

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,300

Open access books available

170,000

International authors and editors

185M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.

For more information visit www.intechopen.com



Chapter

Literacy and Trust as Influencing Factors of Health Communication Online

Heinz Bonfadelli

Abstract

This qualitative research synthesis of empirical studies, integrated by a theoretical perspective, focuses on the societal and personal factors influencing digital health communication by individuals. In a process-oriented perspective, it analyzes how Internet users interact with online health information by seeking, receiving, interpreting, and using online health content with varying complexity, utility value, and credibility. The reception process, based on user parameters such as information needs, perceived benefits and costs, digital literacy, and trust, is influencing in a second-step health-related knowledge, attitudes, and behavioral intentions of Internet users and stimulates overt health-oriented behavior.

Keywords: health communication, eHealth, health information seeking, literacy, trust

1. Introduction

This qualitative research synthesis of empirical studies is integrated by a theoretical perspective and focusing on the underlying societal and personal factors that influence digital health communication activities by individuals such as health-related needs, perceived benefits and costs, and user experience on the hand and especially digital literacy or skills together with trust in online health offerings on the other hand.

The *digitalization of society* has transformed our lives fundamentally in all domains such as politics, economy, culture, and especially health communication [1–4]. Today, 96 percent of the population are *using the Internet* in the United States of America [5] and many say they are almost constantly online [6], and in most countries of Europe, for example, 76% in Germany or even 95% in Switzerland, and 86% also use mobile Internet [7]. In addition, more than 70% use the Internet and Social Media as *sources for news*, for example, 84% in Sweden, 82% in Switzerland, 74% in the United Kingdom, 72% in the U.S., or 66% in Germany [5]. Today, the digital media have especially for younger people become the most important source of information. And for the majority of people, the Internet has as well become the most important *source for health information* [8–13], for example, one in two EU citizens look for health information online, most popular in Finland and the Netherlands with about 75% [14].

This can be illustrated actually by the global health pandemic Coronavirus [5]: The coronavirus crisis increased news consumption substantially, especially for mainstream media like television, in all six countries with surveys before and after the pandemic had taken effect. And interestingly, trust in media's coverage of COVID-19 in 2020 was relatively high in all countries with 59%. And even 60% agreed that "media has helped me understand the crisis." [15].

But despite this society wide diffusion of the Internet and Social Media, there still exist gaps in access and especially disparities in usage of the Internet as the so-called *digital divides* in general [16–19] and especially for online health information seeking and application [8, 20–22], not at least based on varying digital skills to use the Internet [23, 24], especially among older adults [25–28]. In addition, there is the question, under what conditions health communication may eliminate health disparities [29, 30], especially in developing countries where still only about 45% have access to the Internet [21–31].

Not so long ago, experts from medicine and public health administration, together with the traditional mass media, possessed a *monopoly as trustworthy top-down sources* for health information. But this was weakened by the fast diffusion of the Internet since the mid-nineties under the label of *eHealth* and in particular by the new interactive Social Media with its participative Blogs or Apps as *mHealth* [32–35] or serious games with health topics [36]. Despite the benefits of those new interactive opportunities for horizontal health communication, there are disadvantages and challenges such as *social usage divides* [21] and risks for the users as well, because the search processes, for example, by Google or on YouTube, are guided by *hidden algorithms*, [37, 38] favoring in most cases the economic interests of the manufacturers of health or medicine products, for example, by *endangering privacy*. But even in the traditional trustworthy print media such as newspapers or magazines, there is more and more of the so-called *sponsored content* by health industry stakeholders in a similar form like the editorial content by media journalists.

2. A theoretical perspective of digital health communication

Figure 1 displays a systematic theoretical framework to analyze the complex field of digital health communication and to locate the many empirical research studies, dealing with a wide variety of online health phenomena [39]. It starts process-oriented from left side with the existing supply of online health information for different target groups, the usage, personal motivation, trust, perceived benefits and costs, and varying experience with health communication and its effects on health-related knowledge, attitudes, and behavior. This *input-output process* is embedded in a *macro societal context*, consisting of the providers of online health information on the one hand and the digital infrastructure on the other hand, depending on *communicative support* [40] by interpersonal communication of social networks [41] and the available resources by communities [42–45]. And individual characteristics of people such as age, sex, education, or a migrant background, together with individual information needs concerning health, perceived norms, for example, with regard to Corona vaccination, e-health literacy, and self-efficacy, for example, to handle Corona infection, influence on the *micro level* the digital health communication process.

Online Health Information as input can be differentiated according to its form and content. Of importance for the user are especially aspects such as accessibility and security [46], the visual structure of a Web site [47], the ease of use and user friendliness, and the complexity of online health information [48], together with its utility

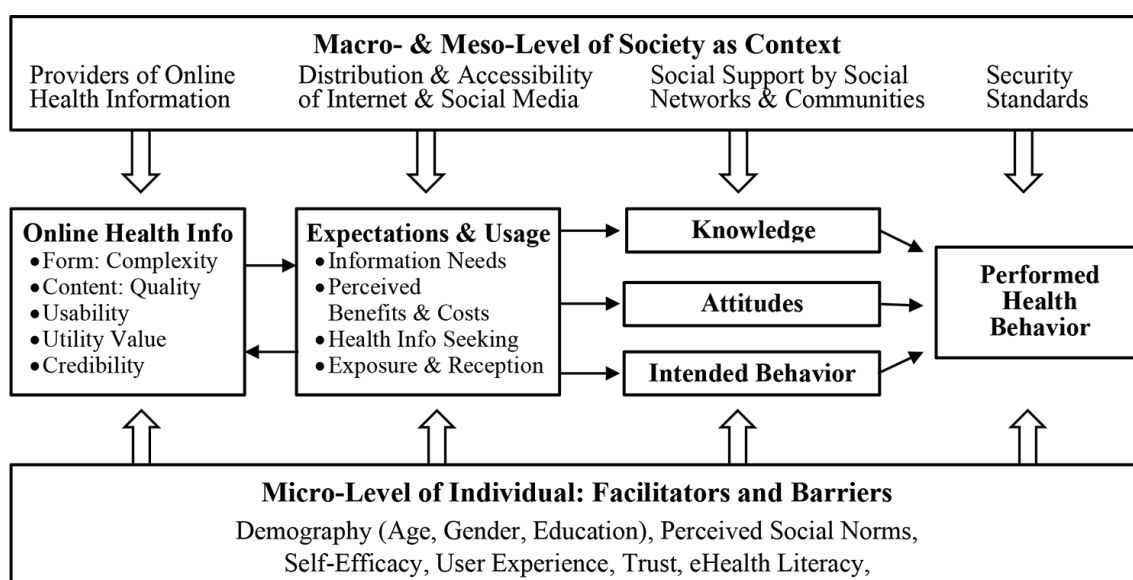


Figure 1.
 Digital health communication: societal context, personal situation, use, and effects.

value, and not at least the quality and credibility of online health information and its underlying sources. There are many content analyses dealing with health information in general or with topics such as HIV/AIDS, cigarette smoking, cancer, body images, in the classic print media or television [49–50], but there are still not so many comparative analyses of *health Web sites* with varying interactivity and quality on the one hand and health videos in Social Media on the other hand [51–53] as a prerequisite for developing *Web site quality standards* [53–56].

Usage and Experience incorporate the many aspects of a wide variety of concrete interactions between online health offerings and its users, starting with *information needs*, *perceived benefits and costs* [57] and the process of seeking online health information and its exposure to it [8, 58]. And there are many *underlying mediating factors* such as *self-efficacy* [59–61] *online user experience* [62], *trust*, based on perceived quality and credibility of online health Web sites and its content [63–66], and not at least *eHealth literacy* [67–76].

Knowledge, Attitudes, and Intended Behavior of people are the effects of the varying use and reception of online health information, depending not at least on health information needs as motivation, perceived benefits and costs, eHealth literacy, and self-efficacy or trust, and are a prerequisite of the actually performed health behavior. Usually, there exist gaps between knowledge, attitude, and performed behavior, because of existing barriers such as costs or not having enough incentives or self-efficacy and empowerment [60, 61].

The above-mentioned interaction between online health content on the one hand and seeking and usage of this information by people and its effects on health behavior of users are influenced on the *macro- and meso-level* by the societal context, for example, with the amount and distribution of Internet access, the diversity of online health providers, and the social networks together with the urban or rural context of its users. On the *micro-level of the individual person*, there are mediating factors as well such as age, gender, education, or a migrant background that influence the existing health information needs, perceived norms, health literacy, and especially the *self-efficacy of a person* to seek, use, and implement online health information.

It is the aim of this contribution, to *summarize and integrate the existing research* and its manifold insights, focusing first on the processes of health information seeking,

and second on the underlying and mediating factors of online health information such as user experience, involved credibility and trust, and health literacy, as well as the individual characteristics of the more or less active user of health online.

3. Methodology

The following summarized findings about the topic of health communication online and its influencing factors such as literacy and trust are based on a qualitative research synthesis of empirical studies from different countries and covering about the last twenty years. The considered results have been included on the one hand due to published relevant original research studies and on the other hand by citations in summarizing thematic publications, both have been searched in important journals of the field like “Journal of Health Communication” or “Journal of Public Health” and in relevant handbooks like “The Routledge Handbook of Health Communication,” with a focus on publications in English language. Thus, the subsequent presented findings and insights of this review chapter are not based on a standardized quantitative meta-analysis, but as a limitation is only the result of a qualitative integrative synopsis of the topic by the author.

4. Health information online

Today, an immense number of *online offerings for health promotion* exist in a variety of forms such as Internet Web sites and videos on Social Media such as YouTube, Facebook, or Twitter, and with different levels of quality. And it seems that health Web site quality influences the intention to use it [77]. In addition, people use more and more the so-called *mobile wearables* such as Smartphone Apps that count undertaken steps or measure the cardioplegia, and give tips for healthy behavior like physical activity, but unfortunately often not based on clear evidence [10, 78]. Rossman and Karnowski [79] created a *classification, based on five dimensions*, that enables the contextualization of the wide variety of new *eHealth and mHealth Phenomena* (**Table 1**):

Provider	Addresses	Interests	Interactivity	Functionality
<ul style="list-style-type: none"> • Economy: For example, Health Insurances • Politics: Health Services • (Health) Sciences • Mass Media • Lay People 	<ul style="list-style-type: none"> • Health Services • Politicians • (Health) Sciences • Lay People: General Public, Target Groups, Persons Concerned 	<ul style="list-style-type: none"> • Non-Profit in the Public Interest • Commercial with Financial Interest 	<ul style="list-style-type: none"> • Information: one-sided • Interaction: two-sided • Transaction: two-sided 	<ul style="list-style-type: none"> • Content • Community • Provision

Source: Adapted from Rossmann & Karnowski 2015: 273 [79].

Table 1.
Classification of health offerings on the Internet.

There are on the one hand *providers* and on the other hand *addresses* of online health offerings, namely from governmental public health services or health insurances, from politics, (health) science and mass media, but as well from lay people, for example, as communicators and recipients, the so-called prosumers, of Social Media.

These providers of health offerings do not always represent *non-profit public interest*, but act as well as commercial agents with financial interests, for example, to sell medicines and drugs, however not always openly declared like in the many new health magazines. The online health contents can offer different *levels of interactivity* like one-sided information only, two-sided interactive communication, or even two-sided ways of transaction. And *functionality* means the purpose or the objective target of the online health offering like “*content*” as one-sided information for more or less passive receivers as distinguished from “*community*” as enabling two-sided interactivity between providers and addressees, and “*provision*” stands for supplying, for example, orientation in the doctor-patient relationship.

Not surprisingly, the *Usability of Health Information Websites* and *eHealth Offerings* [80–82] or the observed aesthetics [83] are judged differently by age groups: Whereas younger people prefer visually appealing and interactive content such as videos, games, or quizzes, and find too much text difficult to handle [57], older adults instead have difficulty in identifying and access relevant, reliable, and trustworthy sources of health information on the Web [27, 28]. In addition, sociodemographic factors like education influence the use of eHealth as well. It is a challenge that eHealth is still least used by persons who need it most [58]. To overcome these barriers, health information Web sites should not be generalized for all people, but suitably tailored to the needs of its specific target groups by taking into consideration barriers as well facilitators to enhance access, usage, and implementation [39, 84].

5. Online health information seeking

In most surveys, dealing with personal concerns, health has a high priority. As a consequence, it is not surprising that information seeking about health on the Internet and Social Media is performed by most people on a regular basis. **Table 2** lists data from different countries: In the Pew Internet Survey from 2013 [86], 59% of *U.S. adults* have looked online for health information in the past year, which means 73% of Internet users. And in 2013, 75% of the European population used the Internet and 59% of the Internet users were seeking online health information; the highest rates have been measured in Germany with 69% and Finland with 65%, and the rates increased in 2019 to 53% overall, but, for example, to 80% in Finland. There are as well survey data for Switzerland [85]: 92% used the Internet in 2019 and 76% of the Internet users have been searching for health information online.

Taken together, at least 90% in the Western Information Societies have access to the Internet today, and around 70% of the Internet users are seeking for health information. It should be kept in mind that most studies focus on *conscious and active searches for health information*, but not on “random contacts” with the topic, for example, on YouTube or Instagram. Furthermore, the effects of health information seeking on knowledge, opinion forming, and health behavior have so far been largely unexplained.

But despite the widespread use of online health information, there are still *barriers* such as costs and groups such as the elderly, the disabled or those living in rural areas, because of not having physical access, a lack of relevant digital skills or negative experiences with computer use [26, 29]. Ren et al. [87] analyzed the perceived benefits and costs of seeking and using online health information. Based on 282 questionnaires, obtained from patients and their family members, they summarize the following key finding: perceived functional, learning, social and personal integrative benefits

Country	U.S. 2012	Europe 2013				Europe 2019				
		EU 27	Germany	UK	Finland	EU 27	Germany	UK	Finland	Switzerland
Study	Pew Internet 2013	Eurostat* 2013				Eurostat* 2019				Latzer et al. 2019 [85]
Internet users (%)	81	75	84	90	92	87	93	96	95	92
Indicators	Health info online in past year	Individuals using the Internet for seeking health information				Individuals using the Internet for seeking health information				Individuals seeking health/nutrition info online
All** (%)	59	44	58	45	60	53	66	67	76	70
Onliner*** (%)	73	59	69	50	65	61	71	70	80	76
Sample	18+ years n = 3'014	16–74 years samples per country between 3000 and 6000								14+ years n = 1'122

*Eurostat: <https://ec.europa.eu/eurostat/databrowser/view/tin00101/default/table?lang=en>.

**Percentage of health information seeking for all people.

***Only for people using the Internet.

Table 2.
Health information seeking on the Internet by people and Internet users.

positively affect online health information seeking, whereas cognitive (search) costs influence information seeking negatively.

Besides active health information seeking, a German survey by Bertelsmann Foundation [88] asked for the *communication channels used*, and the *underlying motivation* to use the Internet for health-related questions: 88% of the 18 to 80 years old adults have been seeking information about health in the past year, and 46% of these used the Internet as information source; the classical sources were still more used: 62% used mass media, and 56% had interpersonal communication with doctors or nursing staff or 54% with family or colleges. The most named *motivation of health information seeking* with 73% was to be informed about health risks and diseases in general; 58% mentioned to look for tips about healthier behavior, and the own need for help in concrete situations of illness (52%) or to be able to give help to family members and friends concerning health problems (46%).

But there are *dysfunctional aspects* of seeking and using online health content as well, especially in Social Media are the rarely transparent underlying *algorithms* a problem, together with *health misinformation* [38, 89, 90], as the public debate about COVID-19 is showing. As a *practical consequence*, there are *essential challenges* for the providers of prevention marketing [91, 92] and public health campaigns [93–97].

The above presented findings on the active search for information on the Internet and their underlying motives in relation to perceived benefits and costs [11] will be deepened in a further step by the discussion of some relevant *mediating factors* [87, 98–100], which influence the *modality of handling health information on the Internet*: namely (1) *user experience* like eHealth literacy [101], (2) *salience* of information about the topic, (3) *beliefs* that the behavior is producing the expected outcome, (4) perceived *behavioral control*, (5) *subjective norms* as beliefs about whether significant others think the behavior should be undertaken, (6) perceived *credibility together with trust* of site information [64, 70], and (7) *characteristics of users*. These mediating factors are relevant for providers of online health information, the tailoring of their messages, and the specification of relevant target groups. But it has to be emphasized that most of the existing studies focus on the so-called top-down offerings such as Web sites and online health campaigns; studies on interactive communication on the Social Web have so far been rare [22, 102, 103].

6. User experience with eHealth content

User experience during online health information seeking and use has a decisive influence on the success of an online offer and on its impact on users. The term user experience includes all experiences when interacting with an (online) health offer, starting with *navigational needs* [104]. Usually, the *subjective impression of health content*, its *usability or user-friendliness*, and the *attractiveness or visual aesthetics* of online health contents [83] are examined in corresponding studies [82, 105].

The way in which user experience as a whole and its various components work with classic Web sites has meanwhile been researched quite well, especially in the German-speaking countries. Right at the beginning of a visit, for example, access to a Web site or an advertisement in a social media feed, visitors get an impression of the visual attractiveness in less than a second, and this perception remains mostly stable [106]. And a high *visual attractiveness* increases the likelihood that an offer will be used for a longer time [107, 108]. For the willingness to revisit or recommend a Web site, content evaluation plays a decisive role [109]: Beneficial users are

willing to accept any hurdles in usability for particularly good and exclusive content. Finally, *usability* is crucial for visitors to find search information immediately—or whether their experience of use is clouded by confusion, slow page construction, or navigational hurdles. And Uwe Hambrock [110] in his summary for the Bertelsmann Stiftung used qualitative interviews to investigate health information-seeking behavior of men and women in their role as patients in Germany. The interaction between doctor, patient, and Internet repeatedly revealed challenges, for example, when doctors advise against visiting the Internet. A key finding of the study was that information that serves one's own motives is more familiar in the sense of consistency theory.

For online offers, all the above-mentioned factors such as clarity, informativeness and likeability of content, its visual attractiveness, usability, credibility, and rating are essential. However, the research is still rather undifferentiated. Meinald T. Thielsch and his colleagues [106] have presented benchmarks based on user experiences with Web sites as the so-called *user experience measures*. With the freely available collection of validated scales as a “*Website Evaluation Toolbox*,” the key aspects of Web site perception can be recorded reliably. However, the subject of the investigation was classic Web site formats. Appropriate tools for analyzing the quality of other online formats have so far been largely lacking.

7. Credibility and trust

Another relevant factor for the assessment of online health information is *credibility of the information from a user perspective*. The credibility of information, or trust in (print) media and public authorities, but also in experts from academia, linked to keywords “fake news” and “lies press,” has not only in Germany [111] been controversially discussed recently. Politicians are therefore trying to use new tools such as the “*Network Search Law*” (Netzwerkdurchsuchungsgesetz) in Germany to be able to follow relevant penal content better, especially by Social Media.

Research about the credibility of information and trust in these and their sources has so far been a priority for political news in the online sector. For example, the Digital News Report by Reuters of 2020 [15] shows that 45% of respondents in Germany still trust most news, with the extent for “news I use” being as high as 59%; however, only 14% trust the news on Social Media. Further findings also show that people rate *online misinformation* more credibly when they see it frequently [112, 113]. In addition, users with above-average social media experience tend to rate online information more trustworthy [114]. And the attempt to limit the spread of misinformation through warnings can even increase its spread [115, 116]. Information is also considered to be more credible when arguments are made for different sides of a point of contention. However, this rule of thumb depends on the extent to which the ability to think flexibly is pronounced among the beneficiaries [65, 117].

In the *field of health communication*, the research situation on trust has so far been rather thin; most of the analyses are limited to overall measures of “Internet” and “trust” without differentiating the formats and concepts [63, 118]. In Germany, Sarah Fischer [119] empirically investigated the influence of the type of information source and scientific uncertainty on trust in health services on the Internet with two studies. And Yeolib Kim [64] found in a systematic literature review up to 2013 only 20 English language studies that used differentiated measures of trust in Web sites. And he classified the factors that determine trust into individual difference antecedents, Web site-related antecedents, and consumer-to-Web site interaction-related antecedents.

And among the *antecedents of trust*, socio-demographics such as age, gender, and perceived health status, information quality, design, and perceived reputation of a Web site have been analyzed most frequently, but without consistent results. Sbaffi und Rowley [66] analyzed 34 studies until 2015. And they also were not able to find uniform results. Besides the role of *information quality* as a factor for the credibility of web-based health information, *health literacy* [70, 75] seems to influence perceived trust as well.

8. Health literacy

“Literacy” is a rather broad theoretical concept from diverse disciplines that constitutes a *heterogeneous and complex research topic* [67, 69, 70, 73–75, 120, 121]. It includes *different subtypes* that are strongly interconnected [71]: 1) *traditional literacy* as ability to understand texts, 2) *health literacy* together with eHealth literacy as ability to understand and process health information in everyday life as well as in the Internet and social media, 3) *computer literacy* as ability to use computer hardware and software, 4) *science literacy* as ability to understand scientific research and results, 5) *media literacy* as ability to access, understand, and use media content and its quality, and 6) *information literacy* as ability to know, use, estimate and process information. And health literacy and online health literacy, labeled as eHealth literacy, are strongly interconnected, not at least because most people today access, receive, and process health information not only by interpersonal communication in the form of conversations or the classic journalistic media such as newspapers, radio, or television, but as well by the Internet and social media.

So it is not surprising, that *many definitions of eHealth literacy exist*: According to Gunther Eysenbach [32], “e-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology.” In contrast, Cameron D. Norman and Harvey A. Skinner [122] defined eHealth literacy in a more concise way as the “ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem.” Not surprising, *the concept of eHealth* got many definitions over time, and a systematic review by Hans Oh and his colleges [123] found 51 unique definitions according to different persons like health professionals, consumers of health services, or lay persons using the Internet. In addition, there have been many attempts *to operationalize and measure eHealth literacy* on the individual’s level, for example, in the form of *literacy scales* like eHEALS by Cameron D. Norman and Harvey A. Sinner [122]. But there is critique that the empirical measurement of (health) literacy was and still is mostly not based on a theoretical background, and literacy together with eHealth literacy is mostly measured based on subjective ratings by individuals and not on an objective factual basis. In addition, there still is not the so-called *gold standard of measurement*. And another weakness is that medical professionals have been only weak included in the process of definition and measurement of ehealth literacy [71].

As a significant factor in the field of health communication, eHealth literacy has been investigated and still is in many *empirical studies*. But most studies are measuring the level of eHealth literacy hold by the citizens of a specific population or by

subgroups of a population only in a descriptive way, and especially in survey studies only as subjective assessment. As an example, the Flash Eurobarometer 404 survey investigated “*European Citizens’ Digital Health Literacy*” with the following key insights by the European Commission in 2014 [23]: 1) Around six out of 10 respondents and 75% of the Internet users (80% of the population) had searched online for health-related information within the last year, the highest in the 25–34 age group. 2) Over three quarters of all respondents agreed that the Internet was a good tool for improving their knowledge of health-related topics. 3) Nearly 9 out of 10 people who looked for health information online said they were satisfied with the information they found. 4) Eight out of 10 people thought that the health-related information they found online was useful and that it was easy to understand. 5) And even more than 9 out of 10 respondents agree that their research on the Internet helps them improve their knowledge of health-related topics. 6) Over 80% agreed that they know where to find reliable health-related information on the Internet, and even 90% agreed that they know how to use the health-related information they found on the Internet. 7) But still 40% did not think the information came from a trustworthy source and did not trust information from the Internet to make health-related decisions. These results indicate an overall high level of online health literacy but can also be interpreted as an uncritically overestimation by many persons.

Beyond that, there has been the question if *eHealth literacy as a significant independent factor* is influencing whether an online health content is perceived and evaluated as useful and credible [75], a layout as aesthetically satisfying, or a media source or sender is perceived as trustworthy or not [70]. And besides empirical research, in practice there have been many *interventions* in the form of programs to improve the eHealth literacy of potential user groups like older adults [124]. The underlying goal especially in media education at school is learning how to deal with media by enhancing media knowledge and media competency of the pupils in form of skills to judge media reality more critically and, for example, to detect Fake News [125, 126].

9. Personal context of online communication

Besides trust and eHealth literacy, there are additional factors influencing health online communication. *Demographics* of persons and target groups such as age, gender, or education on the one hand, and the *personal context of online use* on the other hand also have an impact on the accessibility of the users as well as the use and appraisal of online offerings. And the significance of each factor depends not least on the personal context of health online usage. *Older people* for instance may not have access to the Internet together with the necessary skills to use eHealth. Otherwise, many young people today are particularly well accessible *via* an entry in their Instagram feed, which is scrolled through around lunch. In order to be considered in this context—for example with information on the effects of alcohol—a health campaign, for example, must be able to attract formal attention and interest in terms of content and be able to be captured in a very short time as well: This is not least because in this context of use the *attention span* is narrow and *cognitive processing* is rather superficial. On the other hand, young people are informed about a particular topic, for example, about the effects of alcohol on the occasion of a lecture at school, and seriousness, comprehensibility, and scope of information come to the fore. In this context, the *ELM-Elaboration-Likelihood Model* [127, 128] is distinguishing two contrasting “routes of information processing”: A *central and in-depth processing* deals

discursively with the arguments of a message, while a *peripheral and superficial processing* is oriented toward images and emotions. The consideration of such and other factors as well as the corresponding theoretical perspectives allows a more efficient approach of the respective target groups. A comprehensive model for online communication in the health sector would have to systematically integrate these conditional mediating factors and processes for seeking, accessing, and handling health information on the Internet as precondition of health behavior.

Valuable and useful information about mediating personal factors of health information-seeking behavior can be found in various models and theoretical perspectives of *social psychology* such as the *Theory of Planned Behavior* [129, 130] or the Social Capital Concept [131], and in *communication science* the *ELM Model* [127] or in *health sciences* [132] the *Health Belief Model* [133, 134] or the *Protection Motivation Theory* [135, 136], which deal specifically with health-related factors such as the magnitude of threat of a health problem and the vulnerability of people, together with costs and barriers but as well the usefulness and motivation of health behavior based on personal self-efficacy and coping assessment of how to deal with health risks. Not least the so-called *Transtheoretical Model* [137] also is of relevance for addressing the respective target groups, which distinguishes *process-oriented six different stages of change* in the management of health problems in which a person is looking for health information on the Internet as precontemplation, contemplation, preparation, action, maintenance, and termination.

10. Summary and conclusions

This contribution—initiated by Salaschek & Bonfadelli in 2020 [138]—provides an application-oriented overview of the development of digital health communication in the face of the Internet and Social Media, with a focus on online search for health information and its reception and effects, influenced by factors such as credibility and trust of health offerings by media and medicine, together with eHealth literacy as necessary precondition. In the studies carried out for this purpose, the *user experience and skills* on the side of the Internet audience, and the *perceived quality and credibility* on the side of the offerings of online health information are emphasized.

This results in *practical challenges for providers of health information* on the Internet and Social Media, but also for the planning and implementation of *prevention marketing* [68] and *online health communication campaigns* [93–95, 139], in order to still reliably reach the target groups in the new and constantly changing digital environment with informative, interesting, and convincing tailored health information that is perceived as useful and trustworthy [140] and should not deepen existing social inequalities [8]. And last but not the least, *empirical evidence-based evaluations* for quality assurance [141–143] play an important role for online health services, but also (certified) *quality labels for websites* such as the quality label “Health On the Net” (HON) based on criteria such as expert knowledge, data protection, transparency, and balance [144].

In addition to the active reception and implementation of the existing knowledge in communication practice [145], and in view of the existing shortcomings, further basic research on factors such as user experience, trust, and credibility of target groups of new interactive digital formats is important, especially for interactive communication on Web 2.0 [146]. And for application-oriented, various questions play a role, for which there is still too little reliable knowledge: In which reception context


which target group can best be addressed with which formats? Or: What is needed to achieve trust, acceptance, and implementation in different user segments? Such research questions should take up the existing diverse practical experience, examine, and systematize evidence-based, to be able to communicate online more effectively and efficiently on health issues in the future. This is relevant not least because individual target groups like young people can already be reached almost exclusively online. But despite the ubiquity of the Internet, successful health communication will have to continue to work in future on an *evidence-based basis* with a combination of online and offline channels and offerings.

Author details

Heinz Bonfadelli
Department of Communication and Media Research, University of Zurich,
Switzerland

*Address all correspondence to: h.bonfadelli@ikmz.uzh.ch

IntechOpen

© 2022 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 

References

- [1] Benjamin C, Potts HWW. Digital transformation in government: Lessons for digital health? *Digital Health*. 2018;**3**:1-5
- [2] Helbing D, editor. *Towards Digital Enlightenment. Essays on the Dark and Light Sides of the Digital Revolution*. Cham, Switzerland: Springer; 2019
- [3] Musik C, Bogner A. *Digitalization and Society. A Sociology of Technology Perspective on Current Trends in Data, Digital Security and the Internet*. Wiesbaden: Springer Nature; 2019
- [4] Van Veldhoven Z, Vanthienen J. Digital transformation as an interaction-driven perspective between business, society, and technology. *Electronic Markets*. 2021
- [5] Reuters Institute. *Digital News Report 2021*. Oxford: University of Oxford; 2021
- [6] Perrin A, Kumar M. About Three-in-Ten U.S. Adults Say They are 'Almost Constantly' Online. Washington: Pew Research Center; 2019
- [7] Latzer M, Büchi M, Kappeler K, Festic N. Vertrauen und Sorgen bei der Internetnutzung in der Schweiz. In: *Themenbericht aus dem World Internet Project – Switzerland 2021*. Zürich: University of Zurich; 2021. p. 2021
- [8] Bonfadelli H. Digital inequalities in health communication. In: Hargittai E, editor. *Handbook of Digital Inequality*. London: Elgar Publ; 2021. pp. 217-232
- [9] Bujnowska-Fedak J, Waligóra J, Mastalerz-Migas A. The Internet as a Source of Health Information and Services. In: Pokorski M, editor. *Advancements and Innovations in Health Sciences*. Cham, Switzerland: Springer; 2019. pp. 1-10
- [10] Bert F, Giacometti M, Gualano MR, Siliquini R. Smartphones and Health Promotion: A Review of the Evidence. *Journal of Medical Systems*. 2014;**38**:9995
- [11] Johnson DJ, Case DO. *Health Information Seeking*. New York u. a.: P. Lang; 2012
- [12] Lustria MLA, Smith SA, Hinnant CC. Exploring digital divides: An examination of eHealth technology use in health information seeking, communication and personal health information management in the USA. *Health Information Journal*. 2011;**17**(3):224-243
- [13] Percheski C, Hargittai E. Health information-seeking in the digital age. *Journal of American College Health*. 2011;**59**(5):379-386
- [14] Available from: <https://ec.europa.eu/eurostat/>
- [15] Reuters Institute. *Digital News Report 2020*. Oxford: University of Oxford; 2020
- [16] Büchi M, Just N, Latzer M. Modeling the second-level digital divide: A five-country study of social differences in Internet use. *New Media & Society*. 2015;**18**(11):1-20
- [17] Gui M, Büchi M. From use to overuse: digital inequality in the age of communication abundance. *Social Science Computer Review*. 2021;**39**(1):3-19
- [18] van Deursen A, van Dijk J. New media and digital divide. In: *International Encyclopedia of the Social*

& Behavioral Sciences. 2nd ed. Vol. 16. 2015. pp. 787-792

[19] van Doersen AJAM, Helsper EJ. The third-level digital divide. Who benefits most from being online. *Communication and Information Technologies Annual*. 2017;**10**:29-52

[20] Brodie M, Flourno RE, Altman DE, Blendon RJ, Benson JM, Rosenbaum MD. Health information, the internet, and the digital divide. *Health Affairs*. 2000;**19**(6):255-265

[21] Chib A, Helena M, van Velthoven MH, Car J. mHealth adoption in low-resource environments: A review of the use of mobile healthcare in developing countries. *Journal of Health Communication*. 2015;**20**:4-34

[22] Moorhead SA, Hazlett DE, Harrison L, Carroll JK, Irwin A, Hoving C. A new dimension of health care: Systematic review of the uses, benefits, and limitations of social media for health communication. *Journal of Medical Internet Research*. 2013;**15**(4):e85

[23] Commission E. Flash Eurobarometer 404: Europeans' Citizens Digital Health Literacy. Brussels: European Commission; 2014

[24] Scheerder A, van Deursen A, van Dijk J. Determinants of Internet skills, uses and outcomes. A systematic review of the second- and third-level digital divide. *Telematics and Informatics*. 2017;**34**:1607-1624

[25] Friemel TN. The digital divide has grown old: Determinants of a digital divide among seniors. *New Media and Society*. 2016;**18**(2):313-331

[26] Hargittai E, Dobransky K. Old dogs, new clicks: Digital inequality

in skills and uses among older adults. *Canadian Journal of Communication*. 2017;**42**:195-212

[27] Ware P et al. Using eHealth technologies: interests, preferences, and concerns of older adults. *Interactive Journal of Medical Research*. 2017;**6**(1):e3

[28] Weber W, Reinhardt A, Rossmann C. Lifestyle segmentation to explain the online health information-seeking behavior of older adults: Representative telephone survey. *Journal of Medical Internet Research*. 2020;**22**(6):e15099

[29] Borg K, Boulet M, Smith L, Bragge P. Digital inclusion & health communication: A rapid review of literature. *Health Communication*. 2019;**34**(11):1320-1328

[30] Freimuth VS, Quinn SC. The contributions of health communication to eliminating health disparities. *American Journal of Public Health*. 2004;**94**(12):2053-2059

[31] Makri A. Bridging the digital divide in health care. *The Lancet*. 2019;**1**(Sept):e204-e205

[32] Eysenbach G. What is e-health? *Journal of Medical Internet Research*. 2001;**3**(2):e20

[33] Kreps GL, Neuhauser L. New directions in eHealth communication: Opportunities and challenges. *Patient Education and Counseling*. 2010;**78**:329-336

[34] Schiavo R. Digital marketing the rise of e-health: Current trends and topics on online health communications. *Journal of Medical Marketing*. 2008;**8**:9-18

[35] Sundar SS, Rice RF, Kim H-S, Sciamanna CN. Online Health Information. Conceptual Challenges and Theoretical Opportunities.

- In: Thompson TL, Parrott R, Nussbaum JF, editors. *The Routledge Handbook of Health Communication*. New York / London: Routledge; 2011. pp. 181-202
- [36] Sharifzadeh N, Kharrazi H, Nazari E, et al. Health education serious games targeting health care providers, patients, and public health users: Scoping review. *JMIR Serious Games*. 2020;**8**(1):e13459
- [37] Puaschunder JM. Big Data, Algorithms and Health Data. 2019. Available at SSRN: <https://ssrn.com/abstract=3474126> or 10.2139/ssrn.3474126
- [38] Shin J, Valente T. Algorithms and health misinformation: A case study of vaccine books on amazon. *Journal of Health Communication*. 2020;**25**:394-401
- [39] Schreiweis B et al. Barriers and facilitators to the implementation of eHealth services: Systematic literature analysis. *Journal of Medical Internet Research*. 2019;**21**(11):e14197
- [40] Kreps GL. Online information and communication systems to enhance health outcomes through communication convergence. *Human Communication Research*. 2017;**43**:518-530
- [41] Wright KB. Communication in health-related online social support groups/communities: A review of research on predictors of participation, applications of social support theory, and health outcomes. *Review of Communication Research*. 2016;**4**:65-87
- [42] Goldsmith D, Albrecht TL. Social support, social networks, and health. In: Thompson TL, Parrott R, Nussbaum JF, editors. *The Routledge Handbook of Health Communication*. New York: Routledge; 2011. pp. 335-348
- [43] Lefebvre RC, Bornkessel AS. Digital social networks and health. *Circulation*. 2013;**127**:1829-1836
- [44] Valente TW. *Social Networks and Health: Models, Methods, and Applications*. New York: Oxford University Press; 2010
- [45] Valente TW. Social networks and health communication. In: Thompson TL, Parrott R, Nussbaum JF, editors. *The Routledge Handbook of Health Communication*. New York: Routledge; 2011. pp. 519-531
- [46] Alajarmeh N. *Evaluating the Accessibility of Public Health Websites: An Exploratory Cross-Country Study*. Wiesbaden: Universal Access in the Information Society; Springer; 2021
- [47] Valizadeh-Haghi S, Moghaddasi H, Rabiei R, Asadi F. Health websites visual structure: the necessity of developing a comprehensive design guideline. *Journal of Paramedical Sciences*. 2017;**8**(4):53-59
- [48] Ford EW, Huerta TR, Schilhavy RAM, Menachemi N. Effective US health system websites: Establishing benchmarks and standards for effective consumer engagement. *Journal of Healthcare Management*. 2012;**57**(1):47-65
- [49] Kaiser Family Foundation. *Health News Coverage in the U.S. Media*. January – June 2009. California: Menlo Park; 2009
- [50] Manganello J, Blake N. A study of quantitative content analysis of health messages in U.S. media from 1985 to 2005. *Health Communication*. 2010;**25**(5):387-396
- [51] Kristiansen S, Bonfadelli H. E-Health: Gesundheit im Internet. In: Rossmann C, Hastall M, editors. *Medien und*

Gesundheitskommunikation. Befunde, Entwicklungen, Herausforderungen. Nomos: Baden-Baden; 2013. pp. 237-255

[52] Venkatasubramanian M. Applications of qualitative content analysis: Evaluating the reliability and quality of health information websites. *Qualitative Research Reports in Communication*. 2021;22(1):89-96

[53] Zhang Y, Sun Y, Xie B. Quality of health information for consumers on the web: A systematic review of indicators, criteria, tools, and evaluation results. *Journal of the Association for Information Science and Technology*. 2015;66(10):2071-2084

[54] Devine T, Broderick J, Harris LM, Wu H, Hilfiker SW. Making quality health websites a national public health priority: Toward quality standards. *Journal of Medical Internet Research*. 2016;18(8):e211

[55] Eysenbach G, Powell J, Kuss O, Sa ER. Empirical studies assessing the quality of health information for consumers on the world wide web. A Systematic Review. *JAMA*. 2002;287(20):2691-2715

[56] Tao D, LeRouge C, Smith KJ, De Leo G. Defining information quality into health websites: A conceptual framework of health website information quality for educated young adults. *JMIR Human Factors*. 2017;4(4):1-19

[57] Reen GK, Muirhead L, Langdon DW. Usability of health information websites designed for adolescents: Systematic review, neurodevelopmental model, and design brief. *Journal of Medical Internet Research*. 2019;21(4):e11584

[58] Reiners F, Sturm J, Bouw LJW, Wouters EJM. Sociodemographic factors influencing the use of ehealth in people

with chronic diseases. *International Journal of Environmental Research and Public Health*. 2019;16:645

[59] Ajzen I. Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology*. 2002;32:665-683

[60] Kollmuss A, Agyeman J. Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*. 2002;8(2):239-260

[61] Sheeran P, Webb TL. The intention-behavior gap. *Social and Personality Psychology Compass*. 2016;10:503-518

[62] Vantriet J, Crutzen R, De Vries H. Investigating predictors of visiting, using, and revisiting an online health-communication program: A longitudinal study. *Journal of Medical Internet Research*. 2010;12(3):e37

[63] Hesse BW, Nelson E, Kreps GL, et al. Trust and sources of health information. *Archives of Internal Medicine*. 2005;165:2618-2624

[64] Kim Y. Trust in health information websites: A systematic literature review on the antecedents of trust. *Health Informatics Journal*. 2016;22:355-369

[65] Metzger MJ, Flanagin AJ. Psychological Approaches to Credibility Assessment Online. In: *The Handbook of Psychology of Communication Technology*. London: John Wiley & Sons, Inc.; 2015. pp. 445-466

[66] Sbaffi L, Rowley J. Trust and credibility in web-based health information: A review and agenda for future research. *Journal of Medical Internet Research*. 2017;19(6):e218

- [67] Berkman N-D, Davis TC, McCormack L. Health literacy: What is it? *Journal of Health Communication*. 2010;**15**(S2):9-19
- [68] Bodie GD, Dutta MJ. Understanding health literacy for strategic health marketing: eHealth literacy, health disparities, and the digital divide. *Health Marketing Quarterly*. 2008;**25**(1):175-203
- [69] Cameron KA, Wolf MS, Bake DW. Integrating health literacy in health communication. In: Thompson TL, Parrott R, Nussbaum JF, editors. *The Routledge Handbook of Health Communication*. New York/London: Routledge; 2011. pp. 306-319
- [70] Chen X, Hay JL, Waters EA, Kiviniemi MT, Briddle C, Schofield E, et al. Health literacy and the use and trust in health information. *Journal of Health Communication*. 2018;**23**:724-734
- [71] Griebel L, Enwald H, Gilstad H, Pohl A-L, Moreland J. eHealth literacy research—Quo vadis? *Informatics for Health & Social Care*. 2018;**4**(4):427-442
- [72] Ishikawa H, Takeuchi T, Yano E. Measuring functional, communicative, and critical health literacy among diabetic patients. *Diabetes Care*. 2008;**31**(5):874-879
- [73] Nutbeam D. The evolving concept of health literacy. *Social Science & Medicine*. 2008;**67**:2072-2078
- [74] Nutbeam D, Lloyd JE. Understanding and responding to health literacy as a social determinant of health. *Annual Review of Public Health*. 2021;**42**(1):159-173
- [75] Paige SR, Krieger JL, Stollefson ML. The influence of ehealth literacy on perceived trust in online health communication channels and sources. *Journal of Health Communication*. 2017;**22**:53-65
- [76] Samerski S. Health literacy as a social practice: Social and empirical dimensions of knowledge on health and healthcare. *Social Science & Medicine*. 2019;**226**:1-8
- [77] Boon-itt S. Quality of health websites and their influence on perceived usefulness, trust and intention to use: an analysis from Thailand. *Journal of Innovation and Entrepreneurship*. 2019;**8**(4):1-18
- [78] Chib A, Lin SH. Theoretical advancements in mHealth: A systematic review of mobile apps. *Journal of Health Communication*. 2018;**23**:909-955
- [79] Rossmann C, Karnowski V. eHealth und mHealth. In: Hurrelmann K, Baumann E, editors. *Handbuch Gesundheitskommunikation*. Bern: Huber; 2015. pp. 271-284
- [80] Guenther K. Assessing website usability (website management). *Online*. 2003;**27**(2):65-68
- [81] Hinchliffe A, Mummery WK. Applying usability testing techniques to improve a health promotion website. *Health Promotion Journal of Australia*. 2008;**19**:29-35
- [82] Thüring M, Mahlke S. Usability, aesthetics and emotions in human-technology interaction. *International Journal of Psychology*. 2007;**42**(4):253-264
- [83] Thielsch MT. *Ästhetik von Websites. Wahrnehmung von Ästhetik und deren Beziehung zu Inhalt, Usability und Persönlichkeitsmerkmalen*. Münster: MV Wissenschaft; 2008
- [84] Hardiker NR, Grant MJ. Factors that influence public engagement with eHealth: A literature review.

International Journal of Medical Informatics. 2011;**80**:1-12

[85] Latzer M, Büchi M, Festic N. Vertrauen und Sorgen bei der Internetnutzung in der Schweiz 2019. Themenbericht aus dem World Internet Project – Switzerland 2019. Zürich: Universität Zürich;

[86] Fox S, Duggan M. Health Online 2013. 35% of U.S. adults have gone online to figure out a medical condition; of these, half followed up with a visit to a medical professional. Washington D.C.: Pew Internet & American Life Project; 2013

[87] Ren C, Deng Z, Hong Z, Zhang W. Health information in the digital age: an empirical study of the perceived benefits and costs of seeking and using health information from online sources. *Health Information & Libraries Journal*. 2019;**36**:153-167

[88] Marstedt G. Das Internet: Auch Ihr Ratgeber für Gesundheitsfragen? Bevölkerungsumfrage zur Suche von Gesundheitsinformationen im Internet und zur Reaktion der Ärzte. Bertelsmann Stiftung: Gütersloh; 2018

[89] Southwell BG et al. Misinformation as a misunderstood challenge to public health. *American Journal of Preventive Medicine*. 2019;**57**(2):282-285

[90] Wang Y, McKee M, TorbiCa A, Stukler D. Systematic literature review on the spread of health-related misinformation on social media. *Social Science and Medicine*. 2019;**240**:112552

[91] French J, Blair-Stevens C, McVey D, Merritt R, editors. *Social Marketing and Public Health. Theory and Practice*. Oxford: University Press; 2010

[92] Grier S, Bryant CA. Social marketing in public health. *Annual Review of Public Health*. 2005;**26**:319-339

[93] Bonfadelli H. Gesundheitskampagnen. In: Kohlmann C-W, Salewski C, Wirtz MA, editors. *Psychologie in der Gesundheitsförderung*. Hogrefe: Bern; 2018. pp. 383-396

[94] Bonfadelli H, Friemel TN. *Kommunikationskampagnen im Gesundheitsbereich. Grundlagen und Anwendungen*. Köln: von Halem. 2020

[95] Rossmann C. Strategic health communication. Theory- and evidence-based campaign development. In: Holtzhausen D, Zerfass A, editors. *The Routledge Handbook of Strategic Communication*. New York/London: Routledge; 2015. pp. 409-423

[96] Swire-Thompson B, Lazer D. Public health and online misinformation: Challenges and recommendations. *Annual Review of Public Health*. 2019;**41**:433-451

[97] Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behavior. *Lancet*. 2010;**376**:1261-1271

[98] Lee T, Lin J. The influence of offline and online intrinsic motivations on online health information seeking. *Health Communication*. 2020;**5**(9):1129-1136

[99] Marton C, Choo CW. A review of theoretical models of health information seeking on the web. *Journal of Documentation*. 2012;**68**(3):330-352

[100] Wang X, Shi J, Kong H. Online health information seeking: A review and meta-analysis. *Health Communication*. 2021;**6**(10):116-1175

[101] Tennant B et al. eHealth literacy and web 2.0 health information seeking behaviors among baby boomers and older adults. *Journal of Medical Internet Research*. 2015;**17**(3):e70

- [102] Huo J, Desai R, Hong YR, Turner K, Mainous AG, Bian J. Use of social media in health communication: Findings from the health information national trends survey 2013, 2014, and 2017. *Cancer Control.* ;2019(26):1-10
- [103] Whiting A, Williams D. Why people use social media: A uses and gratifications approach. *Qualitative Market Research: An International Journal.* 2013;1(4):362-369
- [104] Lee K, Hoti K, Hughes DJ, Emmerton L. Google and the consumer: A qualitative study exploring the navigational needs and online health information-seeking behaviors of consumers with chronic health conditions. *Journal of Medical Internet Research.* 2014;16(12):e262
- [105] Shin D-H, Lee S, Hwang Y. How do credibility and utility play in the user experience of health informatics services? *Computers in Human Behavior.* 2017;67:292-302
- [106] Thielsch MT, Thielsch C, Hirschfeld G. How informative is informative? benchmarks and optimal cut points for e-health websites. *Proceedings of the Mensch und Computer 2019 Workshop.* 2019 Available from: <https://dl.gi.de/bitstream/handle/20.500.12116/25258/642.pdf?sequence=1>
- [107] Lindgaard G, Fernandes G, Dudek C, et al. Attention web designers: You have 50 milliseconds to make a good first impression! *Behavior & Information Technology.* 2006;25:115-126
- [108] Lindgaard G et al. An exploration of relations between visual appeal, trustworthiness and perceived usability of homepages. *ACM Transactions on Computer-Human Interaction.* 2011;18(1):1-30
- [109] Bloch PH, Brunel FF, Arnold TJ. Individual differences in the centrality of visual product aesthetics: Concept and measurement. *Journal of Consumer Research.* 2003;29:551-565
- [110] Hambrock U. *Die Suche nach Gesundheitsinformationen. Patientenperspektiven und Marktüberblick.* Gütersloh: Bertelsmann Stiftung; 2018
- [111] Quandt T, Frischlich L, Boberg S, Schatto-Eckroth T. Fake news. In: Vos TP, Hanusch F, editors. *The International Encyclopedia of Journalism Studies.* Chichester: John Wiley & Sons; 2019
- [112] De Keersmaecker J, Roets A, Dhont K, et al. Need for closure and perceived threat as bases of right-wing authoritarianism: A longitudinal moderation approach. *Social Cognition.* 2017;35:433-449
- [113] Pennycook G, Cannon TD, Rand DG. Prior exposure increases perceived accuracy of fake news. *Journal of Experimental Psychology: General.* 2018;147(12):1865-1880
- [114] Hocevar KP, Flanagin AJ, Metzger MJ. Social media self-efficacy and information evaluation online. *Computers in Human Behavior.* 2014;39:254-262
- [115] Flynn DJ, Nyhan B, Reifler J. The nature and origins of misperceptions: Understanding false and unsupported beliefs about politics. *Political Psychology.* 2017;38:127-150
- [116] Nyhan B, Reifler J. When corrections fail: The persistence of political misperceptions. *Political Behavior.* 2010;32:303-330
- [117] Metzger MJ, Flanagin AJ. Credibility and trust of information in online environments: The use of cognitive

heuristics. *Journal of Pragmatics*. 2013;**59**:210-220

[118] Clayman ML, Manganello JA, Viswanath K, Hesse BW, Arora NK. Providing health messages to hispanics/latinos: understanding the importance of language, trust in health information sources, and media use. *Journal of Health Communication*. 2010;**15**:252-263

[119] Fischer S. Vertrauen in Gesundheitsangebote im Internet. Einfluss von Informationsquellen und wissenschaftlichen Unsicherheiten auf die Rezeption von Online-Informationen. Baden-Baden: Nomos; 2016

[120] Chinn D. Critical health literacy: A review and critical analysis. *Social Science & Medicine*. 2011;**73**:60-67

[121] Liu C et al. What is the meaning of health literacy? A systematic review and qualitative synthesis. *Family Medicine and Community Health*. 2020;**8**:e000351

[122] Norman CD, Skinner HA. eHealth literacy: Essential skills for consumer health in a networked world. *Journal of Medical Internet Research*. 2006;**8**(2):e9

[123] Oh H, Rizo C, Enkin M, Jadad A, Powell J, Pagliari C. What is eHealth: A systematic review of published definitions. *Journal of Medical Internet Research*. 2005;**7**(1):e1

[124] Xie B. Effects of an eHealth literacy intervention for older adults. *Journal of Medical Internet Research*. 2011;**13**(4):e90

[125] Jeong S-H, Cho H, Hwang Y. Media literacy interventions: A meta-analytic review. *Journal of Communication*. 2012;**62**:454-472

[126] Oprea SJ. Media literacy. In: Rössler P, editor. *The International*

Encyclopedia of Media Effects. Chichester: John Wiley & Sons; 2017

[127] Petty RE, Cacioppo JT. The elaboration likelihood model of persuasion BT—Communication and persuasion: Central and peripheral routes to attitude change. In: Petty RE, Cacioppo JT, editors. *Communication and Persuasion. Central and Peripheral Routes to Attitude Change*. New York: Springer; 1986. pp. 1-24

[128] Petty RE, Brinol P, Priester JR. Mass media attitude change: Implications of the elaboration likelihood model of persuasion. In: Bryant J, Oliver MB, editors. *Media Effects*. New York: Routledge; 2009. pp. 141-180

[129] Ajzen I. The theory of planned behavior. *Organizational behavior and Human Decision Processes*. 1991;**50**:179-211

[130] Montaña DE, Kasprzyk D. Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. In: Glanz K, Rimer BK, Viswanath K, editors. *Health Behavior and Health Education. Theory, Research and Practice*. San Francisco, CA: Jossey-Bass; 2008. pp. 67-96

[131] Putland C et al. Enabling pathways to health equity: developing a framework for implementing social capital in practice. *MBC Public Health*. 2013;**13**:517

[132] Michie S, Marques MM, Norris E, Johnston M. Theories and interventions in health behavior change. In: Revenson TA, Gurung RAR, editors. *Handbook of Health Psychology*. New York: Routledge; 2018. pp. 69-88

[133] Becker MH. The health belief model and personal health behavior. *Health Education Monographs*. 1974;**2**:324-508

- [134] Champion VL, Sugg SC. The health belief model. In: Glanz K, Rimer BK, Viswanath K, editors. *Health Behavior and Health Education. Theory, Research and Practice*. San Francisco, CA: Jossey-Bass; 2015. pp. 45-65
- [135] Rogers RW. The protection motivation theory of fear appeals and attitude change. *Journal of Psychology*. 1975;**91**:93-114
- [136] Floyd DL, Prentice-Dunn S, Rogers RW. A meta-analysis of research on protection motivation theory. *Journal of Applied Social Psychology*. 2000;**30**(2):407-429
- [137] Prochaska JO, Redding CA, Evers KE. The transtheoretical model and stages of change. In: Glanz K, Rimer BK, Viswanath K, editors. *Health Behavior: Theory, Research and Practice*. San Francisco, CA: Jossey-Bass; 2015. pp. 97-121
- [138] Salaschek M, Bonfadelli H. Digitale Gesundheitskommunikation: Kontext und Einflussfaktoren. *Bundesgesundheitsblatt*. 2020;**63**(2):160-165
- [139] Bonfadelli H. Theoretical approaches of health campaigns and practical applications to COVID-19 campaigns. *Science Journal of Public Health*. 2022;**10**(1):60-72
- [140] Noar SM, Harrington NG. Tailored communication for health-related decision making and behavioral change. In: Diefenbach MA, Miller-Halegoua S, Bowen D, editors. *Handbook of Health Decision Science*. New York: Springer; 2016. pp. 251-263
- [141] Simon A. Qualität und eHealth. In: Fischer F, Krämer A, editors. *eHealth in Deutschland. Anforderungen und Potenziale innovativer Versorgungsstrukturen*. Berlin/Heidelberg: Springer; 2016. pp. 125-154
- [142] Thielsch MT, Blotenberg I, Jaron R. User evaluation of websites: From first impression to recommendation. *Interacting with Computers*. 2014;**26**:89-102
- [143] Thielsch MT, Hirschfeld G. Facets of website content. *Human-Computer Interaction*. 2019;**34**:279-327
- [144] Eichenberg C, Blokus G, Malberg D. Evidenzbasierte Patienteninformationen im Internet – Eine Studie zur Qualität von Websites zur Posttraumatischen Belastungsstörung. *Zeitschrift für Psychiatrie, Psychologie und Psychotherapie*. 2013;**61**(4):263-271
- [145] Corcoran N. *Working on Health Communication*. Los Angeles: Sage; 2011
- [146] Welch V et al. Interactive social media interventions for health behaviour change, health outcomes, and health equity in the adult population. *Cochrane Database of Systematic Reviews*. 2018;**2**:1-23