/10.1080/10410236.2012.708633

Sweeny, K., Melnyk, D., Miller, W., & Shepperd, J. A. (2010). Information avoidance: Who, what, when, and why. *Review of General Psychology*, *14*(4), 340–353. https://doi.org/10.1037/a0021288

Swoboda, C. M., Walker, D. M., & Huerta, T. (2021). Odds of meeting cancer prevention behavior recommendations by health information seeking behavior: A cross-sectional HINTS analysis. *Journal of Cancer Education*, *36*(1), 56–64. https://doi.org/10.1007/s13187-019-01597-0

Vrinten, C., Boniface, D., Lo, S. H., Kobayashi, L. C., Wagner, C. V., & Waller, J. (2018). Does psychosocial stress exacerbate avoidant responses to cancer information in those who are afraid of cancer? A population-based survey among older adults in England. *Psychology & Health*, *33*(1), 117–129. https://doi.org/10.1080/08870446.2017.1314475

Wong, N. C. H. (2012). Interaction of comparative cancer risk and cancer efficacy perceptions on cancer-related information seeking and scanning behaviors. *Communication Research Reports*, *29*(3), 193–203. https://doi.org/10.1080/08824096.2012.684808

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

Zhuang, J., & Guan, M. (2022). Modeling the mediating and moderating roles of risk perceptions, efficacy, desired uncertainty, and worry in information seeking-cancer screening relationship using HINTS 2017 data. *Health Communication*, *37*(7), 897–908. https://doi.org/10.1080/10410236.2021.1876324