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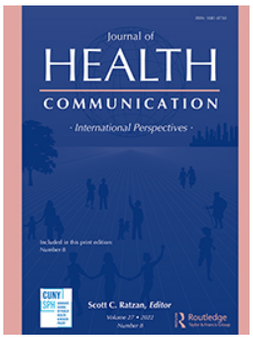

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Expanding the Health Information National Trends Survey Research Program Internationally to Examine Global Health Communication Trends: Comparing Health Information Seeking Behaviors in the U.S. and Germany

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ABSTRACT

The Health Information National Trends Survey (HINTS) is a well-established U.S.-based research program administered by the National Cancer Institute to track the public access to and use of health information. This paper introduces a German research initiative, part of the International Studies to Investigate Global Health Information Trends (INSIGHTS) research consortium. This adaptation of the HINTS is important for initiating analyses of global health communication practices and comparing health information seeking behaviors (HISB) across nations to pinpoint potentials and challenges of health information provision and contribute to a deeper understanding of socio-contextual determinants of HISB. First cross-country comparisons revealed that the share of residents seeking for health information is high in the U.S. (80%) and Germany (74%), but different primary sources are used. Whereas a clear majority of U.S. residents chose the Internet to gather health information (74.9%), Germans most often turn to health professionals (48.0%). Socio-structural and health(care)-related predictors were found to contribute to the explanation of HISB in both countries, whereas information-related predictors were only relevant in Germany. The results indicate the need to engage in patient-provider communication to initiate HISB and to improve the access to information for residents with lower socio-economic backgrounds.

The Health Information National Trends Survey (HINTS) is a well-established U.S.-based research program that tracks public access to and use of health information to guide evidence-based health communication programs (Finney Rutten et al., 2020; Nelson et al., 2004). This paper introduces an international adaptation of the HINTS to Germany. The German research initiative is part of the new International Studies to Investigate Global Health Information Trends research consortium (INSIGHTS; Baumann, Czerwinski, Rosset, Seelig, & Suhr, 2020; Kreps, 2020). Based on the HINTS U.S. survey methodology, the nationally representative German data can be compared with findings from the U.S. and other INSIGHTS program countries.

The international adaptation of HINTS is important for initiating examinations of global health communication practices and opportunities and comparing HISB across nations instead of the current, more narrowly framed state of HISB research usually focusing on one country (Kreps, Yu, Zhao, Chou, & Hesse, 2017; Zschorlich et al., 2015). By reflecting differences in social structure, healthcare systems, and cultural values (Hofstede, 1993; Ridic, Gleason, & Ridic, 2012), country-specific predictors and patterns of HISB could be revealed and help pinpoint potentials and challenges of health information provision. Additionally, international comparisons can contribute to a deeper understanding of socio-contextual determinants of HISB focusing on national peculiarities (Johnson & Case, 2012). Further, since theories are often

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developed in one specific social context, cross-country comparisons yield the possibility to test their generalizability across countries (Watkins, 2010).

Besides outlining the main idea and methodological challenges of the adaptation of the HINTS, the present paper provides first cross-country insights into HISB based on patterns of personal, health(care)-related, and information-related determining factors. Comparing the U.S. with Germany appears particularly promising, because they have commonalities but also differences in their social structures, healthcare systems, and cultural values (Jürges, 2006; Ridic et al., 2012), which we will elaborate below.

Theoretical Background

Health Information Seeking and Its Determinants

HISB is defined as an active, purposeful behavior to find health information from selected sources such as discussing symptoms with health professionals, seeking advice from friends, or using a search engine to learn about a treatment (Zimmerman & Shaw, 2020). HISB is a multistage process varying depending on the reasons for information seeking that influence individuals' needs for information, the types of information sought, and the sources used (Choi & Jeong, 2021; Galarce, Ramanadhan, & Viswanath, 2011). Among the reasons for HISB are the need of individuals to cope with health-related uncertainties (Brashers, 2001), or to feel empowered to engage in health-enhancing behaviors (Kreps, 1988, 2008). The acquisition of health knowledge can guide decision-making, health promotion, and the prevention and management of health problems (Johnson & Case, 2012; Kreps, 2003). However, acquiring relevant health information is challenging and not everyone is willing and able to seek health information (Viswanath & Kreuter, 2007; Viswanath, McCloud, & Bekalu, 2021).

Existing overview articles (Lambert & Loiselle, 2007; Zimmerman & Shaw, 2020) and theoretical models such as the Comprehensive Model of Information Seeking (Johnson & Meischke, 1993) or the Risk Information Seeking and Processing Model (Griffin, Dunwoody, & Neuwirth, 1999; Kahlor, 2007) identify different sets of socio-structural, cognitive, affective, or normative predictors of HISB which should guide international comparative approaches as well. In this vein, this study focuses on socio-structural predictors as well as health- and information-related variables.

Regarding the *socio-structural* determinants such as gender, age, ethnicity, or socio-economic status, research has consistently shown that women and individuals with a higher socio-economic status are more active information seekers (Alvarez-Galvez, Salinas-Perez, Montagni, & Salvador-Carulla, 2020; Baumann, Czerwinski, & Reifegerste, 2017; Jung, 2015; Link et al., 2021). However, there is a lack of consensus regarding the theoretical rationale for the inclusion of socio-structural factors in HISB models (Kahlor, 2007) as it can be assumed that these determinants affect HISB via healthcare-related or information-related perceptions or attitudes (Godin et al., 2010).

Health(care)-related predictors such as health status, preexisting health conditions, healthcare uptake, and experiences and satisfaction with healthcare are considered as it is assumed that these predictors are relevant for the origin of informational needs and the type of information sought (Anker, Reinhart, & Feeley, 2011; Oh & Cho, 2015). Further, health-related self-efficacy that describes beliefs in abilities (Bandura, 1997) to deal with health challenges is included.

Regarding *information-related factors*, information-related self-efficacy is covered (Cao, Zhang, Xu, & Wang, 2016; Deng & Liu, 2017; Lee & Kim, 2015), understood as the perceived ability to find and make sense of health information (Zimmerman & Shaw, 2020). Further, higher trust in health information sources is an often-considered channel belief associated with more frequent HISB (Griffin et al., 1999; Johnson & Meischke, 1993).

To sum up, our approach takes a theory-informed, individual-centered perspective on HISB that identifies its socio-structural, health(care)- and information-related influences from an international comparative perspective, which is explained in more detail below.

Cross-Country Comparisons of HISB

An international comparative approach reflects two basic assumptions (Kim, Singhal, & Kreps, 2013; Kreps et al., 2017): On the one hand, assuming *structural similarity*, cross-country benchmarks can be derived with respect to determinants and mechanisms of HISB. Comparisons reveal country-specific merits of the citizens' health literacies and also necessitates action to support access to health information in the countries under study. On the other hand, there are *national peculiarities* determining the type and scope of HISB. Such differences may be traced back to country-specific social structures, the quality and accessibility of healthcare services, or cultural values influencing health-related attitudes (Andreassen et al., 2007).

Focusing on the social structures, the U.S. is a more heterogeneous country than Germany (Ridic et al., 2012) with more diverse ethnic groups and more pronounced socio-economic inequalities (Hu et al., 2016; Jürges, 2006; Mackenbach et al., 2008). Since these socio-structural factors are associated with HISB (e.g. Choi & Jeong, 2021; Jung, 2015; Niederdeppe, 2008), these determinants can provide important explanatory power in cross-country comparisons.

Additionally, there are structural differences in the healthcare systems. The German system is predominantly shaped by a Bismarckian model according to the principles of social solidarity with statutory health insurance and nearly universal healthcare coverage (Ridic et al., 2012). In the U.S., the healthcare system primarily follows the principles of the market economy with various commercial insurance companies and the governmental provision of insurance for only certain population groups (Ridic et al., 2012). These national peculiarities are associated with higher financial barriers and lower access to healthcare services for underprivileged groups in the U.S. than in Germany. Further, Germans are more satisfied with their healthcare system and have longer life expectancies than U.S. residents (Klenk, Keil, Jaensch, Christiansen, & Nagel, 2016; Ridic et al., 2012), which highlights the relevance of considering healthcare-related factors such as health insurance, the uptake of care, and attitudes toward healthcare when explaining HISB.

Finally, cultural values might help to understand differences in the impact of health(care)-related and information-related

determinants of HISB such as self-efficacy and trust. The meaning of cultural values is based on the idea that individuals' behaviors such as HISB, and determinants of HISB, reflect the constraints of their environment (Yang, Kahlor, & Li, 2014). While the U.S. culture is highly individualistic and characterized by low scores related to power distance and uncertainty avoidance, the German culture is shaped by less extreme individualism and higher scores regarding uncertainty avoidance indicating that individuals feel uncomfortable with uncertainty and prefer clear rules (Hofstede, 1993).

Taken together, besides socio-structural, health(care)-related, and information-related determinants of HISB, health-related structural national peculiarities such as the health system and cultural values should at least be considered for the reflection on cross-country comparisons of HISB (Kim et al., 2013; Kreps et al., 2017).

Research Objectives

We aim to expand the existing international comparative research on HISB by integrating socio-structural, health-(care)-related, and information-related determinants of HISB on the one hand and health-related structural national peculiarities on the other hand. In this vein, the present study is one of few that provide a multidimensional reflection of HISB in an international comparative approach (see Link et al., 2021). Focusing on the U.S. and Germany as two countries with both socio-cultural and socio-structural similarities and differences, this comparative approach aims to reveal country-specific patterns of HISB and thereby contribute to the discourse on future adjustments of health communication strategies in a global context.

Against this backdrop, the first objective is to compare the current state of HISB in the U.S. and Germany. Second, the two populations are described regarding the relevant socio-structural, health(care)-related, and information-related HISB determinants. The third objective is to identify country-specific predictors of HISB. Thus, the research questions of this study are as follows:

RQ1: How does HISB differ between U.S. and German residents?

RQ2: How do health(care)-related and information-related characteristics differ between the U.S. and Germany?

RQ3: How do country-specific influencing patterns of socio-structural, health(care)-related, and information-related predictors explaining HISB differ between the U.S. and Germany?

Method

A comparative secondary analysis was conducted of data from the first wave of the HINTS-based German representative national survey ($N_{Germany}$ = 2,902) collected from September 2018 to January 2019 along with HINTS U.S. data gathered from HINTS 5, Cycle 1 conducted in January through May 2017 ($N_{U.S.}$ = 3,285). The German research initiative is an adaptation of the HINTS U.S. The project has been operated by the "Stiftung Gesundheitswissen," a German nonprofit foundation under civil law.

The Adaption of HINTS U.S. and Its Methodological Challenges

The process of adapting the HINTS U.S. to Germany involved decisions about the survey population, the sampling frame, the mode of data collection, and the translation and adaption of the instrument to national peculiarities.

In order to ensure the best possible comparability with HINTS U.S. data, which is a nationally representative survey of the U.S. non-institutionalized adult population 18 and older (Finney Rutten et al., 2020), the German sample aimed to be representative to the German-speaking adult population. To meet this criterion, we needed to switch the mode of data collection since there is no central German address registry and online panels lack representativeness. Instead, we used computer-assisted telephone interviewing (CATI) instead of a mail survey. This change is justified by results of HINTS 3 showing a high comparability of postal and CATI surveys (Cantor et al., 2009). The German sampling was based on a dual-frame approach (60% landline, 40% mobile users) implemented on the basis of the reference sampling system for representative studies in Germany (see Baumann et al., 2020). For the landline frame a Kish-Grid was used for the selection of the interviewee among all eligible household members. The combined response rate in Germany was 19% (see Finney Rutten et al., 2020 for comparison to the HINTS U.S.). The switch of the mode of data collection was accompanied by the restriction that only people up to the age of 79 could be surveyed. Further, the questionnaire was shortened to remain below the recommended maximum of 30 minutes for CATI.

Regarding the translation of the questionnaire, the instrument of HINTS 5, Cycle 1 was translated using the TRAPD-framework (Translation, Review, Adjudication, Pretest, and Documentation) within a "team translation" approach (Survey Research Center, 2016). A graduate translator experienced with medical questionnaires and the German research team carried out two independent translations, which were then reviewed by an expert for international survey research. A cognitive pretest (n = 13) and a field pretest (n = 47) were conducted to detect and solve comprehension problems. Some adjustments to the questionnaire were necessary regarding the healthcare and education system as well as the language. Relevant adjustments will be pointed out in the description of the used measures.

Sample

In the German sample, 50.1% of the participants were female. The mean age was 48.3 years ($SD_{Germany}$ = 16.9) and ranged from 18 to 79 years. The U.S. sample consisted of 51.0% females; the mean age was 56.1 years ($SD_{U.S.}$ = 16.2) and ranged from 18 to 101 years. Both data sets

were weighted to adjust for household size, different non-response rates, and other survey design features. For the German data, weights were calculated using data from the 2016 Mikrozensus on age, sex, level of education, and place of residence. In accordance to HINTS U.S. (Finney Rutten et al., 2020), 50 replicate weights were calculated for each case (JK-1) to enhance the precision of variance estimates. These weights were calibrated to population totals in order to reduce the sampling variance of estimators (Baumann et al., 2020; Weststat, 2017).

Measures

Dependent Variable

To describe respondents' HISB, it was asked whether the respondent had ever looked for health information (yes/no). Additionally, respondents were asked to indicate the source they used first during their last search. In both surveys the same list of 12 mass media and interpersonal sources were used.

Independent Variables

Socio-structural Predictors

The considered socio-structural determinants included age, gender, socio-economic status, and migration background. Socio-economic status (SES) was calculated as a function of the income weighted by the size of the household and the level of education converted into an international standard classification of educational degree score (UNESCO, 2011), indicating either a low, medium, or high SES (see Baumann et al., 2020 for further information).

Health(care)-related Predictors

Subjective health status was measured by self-report on a five-point Likert-type scale ranging from 0 ("poor") to 4 ("very excellent"). *Chronic health conditions* were assessed by asking respondents if they suffered from any of six different chronic diseases (e.g. arthrosis, diabetes). The answers were summarized to show the individual's affliction of any chronic disease. As a *psychological health condition*, symptoms of depression and anxiety were measured using the four-item brief screening scale for anxiety (Patient Health Questionnaire, PHQ-4, Kroenke, Spitzer, Williams, & Löwe, 2009). The scale asks for the frequency the participant felt during the preceding two weeks, for example, "little interest or pleasure in doing things" (0 "not at all" to 3 "nearly daily"). The scale showed sufficient internal consistency ($\alpha_{U.S.} = .90$; $\alpha_{Germany} = .67$) and a mean index was computed (ranging from 0 to 3) with higher scores indicating more severe symptoms of depression and anxiety.

To assess *attitudes toward healthcare*, overall satisfaction with healthcare was measured with one item ("Overall, how would you rate the quality of healthcare you received in the past 12 months?") using a five-point Likert-type-scale ranging from 0 ("poor") to 4 ("excellent"). The perceived *patient-provider-communication quality* (PPCQ) was assessed with seven items asking, for example, whether the respondent had the chance to ask all health-related questions. While the content of the items was exactly the same, the active wording of the HINTS U.S. (e.g. "give you"/"involve you") was changed to a passive wording due to the CATI survey. The applicability of these statements was assessed on a four-point Likert-type-scale ranging from 0 ("never") to 3 ("always") and condensed to a mean index ($\alpha_{U.S.} = .93$; $\alpha_{Germany} = .88$). *Health-related self-efficacy* was assessed with one item asking for the respondents' self-rated confidence in their ability to take good care of their health, applying a five-point Likert-type-scale ranging from 0 ("not confident at all") to 4 ("completely confident"). *Healthcare uptake* was assessed by determining the number of visits to health professionals in the preceding 12 months. Whereas the U.S. version also referred to nurses, the German survey omitted nurses since they do not perform independent treatment in Germany. In addition, participants were asked how many years it had been since their *last checkup*. As a proxy for a health-related structural factor, *health insurance* was assessed.

Information-related Predictors

The participants reported their responses to a single-item measure of *information self-efficacy* ("Overall, how confident are you that you could get advice or information about health or medical topics if you needed it?" 0 "not confident at all" to 4 "completely confident"). The *perceived trustworthiness of health information* was evaluated with a single item asking for trust in the same set of eight sources used in the U.S. version such as health professionals or the Internet. Religious organizations and leaders queried in the U.S. was deleted in the German survey. The trustworthiness ratings of the remaining sources (scale from 0 "not at all" to 3 "a lot") were compressed to a mean index ($\alpha_{U.S.} = .76$; $\alpha_{Germany} = .72$).

Data Analysis

To compare HISB (RQ1) and its background factors (RQ2) between the U.S. and Germany, adjusted Wald-Tests were conducted based on a merged data set using the Jackknife replicate weights to account for the complex sampling characteristics of both surveys. For the source used in the last search, Cramer's V was calculated. To examine which predictors were associated with HISB (RQ3), separate binary block-wise logistic regression analyses per country were conducted using whether residents had ever searched for health information as dependent variable. In the first block, socio-structural factors were included as they were assumed to influence HISB through predictors included in the second and third block. The second block considered health(care)-related factors, whereas the third block took information-related predictors into account. Across the multivariate analyses, the Jackknife replicate weights were also applied to ensure proper standard errors (Birrell, Steel, Batterham, & Arya, 2019), using Stata® Version 15.1. Due to the complex survey structure of the data and the corresponding data analysis, no conventional measure of Pseudo-R^2 could be obtained. To address accepted customs, the values of McFadden's R^2 were provided by ignoring the survey structure of the data and running regular regression models.

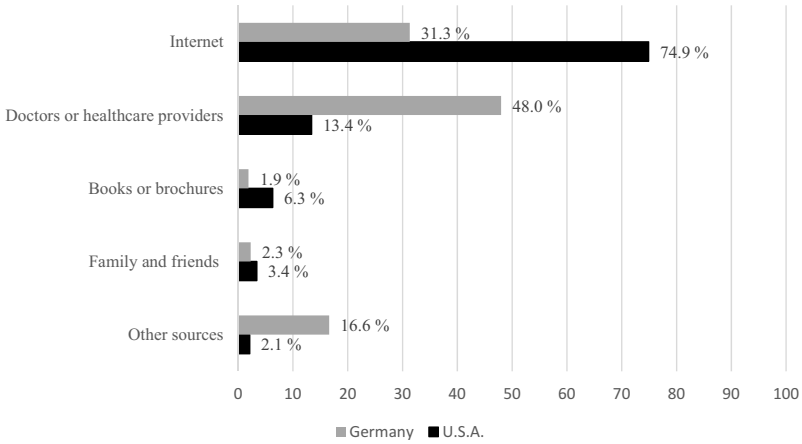

Figure 1. Used source for health information in the last search $N = 4{,}581$, Cramer's V = .44; p ≤ .001.

Results

Differences in HISB Between U.S. and German Residents

RQ1 asked about differences in HISB between U.S. and German residents. The share of people seeking health information was significantly higher in the U.S. (80.0%) compared to Germany (74.0%; F (1, 49) = 14.8, $p \leq .001$).

Concerning the predominant use of information sources, a moderate association was observed across the used sources between the two countries (see Figure 1). A clear majority of U.S. residents chose the Internet to gather health information (74.9%), whereas in Germany the Internet was used by only 31.3% of the respondents for their last HISB. Germans most often turn to health professionals (48.0%), whereas in the U.S. health professionals were consulted by only 13.4%.

Country-specific Differences Between the Background Characteristics of HISB

RQ2 asked to what extent health(care)-related and information-related background characteristics of HISB differed between

Table 1. Means and standard deviation of health(care)-related and information-related background factors of HISB per country

	U.S. *M (SD)*	Germany *M (SD)*
Health(care) related background factors		
Subjective health status***	2.41 (.78)	2.88 (1.28)
Chronic health conditions***	63.0%	45.9%
Symptoms of depression and anxiety	.53 (.62)	.52 (.83)
Satisfaction with healthcare	3.04 (.73)	3.07 (1.19)
Perceived quality of patient-provider-communication***	2.39 (.53)	2.22 (1.03)
Number of health visits***	3.62 (2.22)	4.50 (4.85)
Last checkup***	1.09 (1.77)	2.29 (9.62)
Health-related self-efficacy***	2.86 (.68)	3.07 (1.30)
Information-related background factors		
Information self-efficacy*	2.74 (.78)	2.65 (1.66)
Trust in health information***	1.52 (.39)	1.37 (.67)

Note. N = 6,187; adjusted Wald-Tests; *$p < .05$; **$p < .01$; ***$p < .001$;
Subjective health status: F (1, 49) = 154.16, $p \leq .001$;
Chronic health conditions: F (1, 49) = 72.34; $p < .001$;
Symptoms of depression and anxiety: F (1, 49) = .14, $p = .715$;
Satisfaction with healthcare: F (1, 49) = .35, $p = .556$;
Perceived quality of patient-provider-communication: F (1, 49) = 22.44, $p \leq .001$;
Number of health visits: F (1, 49) = 34.68, $p \leq .001$;
Last checkup: F (1, 49) = 37.33, $p \leq .001$;
Health-related self-efficacy: F (1, 49) = 33.52, $p \leq .001$;
Information self-efficacy: F (1, 49) = 4.04, $p = .050$;
Trust in health information: F (1, 49) = 76.32, $p \leq .001$

the U.S. and Germany (see Table 1). Given the large sample size, most facets differed significantly but the absolute differences between the countries were very weakly. The subjective health status was rather good in both countries; however, the German residents ($M_{Germany}$ = 2.88; $SD_{Germany}$ = 1.28) reported a significantly better health status compared to the U.S. residents ($M_{U.S.}$ = 2.41; $SD_{U.S.}$ = .78; F (1, 49) = 154.16, $p \leq .001$). The shares of chronically ill people were significantly lower in Germany (45.9%) than in the U.S. (63.0%; F (1, 49) = 72.34; $p < .001$), whereas symptoms of depression and anxiety were rather rare in both countries and did not differ between them ($M_{U.S.}$ = .53; $SD_{U.S.}$ = .62; M_{Germany} = .52; $SD_{Germany}$ = .83; F (1, 49) = .14, p = .715). The differences in satisfaction with healthcare were also not significant and showed rather high satisfaction in both countries ($M_{U.S.}$ = 3.04; $SD_{U.S.}$ = .73; $M_{Germany}$ = 3.07; $SD_{Germany}$ = 1.19; F (1, 49) = .35, p = .556). The perceived quality of patient-provider-communication was also perceived as rather good in both countries. However, the findings revealed a significantly weaker value for Germany in comparison to the U.S. ($M_{U.S.}$ = 2.39; $SD_{U.S.}$ = .53; $M_{Germany}$ = 2.22; $SD_{Germany}$ = 1.03; F (1, 49) = 22.44, $p \leq .001$). Further, German respondents reported a significantly larger time gap since their last medical checkup than U.S. residents ($M_{U.S.}$ = 1.09; $SD_{U.S.}$ = 1.77; $M_{Germany}$ = 2.29; $SD_{Germany}$ = 9.62; F (1, 49) = 37.33, $p \leq .001$). In contrast, Germans showed a significantly higher number of visits to health professionals ($M_{U.S.}$ = 3.62; $SD_{U.S.}$ = 2.22; M_{Germany} = 4.50; $SD_{Germany}$ = 4.85; F (1, 49) = 34.68, $p \leq .001$). The respondents in both countries rated their health-related self-efficacy as rather high, with slightly higher values for Germans ($M_{Germany}$ = 3.07; $SD_{Germany}$ = 1.30; $M_{U.S.}$ = 2.86; $SD_{U.S.}$ = .68; F (1, 49) = 33.52, $p \leq .001$).

Referring to information-related background factors, the U.S. respondents assessed their information self-efficacy ($M_{U.S.}$ = 2.74; $SD_{U.S.}$ = .78; $M_{Germany}$ = 2.65; $SD_{Germany}$ = 1.66; F (1, 49) = 4.04, p = .050) and their trust in information sources ($M_{U.S.}$ = 1.52; $SD_{U.S.}$ = .39; $M_{Germany}$ = 1.37; $SD_{Germany}$ = .67; F (1, 49) = 76.32, $p \leq .001$) as slightly, but significantly higher than Germans.

Predictors of HISB in the U.S. and Germany

RQ3 aimed to explore the explanatory power and compare the role of socio-structural, health(care)-related, and information-related predictors of HISB comparing the U.S. and Germany (see Table 2). In both countries, socio-structural and health-(care)-related predictors were associated with HISB, whereas information-related predictors were only relevant for the German respondents' HISB.

Concerning the socio-structural factors (block 1, Table 2), in both countries, the influences of age and migration background on HISB were not significant. Only in Germany, women showed higher HISB compared to men (Odds Ratio (OR) = 2.13 in the final model). SES was found to be a promoting factor for HISB in both countries. Whereas among the U.S. residents the prevalence of HISB was significantly higher with medium and high SES (medium: OR = 3.53; high: OR = 5.31), in Germany, the odds of HISB were only higher for respondents with high SES (OR = 2.09) in contrast to the reference group with low SES.

Regarding the health(care)-related predictors, in both countries the majority of predictors were not significantly associated with HISB (see Table 2). Only in the U.S., the odds of HISB were significantly lower when respondents suffered from chronic health conditions (OR = .54), were less satisfied with healthcare (OR = .63), and were significantly higher with higher numbers of health visits (OR = 1.14). In contrast, only in Germany, the time since the last medical checkup was a significant predictor slightly associated with lower HISB (OR = .96). In both countries, respondents' perceptions of the quality of patient-provider communication were a positive and rather strong predictor of HISB ($OR_{U.S.}$ = 1.57; $OR_{Germany}$ = 1.47).

For the information-related determinants of HISB, in the U.S. neither trust nor information self-efficacy were significantly related to HISB. In Germany, both the level of trust in health information sources (OR = 2.09) and higher information self-efficacy (OR = 1.21) were significantly associated with a higher HISB. The inclusion of the variables in the third block did not lead to changes in the patterns of significance of the predictors involved in the previous blocks.

Discussion

The German research initiative is one of the major international adaptations of the U.S.-based HINTS research program and part of the INSIGHTS initiative. The present study outlines the main idea of the adaptation and provides primary insights by comparing HISB in Germany and the U.S.

HISB in the U.S. and Germany

With the share of information seekers being 74% in Germany and 80% in the U.S., the surveys reveal that HISB is common in both countries. The difference might be attributed to a better perceived health status in Germany causing lower information needs; nonetheless, different modes of data collection may also be the reason for this finding as the respondents have more time to reflect and remember their HISB in postal compared to phone surveys.

Although we found associations between the source preferences in the U.S. and Germany, some differences were observed. The majority of U.S. residents turned to the Internet for HISB while most Germans received their information from health professionals. This difference may be related to the peculiarities of the country's healthcare systems (Ridic et al., 2012). Due to the nationwide health insurance and a lower financial burden for healthcare uptake in Germany, access to health professionals has a lower threshold. Additionally, cultural values such as uncertainty avoidance might lead to a more pronounced role of reliable sources such as health professionals in Germany (Hofstede, 1993).

Table 2. Multiple logistic regression analysis to explain health information seeking behaviors (HISB) in the U.S. and Germany

			Block 1		Block 2		Block 3	
	Category	Variable	OR	95% CI	OR	95% CI	OR	95% CI
U.S.	*Socio-structural*	Sex = female (Ref.: male)	1.18	[.80; 1.74]	1.14	[.76; 1.70]	1.12	[.74; 1.69]
		Age (in years)	1.00	[.98; 1.02]	1.00	[.99; 1.02]	1.01	[.99; 1.02]
		SES (Ref.: low)	3.19***	[2.03; 5.01]	3.53***	[2.21; 5.63]	3.53***	[2.17; 5.73]
		medium	4.71***	[2.43; 9.12]	5.38***	[2.71; 10.69]	5.31***	[2.65; 10.65]
		high	0.84	[.44; 1.62]	.83	[.41; 1.70]	.77	[.37; 1.63]
		Migration background (Ref.: no)						
	Health(care)-related predictors	Health Insurance (Ref.: no)			.70	[.14; 3.50]	.75	[.15; 3.63]
		Subjective health status			1.13	[.79; 1.64]	1.10	[.77; 1.58]
		Chronic health conditions (Ref.: no)			.55*	[.32; .96]	.54*	[.31; .93]
		PHQ4 Mean Index			1.03	[.71; 1.49]	1.07	[.74; 1.54]
		Satisfaction healthcare			.64*	[.43; .94]	.63*	[.43; .93]
		PPQ Mean Index			1.60*	[1.06; 2.39]	1.57*	[1.05; 2.36]
		Number of health visits			1.14**	[1.06; 1.24]	1.14**	[1.05; 1.23]
		Last checkup			1.19	[.92; 1.54]	1.19	[.91; 1.55]
		Health-related self-efficacy			.79	[.58; 1.06]	.81	[.60; 1.11]
	Information-related predictors	Information self-efficacy					.98	[.73; 1.31]
		Trust Mean Index					1.55	[.89; 2.72]
	McFadden's Pseudo-R^2		.0767		.0961		.1039	
Germany	*Socio-structural*	Sex of caller = female (Ref.: male)	2.20***	[1.60; 3.02]	2.14***	[1.55; 3.00]	2.13***	[1.54; 2.96]
		Age of caller (in years)	1.01	[1.00; 1.02]	1.01	[1.00; 1.02]	1.01	[1.00; 1.02]
			1.47	[.96; 2.25]	1.43	[.90; 2.21]	1.42	[.88; 2.29]
			2.32***	[1.50; 3.59]	2.23**	[1.41; 3.38]	2.09**	[1.28; 3.42]
			.76	[.51; 1.14]	.85	[.55; 1.31]	.85	[.55; 1.33]
		SES (Ref.: low)						
		medium						
		high						
		Migration background (Ref.: no)						
	Health(care)-related predictors	Health Insurance = statutory (Ref.: private)			1.11	[.67; 1.85]	1.13	[.67; 1.93]
		Subjective health status			.94	[.73; 1.20]	.92	[.71; 1.20]
		Chronic health conditions (Ref.: no)			1.17	[.78; 1.77]	1.20	[.79; 1.83]
		PHQ4 Mean Index			.92	[.67; 1.27]	.91	[.66; 1.27]
		Satisfaction healthcare			1.05	[.83; 1.33]	1.00	[.79; 1.27]
		PPQ Mean Index			1.61**	[1.21; 2.14]	1.47*	[1.08; 2.01]
		Number of health visits			1.04	[.99; 1.10]	1.04	[.98; 1.10]
		Last checkup			.97***	[.95; .98]	.96***	[.95; .98]
		Health-related self-efficacy			1.08	[.87; 1.35]	1.05	[.84; 1.31]
	Information-related predictors	Information self-efficacy					1.21*	[1.03; 1.42]
		Trust Mean Index					2.09**	[1.38; 3.17]
	McFadden's Pseudo-R^2		.0481		.0802		.1135	

Notes. N = 2,084 (U.S.) and N = 2,290 (Germany). OR = Odds Ratio; CI = Confidence Interval. Coding of the dependent variable: 0 = no; 1 = yes.
* p < .05 ** p < .01 ***p < .001

Comparing Background Factors of HISB in the U.S. and Germany

The German respondents reported better subjective health and being less frequently affected by chronic diseases than their U.S. counterparts. They further reported a higher level of health-related self-efficacy, but significantly more health visits in the last year. This may be associated with structural reasons (Bradley, Sipsma, & Taylor, 2017; Klenk et al., 2016). Mandatory health insurance in Germany allows visits to a doctor free of charge, which might relate to higher levels of general health and may raise individuals' efficacy beliefs in taking care of one's health. Thus, the frequency of health visits may not be traced to exactly the same motivational and occasion-related needs for healthcare in both countries.

U.S. residents rated the quality of their communication with health professionals significantly better than Germans and reported higher levels of trust in several sources. Further, U.S. citizens reported their last checkup to have taken place only about one year ago—half the period reported by Germans. This might result from the fact that checkups are more established in the U.S. (Okoro et al., 2017). Overall, Germans seem to use the healthcare services more frequently but are also more critical of what they face. This could be interpreted as a sign of Germans' higher (informational) self-confidence and perceived self-determination as patients.

Explaining HISB in the U.S. and Germany

Regarding the predictors of HISB, country-specific analyses revealed rather distinctive patterns. Females were found to conduct HISB significantly more often than males in Germany, but no such gender effect was detected in the U.S. In light of the heterogeneous findings whether gender determines HISB (Baumann et al., 2017), our findings suggest that the role of gender for HISB is culturally determined. Respondents' SES showed a stronger influence on HISB in the U.S., reflecting the steeper social gradient that impacts several measures of social and health inequality (Bor, Cohen, & Galea, 2017; Jürges, 2006). The current findings support the statement that social inequality is associated with informational inequality and should be perceived as crucial barriers to health provision and prevention (Viswanath & Kreuter, 2007).

With respect to the health(care)-related factors, a better perceived quality of communication with health professionals was the only HISB-enhancing factor in both countries. A well-functioning interplay of patient-provider interaction can contribute to improving individuals' empowerment and reducing both health and information inequalities. Therefore, it should play a key role in global health promotion and patient empowerment efforts (Kreps, 2008, 1988; Nelson et al., 2004; Viswanath & Kreuter, 2007). Both in Germany and in the U.S., health insurance, subjective health status, symptoms of depression and anxiety, and health-related self-efficacy did not significantly influence HISB.

U.S. respondents suffering from chronic diseases and being more satisfied with their healthcare appeared less likely to perform HISB, whereas respondents more often consulting health professionals were more likely to do **so.** The negative association between chronic disease and HISB contradicts the research suggesting that people suffering from chronic conditions are more in need to search for information (Anker et al., 2011; Oh & Cho, 2015). Possibly, people living with chronic diseases are already better informed through their own experiences with healthcare and—different from newly diagnosed patients—are less in need of occasion-related health information acquisition. For Germans, the negative association between the time since their last checkup and their probability of HISB might result from the absence of health complaints, making the uptake of checkups less likely and reducing the information motivation due to a lower health-related involvement. However, this may indicate a challenge for early disease detection.

The information-related variables acknowledge existing evidence only for respondents from Germany, as they showed a positive association between both their level of information self-efficacy and higher trust in different sources and their probability to conduct HISB (Deng & Liu, 2017; Zimmerman & Shaw, 2020). Thus, initiatives to increase efficacy-beliefs and trust in health information should reflect health information-related attitudes in the target population.

Overall, our analyses suggest that driving forces of HISB are country-specific to some extent, which claims for different priorities in health information targeting strategies in the efforts to engage in HISB.

Limitations and Recommendations for Future Research

Several limitations of the study need to be considered. First, the current results are based on cross-sectional data, thus allowing no causal inferences. Future research may adopt a longitudinal data base that can depict individual trajectories over time and may help disentangle causes and effects. Second, comparisons based on country-specific adopted measures for health insurance or using terms such as "checkups" are limited as they cover different ranges of services in the U.S. and Germany. Third, the theoretical framework should be extended. With the aim of the global adaptation of an existing instrument, the theoretical modeling in this study was limited. Further, for a more comprehensive culture-sensitive approach, more multilevel factors related to the healthcare systems and culture should be considered. Fourth, we know rather little about national differences which are only rarely taken into consideration in HISB models. To identify and explore culture- or country-specific differences in HISB, qualitative cross-country research is required. Future cross-national comparative research should build on this study by collecting more in-depth data about respondents' sensemaking concerning HISB and why the residents searched for which kind of topics or support for themselves or others.

Main Conclusion

By systematically comparing HINTS data from the U.S. and Germany, our findings extend the current state of comparative research on HISB. Our study highlights similarities and differences in HISB and its predictors in the U.S. and Germany,

laying the foundation for future research on HISB determinants. This is not only relevant for the further development of HISB models but also provides indications for success factors in guiding evidence-based global health prevention and promotion efforts. Our study contributes to the expanding the INSIGHTS initiative of HINTS-based studies, allowing for further international comparisons with future survey waves in Germany and the U.S. as well as data collected in other INSIGHTS program countries. Thus, valuable insights into important global health communication issues and responses to health problems from country-specific and transnational perspectives can be provided.

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