

Determinants of hearing aid uptake: a cross-sectional study of attitudes, knowledge, and behavioral intention

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Abstract

Background

Hearing aid uptake remains low despite clear clinical benefits, suggesting that psychosocial factors play a critical role in adoption. Our aim was to develop and validate a questionnaire assessing attitudes toward hearing aid use and to analyze their association with behavioral intention towards hearing aid uptake among adults with and without self-reported hearing loss.

Methods

A cross-sectional survey was done by developing a German-language questionnaire and administered to adults with and without self-reported hearing loss. Attitudinal domains included cost concerns, stigma, aesthetics, social influence, expected benefit and effort, and trust in the healthcare system. Internal consistency, correlations, and regression analyses were conducted.

Results

The study included a heterogeneous adult sample ($N = 159$; age 18–96 years), 48.4% with self-reported hearing loss. Overall attitudes were moderately favorable ($M = 2.65$, $SD = 0.47$), and behavioral intention was relatively strong ($M = 2.28$, $SD = 0.53$). Attitude strongly predicted intention ($r = 0.63$, $p < 0.001$; $R^2 = 0.40$). Expected benefit ($r = 0.66$) and stigma ($r = 0.65$) showed the strongest associations, whereas cost concerns were weakly related ($r = 0.18$). Hearing aid users demonstrated significantly more favorable attitudes and stronger intention than non-users (both $p < 0.001$). The attitude scale demonstrated acceptable internal consistency (Cronbach's $\alpha = 0.70$), and the intention scale showed good reliability ($\alpha = 0.84$).

Conclusions

Stigma and expected benefit are key determinants of hearing aid uptake, whereas structural barriers such as cost appear less influential. These findings highlight potential targets for intervention, particularly addressing stigma and expectations regarding benefit, to improve hearing aid uptake.

Background

Hearing loss is one of the most prevalent chronic conditions worldwide and is associated with reduced quality of life, social isolation, and cognitive decline. Despite well-established benefits of hearing aid use, uptake remains consistently low across countries. Epidemiological studies have reported substantial variability in hearing aid adoption rates, yet a large proportion of individuals with hearing loss remain untreated.

Prevalence rates among adults aged over 50 years with mild to moderate hearing loss in the United States range from 4.3% to 22.1% (Chien & Lin, 2012). Similarly, European data indicate provision rates between 14.7% and 27.1% among adults with mild hearing loss in Germany, France, and the United Kingdom (Bisgaard & Ruf, 2017). Despite this heterogeneity, the overall picture clearly indicates a substantial and persistent undersupply of hearing aids.

In Germany, population-based data on hearing aid use remain limited but suggest comparable patterns. According to the EuroTrak Hearing Study 2025, approximately 28% of individuals with hearing loss in Germany do not use hearing aids despite having received a medical recommendation (BHVI, 2025). The underlying reasons for this gap between medical indication and hearing aid uptake remain insufficiently understood. Both national and international evidence on the determinants of hearing aid provision is sparse. One of the few studies addressing this issue, conducted in the United States, identified associations between hearing aid use and personality characteristics, with users described as more pragmatic, routine-oriented, and problem-solving oriented (Tahden et al., 2018). In contrast, earlier research found no consistent associations between hearing aid use and demographic variables such as age or gender (Knudsen et al., 2010).

Existing research has predominantly focused on reasons for discontinuation of hearing aid use after fitting (Fitzpatrick & Leblanc, 2010; McCormack & Fortnum, 2013; Marcos-Alonso et al., 2023). Far less attention has been paid to earlier decision points, such as why individuals do not seek hearing assessment, decline hearing aid fitting, or choose not to adopt hearing aids despite recognizing hearing difficulties (Gallagher & Woodside, 2018; Pornprasit et al., 2023; Frisby et al., 2026). Although various studies have attempted to identify personal barriers and attitudes toward hearing aids—such as stigma, perceived benefit, aesthetic concerns, or trust in healthcare providers—these factors are typically assessed in isolation especially focusing on stigma and using non-standardized measures (David & Werner, 2016; Rawool, 2018; Ruusuvuori et al., 2021; da Silva et al., 2023; Iankilevitch et al., 2023; Madara & Bhowmik, 2024; Aldè et al., 2025; Gupta, 2025; Nickbakht et al., 2025; Nyathi et al., 2025). To date, there is no widely accepted, standardized tool designed to systematically capture attitudes toward hearing aids and their association with intention across multiple psychosocial domains.

The present study addresses this gap by developing and empirically evaluating a multidimensional questionnaire in German language assessing attitudes toward hearing aids. The instrument was designed to capture key belief domains identified in prior research and clinical practice. In addition, the study aimed to examine how these attitudinal domains relate to hearing aid use status and behavioral intention. Using data from an adult German sample, the study examines the internal consistency of these domains, their associations with behavioral intention, and their ability to differentiate between hearing aid users and non-users. By providing a standardized and theory-informed measurement tool, this study aims to support future research on hearing aid uptake in Germany and to facilitate cross-national comparisons in international contexts.

Materials and methods

Questionnaire development

Attitudes toward hearing aids were assessed using a self-developed questionnaire comprising 21 belief-based items, each rated on a 5-point Likert scale. To this end, an existing but as yet unvalidated questionnaire from an English-language dissertation (O'Shaughnessy, 2018) was translated into German language and further developed. In particular, the questionnaire was adapted and further developed with additional questions regarding access to hearing aids in Germany and its influence on hearing aid provision. The main topics were the coverage of costs by health insurance companies, sources of information for patients, the issuing of hearing aid prescriptions, and the prices of hearing aids.

Face validity was then established. This was done in two steps. In the first step, two experts in this field (otology) were asked to read through the questionnaire. They assessed whether the questions effectively covered the topic under investigation. In the second step, a psychometrician (an expert in the creation of questionnaires) checked the survey for common errors. The questionnaire was then reverse translated and checked by a translator fluent in both English and German languages. Several items address healthcare-system factors relevant to hearing-aid access in Germany, including reimbursement procedures and insurance coverage. These items were intentionally retained because healthcare-system navigation constitutes an important determinant of hearing-aid uptake.

The questionnaire was distributed and analyzed at the university outpatient clinic of the Department of Otolaryngology, Head and Neck Surgery at Marburg University Hospital to adult patients with normal hearing and hearing loss. A pilot test was conducted in which the questionnaire was distributed to 25 people and the results were checked using descriptive analysis. The results were analyzed for principal component analysis and Cronbach's alpha, the standard test for internal consistency. The questionnaire was revised based on the results from the pilot test. The revised final questionnaire in German (supplement 1) was distributed to randomly selected patients visiting the outpatient clinic of the Department of Otolaryngology, Head and Neck Surgery at Marburg University Hospital over a period of three months. The responses were collected, and the analysis was performed again.

Data processing

Each question has two parts. Part a of the questions address the attitude towards hearing aid and part b address the behavioral intention.

The Likert scale of part 'a' addressing attitude was modelled based on the direction of the question (negative attitude: 1 = strongly disagree to 5 = strongly agree and positive attitude (1 = strongly agree to 5 = strongly disagree) so that the direction of the answers is the same and thus double negative question and answers were avoided. Higher mean values indicated negative attitude towards hearing aids. Based on theoretical considerations and prior research on health behavior and hearing aid uptake, items were grouped into six domains: cost concerns, stigma/embarrassment, aesthetics and visibility, social influence, expected benefit and effort, and trust in physicians and the healthcare system (Table 1). For

each participant, domain scores were calculated as the mean of all available items within the corresponding domain (part 'a' of the questions). Domain scores were computed by averaging participants' responses across all items assigned to each domain. Sample-level mean therefore reflects the average degree to which participants endorsed each belief domain. If individual items were missing, domain scores were computed using the remaining answered items to maximize data retention. The means of each sample-level domain therefore reflect the average degree to which participants endorsed each belief domain. Internal consistency of the resulting domain composites was evaluated using Cronbach's alpha.

Behavioral intention (part 'b' of the questions) toward hearing aid use was assessed using 21 corresponding intention items, also rated on 5-point Likert scales and coded such that higher values indicated stronger intention not to buy or try hearing aids. A global behavioral intention score was calculated as the mean of all intention items. Thus, higher scores on the attitude scale indicate less favorable attitudes toward hearing aids, and higher scores on the intention scale indicate lower behavioral intention.

Self-reported hearing loss and hearing aid use were assessed using demographic items in Section 1 of the questionnaire. Participants who reported owning and currently using hearing aids were classified as hearing aid users, whereas participants who reported owning but not using hearing aids or not owning hearing aids were classified as non-users. These variables were used for group comparisons and as predictors in regression analyses.

Table 1
Assignment of Questionnaire Items to Attitudinal Domains

Domain	Item No.	Item content (short description)
Cost concerns	2a	hearing aids are expensive
	4a	Inability to afford an aesthetically appealing and discreet hearing aid
	14a	It is complicated to apply for insurance reimbursement
	19a	health insurance will not cover hearing aid costs
Stigma / embarrassment	6a	It is embarrassing to wear a hearing aid
	8a	will be perceived as unintelligent
	10a	will stand out in a crowd when wearing a hearing aid
	15a	will feel old when wearing a hearing aid
Aesthetics & visibility	1a*	Hearing aids are small and discreet*
	4a	Inability to afford a visually appealing and discreet hearing aid
	10a	will stand out in a crowd when wearing a hearing aid
Social influence	7a	Considering a hearing aid to please others (e.g., family, partner)
	9a	Belief that people react differently to hearing aid users
	11a	Uncertainty about how others react to hearing aid users
Expected benefit & effort	3a	Belief that a hearing aid is not needed despite hearing loss
	5a*	Expectation that a hearing aid would fully restore hearing*
	12a*	Expected cognitive benefits of hearing aid use*
	13a	Anticipated effort and time to adapt to a hearing aid (it would take weeks or months)
	18a	Belief that hearing aids are not very helpful
Trust in physicians / health system	21a	Have doubts about benefit
	16a*	Prior information about hearing aids was provided by a physician*
	17a*	Perceived good quality of physician counseling on hearing aids*
	20a*	Belief that insurance covers hearing aids when medically prescribed*

*Items were rated on 5-point Likert scales (1 = strongly disagree to 5 = strongly agree). *Items were rated on 5-point Likert scales (1 = strongly agree to 5 = strongly disagree, so that the direction of all of the questions is the same. Items 4a and 10a were included in multiple domains due to their conceptual relevance to both cost- and appearance-related concerns.*

Statistical analysis

Statistical analyses were conducted using standard parametric procedures. Descriptive statistics (means, standard deviations, and frequencies) were calculated to characterize the sample and questionnaire responses. Internal consistency of composite scales was assessed using Cronbach's alpha.

For inferential analyses, independent-samples *t*-tests were used to compare attitudinal domain scores and behavioral intention scores between hearing aid users and non-users among participants with self-reported hearing loss. Pearson product-moment correlation coefficients were calculated to examine associations between attitudinal domain scores and behavioral intention. Effect sizes for group comparisons were quantified using Cohen's *d*, calculated as the standardized mean difference using pooled standard deviations.

To examine predictors of behavioral intention, linear regression analyses were conducted. Attitudinal composite scores were entered as predictors, with age and hearing aid use status included as covariates where applicable. Model fit was evaluated using the coefficient of determination (R^2), and standardized regression coefficients were used to assess the relative contribution of individual predictors.

All statistical tests were two-tailed, and a significance level of $p < .05$ was applied throughout. Missing data were handled using pairwise deletion for scale construction and inferential analyses, ensuring that participants were retained in analyses when sufficient data were available. Effect sizes and exact *p*-values are reported where relevant. The data were collected using Microsoft® Excel for Mac version 365. Statistical analysis was done using Stata 14.0 (StataCorp. 2014. Stata Statistical Software: Release 14. College Station, TX: StataCorp LP).

Power and Sensitivity Considerations

Given the exploratory nature of the study, *a priori* power analysis was not conducted. However, a post hoc sensitivity analysis indicates that the available sample size ($N = 159$) provided adequate statistical power (80%, $\alpha = .05$, two-tailed) to detect medium-sized effects in correlational analyses ($|r| \approx .22$) and group comparisons (Cohen's $d \approx 0.45$). For regression analyses including multiple predictors, the sample size was sufficient to detect medium overall model effects ($f^2 \approx 0.15$). Accordingly, the study was well powered to identify effects of practical relevance.

Results

Sample Characteristics

The final sample consisted of N = 159 participants. Age ranged from 18 to 96 years ($M = 46.61$, $SD = 16.37$), indicating a broad adult age distribution. With regard to gender, 57.2% ($n = 91$) identified as female, 42.1% ($n = 67$) as male, and 0.6% ($n = 1$) as diverse. Self-reported hearing loss was indicated by 48.4% ($n = 77$) of participants, whereas 51.6% ($n = 82$) reported no hearing loss.

Hearing Aid Use Among Participants with Self-Reported Hearing Loss

Participants who reported hearing loss ($n = 77$) were asked about current hearing-aid ownership and use (Supplement 1: Section 1, Item A1-6). Among these participants: 28.6% ($n = 22$) reported owning and currently using hearing aids. 9.1% ($n = 7$) reported owning hearing aids but not using them. 61.0% ($n = 47$) reported having hearing loss but not owning hearing aids. One participant did not provide a response.

Thus, only 28.6% of individuals with self-reported hearing loss were current hearing-aid users, whereas 70.1% ($n = 54$) either did not use hearing aids despite ownership or did not own hearing aids at all (Table 2).

Table 2
*Hearing Aid Ownership and Use Among
Participants with Self-Reported Hearing Loss*

Hearing aid status	n	%
Uses hearing aids	22	28.6
Owns but does not use	7	9.1
Does not own hearing aids	47	61.0
Missing	1	1.3
Total	77	100

Attitude and Behavioral Intention towards Hearing Aids

The overall attitude score showed a mean of 2.65 ($SD = 0.47$), suggesting generally moderately favorable attitudes toward hearing aids in the sample. Internal consistency of the attitude scale was acceptable (Cronbach’s $\alpha = 0.70$). The overall behavioral intention score yielded a mean of 2.28 ($SD = 0.53$), indicating relatively strong intention toward hearing aid uptake. The intention scale demonstrated good internal consistency (Cronbach’s $\alpha = 0.84$).

Independent-samples t-tests revealed no significant differences between participants with and without self-reported hearing loss in general attitude toward hearing aids ($t(157) = -0.98, p = .33$), or behavioral intention ($t(157) = 0.02, p = .99$). Mean differences between groups were negligible.

Among participants with self-reported hearing loss, hearing aid users demonstrated significantly more favorable attitudes toward hearing aids ($M = 2.34, SD \approx 0.40$) compared to non-users ($M = 2.73, SD \approx 0.45$), $t(75) = -4.02, p < .001$. Similarly, users reported significantly stronger behavioral intention ($M = 1.93$) than non-users ($M = 2.43$), $t(75) = -4.35, p < .001$. This was reinforced by effect sizes using Cohen's d . Among participants with self-reported hearing loss, hearing aid users showed substantially more favorable attitudes toward hearing aids than non-users, $d = -0.87, 95\% \text{ CI } [-1.39, -0.36]$. Similarly, users reported markedly stronger behavioral intention, $d = -0.91, 95\% \text{ CI } [-1.43, -0.40]$. Both effects were large in magnitude.

General attitude toward hearing aids was strongly positively correlated with behavioral intention, $r(157) = 0.63, p < .001$, indicating that more negative attitudes were associated with lower intention to use hearing aids. A linear regression analysis further showed that attitude significantly predicted intention ($B = 0.73, SE = 0.07, t = 10.17, p < .001$), explaining 39.7% of the variance in intention ($R^2 = 0.40$).

A stepwise multivariate regression analysis was conducted to examine whether general attitude toward hearing aids explains additional variance in behavioral intention beyond age and hearing loss status. In Model 1, age and hearing loss explained 6.1% of the variance in intention ($R^2 = 0.06$). The overall model was significant, $F(2,156) = 5.07, p = .007$, explaining 6.1% of the variance in intention ($R^2 = .06$). Age emerged as a significant predictor, $B = -0.009, SE = 0.003, p = .002$, indicating that older participants reported stronger behavioral intention. In contrast, hearing loss status was not a significant predictor, $B = 0.096, SE = 0.088, p = .281$. After adding general attitude in Model 2, explained variance increased substantially to 40% ($\Delta R^2 = .34, p < .001$). General attitude emerged as a strong and significant predictor ($B = 0.72, SE = 0.08, p < .001$), whereas age ($p = 0.82$) and hearing loss status ($p = 0.40$) were no longer significant.

Item-level analyses (supplement 2) indicated that cost concerns were the most strongly endorsed barrier (Item 2a, $M = 3.85, SD = 0.98$). In contrast, explicit stigma-related beliefs were weakly endorsed, with low agreement that wearing hearing aids is embarrassing (Item 6a, $M = 2.18, SD = 1.25$) or associated with appearing unintelligent (Item 8a, $M = 1.63, SD = 1.11$). Participants generally perceived hearing aids as helpful (Item 18a, $M = 2.00, SD = 1.13$) and discreet (Item 1a, $M = 1.90, SD = 0.93$). Substantial variability was observed for social influence (Item 7a, $SD = 1.47$) and physician-related information (Item 16a, $SD = 1.65$), suggesting heterogeneous experiences in these domains.

Item-level analyses demonstrated considerable variability in the strength of associations between individual attitudinal beliefs and behavioral intention (Fig. 1). The strongest correlations were observed for items reflecting stigma-related perceptions, including embarrassment associated with hearing aid use ($r = 0.54$), being perceived as unintelligent ($r = 0.48$), and standing out in social situations ($r = 0.48$).

Items related to expected benefit also showed substantial associations, particularly doubts about effectiveness ($r = 0.44$) and the belief that hearing aids are not helpful ($r = 0.40$).

Moderate associations were observed for beliefs regarding adaptation effort, perceived need for hearing aids, and expectations of benefit ($r \approx 0.26$ – 0.36). In contrast, items related to physician communication and social influence demonstrated weak or negligible associations, with confidence intervals crossing zero.

Domain based results

Domain-level descriptive analyses indicated variability in attitudinal endorsement across constructs. The highest mean score was observed for cost concerns ($M = 3.25$, $SD = 0.83$), indicating relatively stronger endorsement of cost-related beliefs compared to other domains. Trust in physicians and the healthcare system also showed comparatively elevated values ($M = 2.94$, $SD = 0.98$). Moderate mean scores were observed for social influence ($M = 2.66$, $SD = 0.90$) and expected benefit and effort ($M = 2.60$, $SD = 0.68$). Lower mean values were found for aesthetics and visibility ($M = 2.40$, $SD = 0.77$) and stigma/embarrassment ($M = 2.13$, $SD = 0.92$), indicating comparatively weaker endorsement of these domains. Thus, cost concerns and trust in physicians seem to act as barriers against hearing aid in comparison to attitudes about aesthetics and stigma which are not seen as barriers for hearing aid.

Domain-level analyses with intention revealed that expected benefit and effort ($r = 0.66$, $p < .001$) and stigma-related beliefs ($r = 0.65$, $p < .001$) showed the strongest associations with behavioral intention. Aesthetics demonstrated a moderate correlation ($r = 0.42$), whereas cost concerns showed only a weak association ($r = 0.18$). Social influence and trust in physicians were not significantly related to intention (Fig. 2).

Among participants with self-reported hearing loss, hearing aid users demonstrated significantly more favorable attitudes than non-users in the domains of stigma ($d = -0.78$, 95% CI $[-1.29, -0.27]$), expected benefit and effort ($d = -0.75$, 95% CI $[-1.26, -0.24]$), and trust in physicians ($d = -0.87$, 95% CI $[-1.39, -0.35]$). Differences in cost concerns, aesthetics, and social influence were small and not statistically significant. These results were reinforced by their respective effect magnitudes shown by Cohen's D values (table 3).

Table 3
Attitudinal Domain Scores by Hearing Aid Use Status (With Effect Sizes)

Domain	Users M (SD)	Non-Users M (SD)	T test	p	Cohen's d	95% CI for d
Cost concerns	3.13 (0.98)	3.37 (0.82)	-1.00	.325	-0.27	[- 0.77, 0.22]
Stigma / embarrassment	1.60 (0.61)	2.27 (0.93)	-3.70	< .001	-0.78	[- 1.29, - 0.27]
Aesthetics & visibility	2.33 (0.93)	2.49 (0.74)	-0.71	0.483	-0.20	[- 0.69, 0.30]
Social influence	2.65 (0.80)	2.58 (0.95)	0.32	0.751	0.08	[- 0.43, 0.58]
Expected benefit & effort	2.29 (0.55)	2.77 (0.67)	-3.23	0.002	-0.75	[- 1.26, - 0.24]
Trust in physicians / health system	2.02 (0.93)	2.88 (1.01)	-3.51	0.001	-0.87	[- 1.39, - 0.35]

Discussion

The present study examined attitudes toward hearing aids and their association with behavioral intention and hearing aid use in a heterogeneous adult sample. First, although overall attitudes were moderately favorable, hearing aid uptake among participants with self-reported hearing loss was low, with only 28.6% reporting current use. Second, general attitude strongly predicted behavioral intention, explaining 40% of the variance beyond age and hearing loss status. Third, domain-level analyses revealed that stigma-related beliefs and expectations regarding benefit and effort were most strongly associated with intention. Finally, among participants with hearing loss, hearing aid users demonstrated substantially more favorable attitudes than non-users, particularly in the domains of stigma, expected benefit, and trust in physicians. Importantly, these results must be interpreted within the broader context of structured hearing healthcare provision in Germany, where statutory insurance coverage, standardized fitting procedures, and quality assurance mechanisms are well established. Despite these structural supports, uptake remains limited, underscoring the decisive role of attitudinal factors.

Persistent Gap Between Hearing Loss and Uptake

The finding that only 28.6% of individuals with self-reported hearing loss were current hearing aid users aligns closely with international epidemiological data indicating uptake rates between 10–25% (Knudsen, Oberg et al., 2010) and 20–25% (Manchaiah et al., 2018). Similarly, large-scale German population data from the Gutenberg Health Study indicate substantial prevalence of hearing impairment alongside incomplete hearing aid provision, even within a universal insurance framework (Doge et al., 2023). These findings underscore the substantial gap between perceived hearing impairment and

hearing-aid uptake, indicating persistent underutilization of hearing aids. Despite technological advances and growing awareness of the health consequences of untreated hearing loss, adoption remains limited.

As highlighted in a comprehensive review, help-seeking and uptake are influenced more by psychosocial than demographic factors (Knudsen, Oberg et al., 2010). Our findings reinforce this perspective: neither age nor hearing loss status independently predicted intention once attitude was included in the model.

Epidemiology and Provision in Germany: Structural Availability Versus Utilization

Germany provides a particularly informative context because hearing aids are covered under statutory health insurance with defined reimbursement standards and regulated fitting procedures (Hoppe & Hesse, 2017). In addition, national quality assurance guidelines mandate structured indication, adaptation, verification, and outcome control processes (Limberger, 2025). From a structural perspective, barriers such as access and basic affordability are comparatively minimized.

Nevertheless, lifetime cost analyses demonstrate that out-of-pocket expenses and upgrade costs remain non-negligible for many patients (Thum et al., 2021). However, in the present study, cost concerns—although frequently endorsed—showed only weak association with intention and did not significantly differentiate users from non-users. This pattern suggests that while financial considerations are salient at a descriptive level, they may not independently determine adoption once psychosocial variables are accounted for. Similar conclusions have been drawn in international reviews, where demographic and structural factors show inconsistent predictive value compared with psychosocial determinants (Knudsen, Oberg et al., 2010).

Thus, the German context illustrates a critical distinction: structural provision does not automatically translate into utilization.

Attitude as a Central Determinant of Intention

In our cohort, the strong correlation between general attitude and behavioral intention ($r = .63$) and the substantial variance explained in regression ($R^2 = .40$) underscore the centrality of attitudinal factors in the decision-making process. This finding is consistent with the Theory of Reasoned Action framework, which posits that behavioral intention is primarily shaped by attitudes and subjective norms. Cobelli et al. demonstrated that attitude toward hearing aid adoption significantly predicts intention, whereas perceived social norms may negatively influence it (Cobelli et al., 2014). Similarly, Meister et al. reported that expectations regarding quality-of-life improvement, stigmatization, and self-rated hearing ability explained 55% of the variance in willingness to use hearing aids (Meister et al., 2008). A 2024 validation study on attitudes toward hearing aid use further confirmed the centrality of attitudinal constructs across working-age adults (Zuriekat et al., 2025).

A German pilot study from 2004 identified psychosocial readiness, self-perception, and expectations as critical factors even before the formal provision process begins (Meister et al., 2004). Subsequent

German studies emphasized that non-audiological factors influence rehabilitation success after fitting (Brosch et al., 2005). These earlier German findings are consistent with contemporary international data, reinforcing the longitudinal stability of attitudinal determinants.

Our data extend these findings by showing that general attitude remains a dominant predictor even when controlling for age and hearing loss status. This suggests that cognitive-evaluative representations of hearing aids may outweigh clinical need in shaping behavioral intention.

The Role of Stigma

In the present cohort, stigma-related beliefs emerged as one of the strongest correlates of intention ($r = .65$) and showed large between-group effects ($d = -0.78$) between users and non-users. These findings align with the evidence that hearing loss and hearing aids are embedded in ageist and disability-related stereotypes (Beadle et al., 2024). Meyer et al. demonstrated that stigma-related experiences and concealment of hearing loss are associated with hearing aid use (Meyer et al., 2025), and Ekberg et al. conceptualized disclosure versus concealment as central responses to stigma-induced identity threat (Ekberg et al., 2025).

Although explicit endorsement of stigma items in our sample was relatively low (e.g., embarrassment, unintelligence), domain-level stigma scores strongly predicted intention. This discrepancy reflects patterns observed in social representation research, where hearing aids are simultaneously associated with technological advancement and age-related decline (Manchaiah, Ratinaud et al., 2018).

Within the German system—where hearing aids are normalized within healthcare structures—stigma appears less as a structural barrier and more as an identity-level barrier. This distinction is crucial: system-level normalization does not eliminate symbolic meaning.

Expected Benefit and Effort

The domain “expected benefit and effort” showed the strongest association with intention ($r = .66$) and large hearing aid user–non-user differences ($d = -0.75$). This is highly consistent with prior evidence demonstrating that pre-fitting expectations significantly influence willingness and subsequent adoption (Meister, Walger et al., 2008). In addition, Dwarakanath and Manjula reported that positive attitudes toward hearing loss and amplification were associated with greater use and perceived benefit and that negative attitudes toward hearing loss and hearing aids significantly increase the hazard of device abandonment over time (Dwarakanath & Manjula, 2022). Changes in attitudes have been shown to predict abandonment trajectories, even years after fitting (Fuentes-Lopez et al., 2025; Tapia-Mora et al., 2026). Taken together, these findings suggest that attitudes are not merely antecedents of uptake but dynamic determinants of sustained use.

The salience of this domain in our findings suggests that cognitive expectations regarding functionality and rehabilitation effort are central determinants of behavioral intention, potentially even more influential than cost concerns.

Cost and Social Influence

Although cost concerns were the most strongly endorsed single barrier item, they showed only a weak correlation with intention ($r = .18$) and small, non-significant differences between users and non-users. This pattern is consistent with literature indicating that while cost is frequently cited as a barrier, it may not independently predict uptake once psychosocial variables are considered (Knudsen, Oberg et al., 2010).

Similarly, social influence showed limited association with intention in our data. However, Cobelli et al. found that subjective norms negatively influence intention when individuals perceive disapproval from significant others (Cobelli, Gill et al., 2014). It is possible that social norms operate more subtly or interactively rather than as direct predictors.

Trust in Physicians and Health Communication

Trust in physicians showed large group differences ($d = -0.87$) between users and non-users but was not significantly correlated with intention in the full sample. Cobelli et al. reported that trust in health professionals mitigates negative social pressures and supports adoption (Cobelli, Gill et al., 2014). Moreover, Adorni et al. demonstrated that the language used by physicians can significantly shape attitudes and intention toward hearing aid use (Adorni et al., 2022). Consumer studies in the US market show that individuals prefer in-person models and value professional guidance, even when over-the-counter options are available (Singh & Dhar, 2023).

Our findings also reflect this and suggest that trust may play a more decisive role once hearing loss is acknowledged rather than at the level of general intention in the broader population. German quality assurance frameworks emphasize structured counseling and verification processes (Limberger, 2025). However, our findings suggest that technical adequacy alone is insufficient; attitudinal and identity-related concerns must be explicitly addressed during counseling.

Limitations

The cross-sectional design precludes causal inference regarding the relationship between attitudes, intentions, and hearing aid use. Self-reported measures may be influenced by social desirability, particularly in stigma-related domains. While the study was sufficiently powered to detect effects of moderate magnitude, smaller associations may have gone undetected. Additionally, the heterogeneous sample may limit generalizability to clinical populations actively seeking hearing care.

In spite of these limitations understanding the mechanisms explored in this study is essential for designing targeted interventions to improve hearing aid uptake at the population level. Although conducted in a German-speaking population, the constructs examined are broadly applicable across healthcare contexts, providing insights that are relevant for international hearing health services research.

Conclusion

Despite comprehensive structural provision and regulated quality assurance within the German healthcare system, hearing aid uptake remains strongly shaped by psychosocial determinants. Attitudes—particularly stigma-related beliefs and expectations regarding benefit and effort—emerged as central predictors of behavioral intention and differentiated users from non-users with large effect sizes. These findings support an integrated structural–psychosocial framework and underscore the necessity of addressing attitudinal determinants within hearing rehabilitation programs.

Declarations

Ethics approval and consent to participate

The authors assert that all procedures contributing to this work comply with the ethical standards of the Helsinki Declaration. The submission of the manuscript has been approved by the institutional review board (Ethics Commission) of the University Hospital of Marburg (Die Ethikkommission des Fachbereichs Medizin der Philipps-Universität Marburg).

All participants provided informed consent prior to participation in the study.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to institutional data protection regulations but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

KT conceived the study. CM collected the data. KT and CM performed the statistical analyses. RMV and KR contributed to the study design, and BAS provided infrastructure support. JRR helped with manuscript revision. All authors contributed to data interpretation, critically revised the manuscript, and approved the final version.

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Large Language Models (LLMs) or AI were not used in the writing of this manuscript.

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Figures

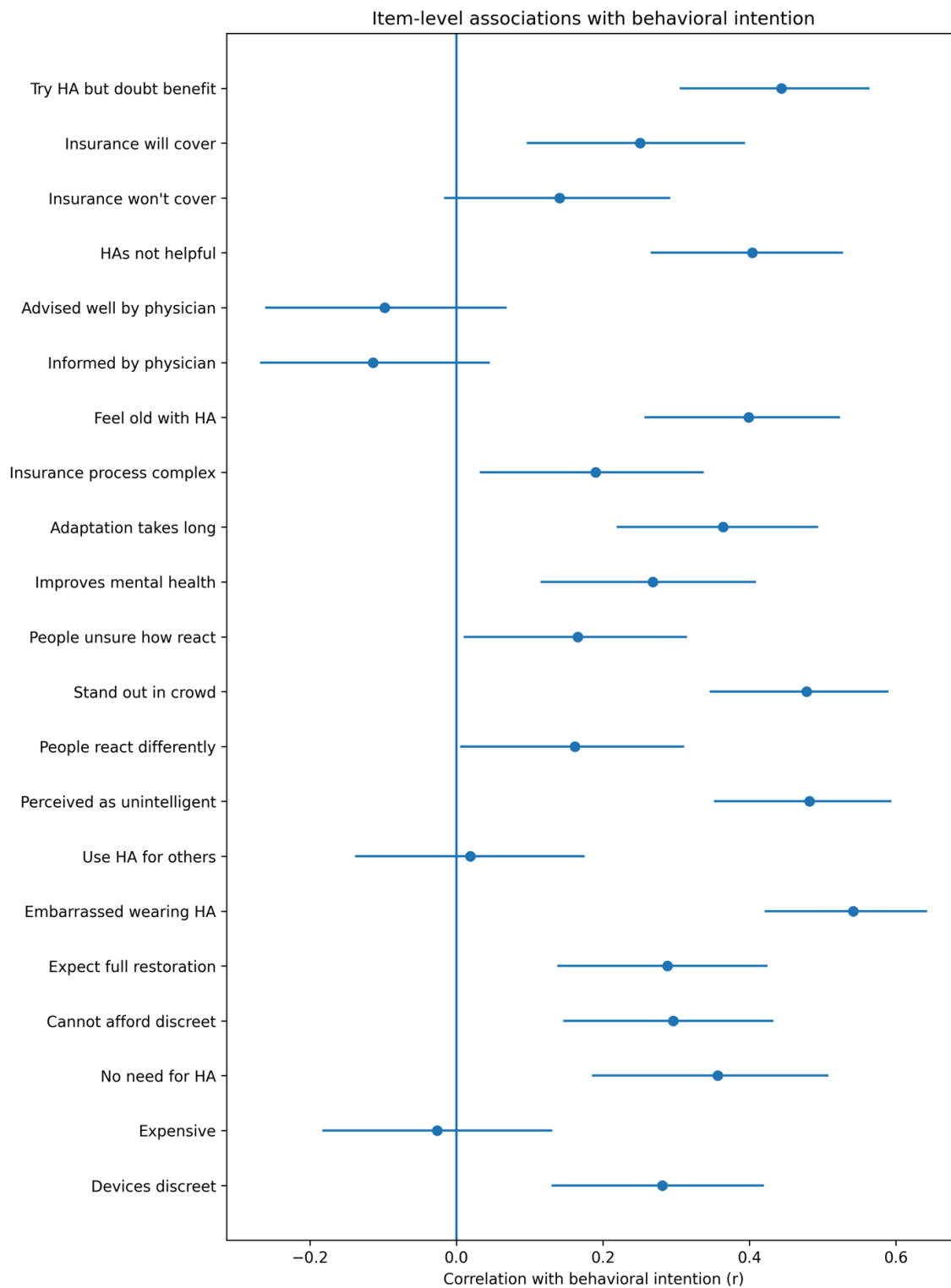


Figure 1

Item-level associations with behavioral intention

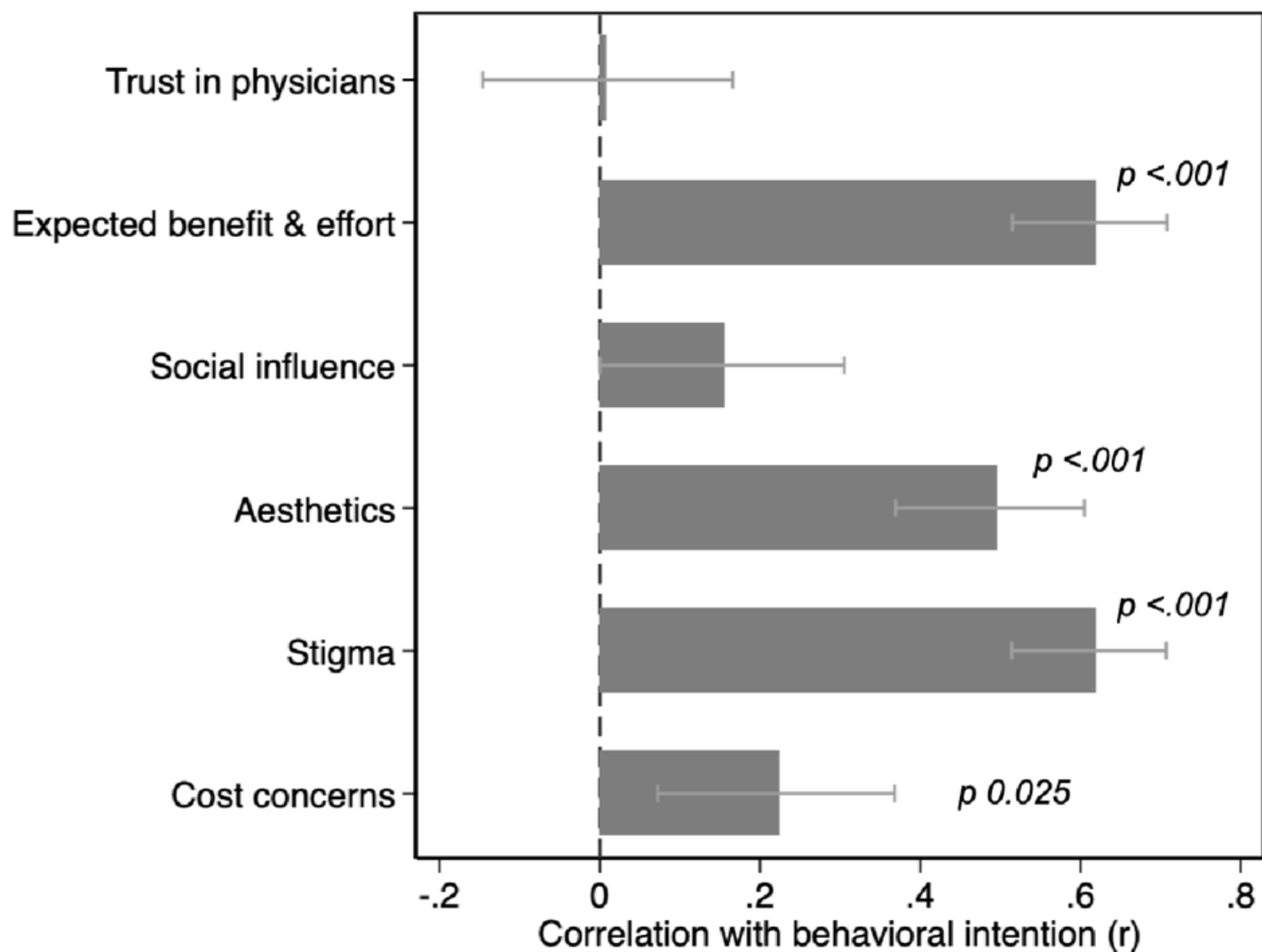


Figure 2

Attitudinal Domain-Level Association with Behavioral Intention

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