HIGH SCHOOL EDITION
Journal of Student Research
Volume 11 Issue 3 (2022)

The Effectiveness of Hearing Aid Website Marketing in Addressing Tampa Bay Consumer Concerns

Madison Wall[1] and Susan Vaughan[1#]

[1]H. B. Plant High School
[#]Advisor

ABSTRACT

79% of American adults choose not to use hearing aids, despite their benefits (Nassiri et al. 2). Recent Over-the-Counter regulations seek to increase this rate through an online distribution of hearing aids. With a new market, this study sought to evaluate a gap: the effectiveness of website marketing language in addressing Tampa Bay consumer concerns. The study utilized two methods: a survey of 197 hearing aid users and a content analysis of 15 Inside Ear products across six hearing aid websites with coding guidelines to maximize objectivity. The survey established a hierarchy of consumer concerns to fulfill ambiguity in the literature and to evaluate the effectiveness of marketing language. The results indicated that the low application rate can be attributed to other stakeholders beyond the marketers including consumers and hearing professionals. For marketing, the websites were only moderately effective, as the most significant concern (49%) of cost was absent. This was exacerbated by a low website traffic rate (12%) from consumers. The finding may also indicate a greater burden for consumers to conduct research, as consistent users (13%) had a higher rate than discontinued users (6%). Thus, brands need to align with consumer concerns and attract more visitors to increase effectiveness. Over-the-counter hearing aid brands may be more attractive due to affordability but may struggle with getting consumers to their websites. Furthermore, hearing professionals were more likely to give one option to discontinued users (50%) than consistent users (38%), which may indicate a need to offer greater options to consumers.

Introduction

The phenomenon of a rapidly aging population has situated hearing loss as an increasingly prevalent condition faced by adults in the United States (Goman et al. 734). The Tampa-St. Petersburg-Clearwater Metropolitan Area commonly referred to as the Tampa Bay Area, serves as a microcosm of this national trend, containing the third-largest concentration of Deaf and Hard-of-Hearing individuals (Rose). Hearing loss is a consequence of damage in the ear, occurring over time or suddenly due to age and/or genetics (American Speech-Language-Hearing Association). To remedy the effects of hearing loss, hearing aids translate sound waves into an electrical signal that is amplified and then transmitted to the ear (American Speech-Language-Hearing Association).

Despite the commonality of hearing loss and efforts to encourage adoption, the use of hearing aid devices continues to remain scarce with a lack of utilization by 79% of eligible adults in the domestic market (Nassiri et al. 2). This means that an estimated 22.9 million American adults could benefit from the use of hearing aids yet choose not to use devices (Chien and Lin 2).

Experts view this low application rate as extremely troubling due to the negative consequences for consumers. Without hearing aids, individuals fear misinterpreting conversations and tend to cope with hearing loss through physical isolation and emotional withdrawal from social situations (Lash and Helme 309; Wallhagen 72). Due to severe social withdrawal, the hearing loss left untreated can place individuals into problematic “life or death” situations with suicidal thoughts and depression (Kochkin and Rogin 12). Kochkin and Rogin’s analysis of MarkeTrak studied a quantitative survey on hearing aid use in the United States with 2,069 hearing-impaired individuals and

1,710 of their family members. They concluded that hearing aid users had significantly higher rates of social activity and lesser periods of depression and anxiety than non-users (Kochkin and Rogin 1, 6). There are considerable psychological, mental, and physical benefits of using hearing aids, with 75.59% of users describing an overall improvement in quality of life (Kochkin and Rogin 9).

Literature Review

Hearing Aids

To address the needs of individuals, there are two main categories of hearing aids, Inside Ear and Outside Ear. Inside Ear styles fit inside one's ear, either within the ear canal or concha, the main depression of the ear (National Health Services). These tend to be less noticeable and may alleviate concerns about self-image (Wallhagen 70). Despite addressing concerns among users about appearance, Inside Ear styles were only purchased by 13% of the domestic market in 2020 (Strom). Yet, Outside Ear Styles, which are more noticeable as they sit behind one's ear, are far more popular among consumers (National Health Services; Strom). This may signify that the self-image of consumers regarding appearance and social stigma is a less influential concern than cost. In much of the literature, experts focus on either cost or self-image as the primary concern for consumers but there is ambiguity as to which is more important.

Cost

The Federal Drug Administration recognizes the pressing nature of affordability with hearing aids and started drafting Over the Counter (OTC) hearing aid regulations in October of 2021 (Hamlin).

Currently, hearing aids are only available to consumers via an approved distributor, either an audiologist or hearing aid specialist, who increase the cost of devices by an average of $1,510 from the manufacturing price ("An Analysis of US"). This increased price is designed to include specialized care and adjustments from the distributors but consequently prohibits their accessibility for average American consumers ("An Analysis of US").

Over-the-Counter regulation seeks to remove this substantial markup, by allowing consumers to purchase hearing aids directly online from brands rather than through distributors (Hamlin). The current hearing aid industry may be replaced with online distribution as the primary means to access consumers, thus placing great emphasis on website marketing.

In the United Kingdom, where hearing aids are fully funded through universal health care, the usage rate of hearing aids is 41.7% which is considerably higher than 21% in the United States (European Hearing Instrument Manufacturers Association 7; Nassiri et al. 2). This reaffirms cost as a barrier since in the United States there is little insurance coverage for hearing aids and individuals must use their discretionary income (Kochkin and Rogin 12).

Self-image

This barrier is contradicted by other experts like Amlani who argued that even if hearing aids were completely free, the majority of consumers would not utilize devices due to fear of social stigma ("It's not immoral"). Hearing aids represent a visible marker of an invisible condition that is considered negative in society as an indicator of aging or disability (Wallhagen 69). This even leads to negative discrimination for wearers at home or in public because it "starts to look like you're slipping" or "becomes a sign 'I'm defective'" (Wallhagen 72, 69).

Researchers identified self-image, ageism, vanity, and discrimination as major barriers influencing individuals from purchasing devices (Ruusuvuori et al. 4; David et al. 130). For the purposes of this study, self-image will refer to the user's feelings regarding their appearance and social stigma when wearing hearing aids.

Margaret Wallhagen, Professor at the Department of Physiological Nursing at the University of California in San Francisco, conducted a one-year longitudinal study comparing the opinions of potential users and close figures in their lives throughout the hearing aid process to evaluate societal pressures. She found that the negative opinions of close figures regarding appearance led to ultimate discontinued use (Wallhagen 72). Others were discouraged by pressure in the workplace, where assistive devices "diminishes one's authority" (Wallhagen 69).

For those concerned with self-image, ageism was the most pressing concern, for instance, these devices would make me look old and as a result not be taken seriously (David et al. 129). This relates directly to the style of the device as smaller, Inside Ear styles are less likely to be seen. In Wallhagen's study, one family member reported "I don't think that he would even be considering wearing hearing aids if, if he didn't think that [he was] a candidate for the in-canal styles" (70). This pressure of social stigma was also evident in an evaluation of the average woman with age-normal hearing, where hearing aid users were perceived as handicapped by 58% of young women, compared with 23% of older women (Erler and Garstecki 86). As the woman increased in age, hearing aids were viewed as more positive and acceptable, which reinforces that societal norms associate wearing hearing aids with aging and being handicapped (Erler and Garstecki 86). These studies have substantiated a proven negative effect of social stigma and the appearance of the devices on hearing aid use.

Consumer Preferences

Within "Consumer Preferences for Hearing Aid Attributes", Bridges and other researchers identified four influential concerns for patients when selecting a hearing aid: sound quality, design, cost, and day-to-day features (41). Design included sub-themes of the comfort and appearance of the devices (Bridges et al. 41). This study did not consider the differences between various styles with these factors.

Role of Marketing Language on Consumers

Only three studies mentioned the role of marketing language on consumers but none analyzed website marketing language. Erler and Garstecki identified the role of marketing in exacerbating "fears of negative labeling or discrimination by portraying hearing loss and hearing aid use as conditions that need to be concealed" (90). Their work expands on Kochkin and Rogin's earlier call for a more holistic view of hearing aid health care through a greater emphasis in marketing on quality of life and well-being rather than concealing a condition (12). Both works were conducted twenty years ago and marketing language constantly evolves to match societal norms. But a more recent study by Wallhagen reinforced this trend that advertisements "emphasize their small nature, minimal visibility, and cosmetic appearance". All of these studies lacked a focus on online marketing, which is a crucial element for OTC hearing aids (72).

Importance of Website Marketing

As described by Patsioura and other researchers, "commercial web sites provide insight on consumers' requirements and perceptions", and to successfully market their products companies should effectively fulfill consumer concerns (372). As there is no existing analysis of website marketing on hearing aids, other industries must be used as a precedent for this study. Sally McMillan, professor in the Advertising Department at the University of Tennessee-Knoxville, reviewed nineteen studies on website content analysis and concluded the strategy was an ideal method to analyze website marketing language (93). She recommended utilizing clear coding guidelines and parameters for the unit of analysis (McMillan 93). A study in the Journal of Global Marketing by Strebinger and Rusetski reaffirms the use of content analysis in websites. The study investigated the discrepancy between the demographics of the global audience and images of the models on luxury brand websites (Strebinger and Rusetski 282). Through an analysis of 15 websites, two coders calculated the frequency of 3,750 image references to the ethnicity of models and were able to conclude if

the ethnicity of the audience was represented by the brand models (Strebinger and Rusetski 282). To understand the effectiveness of this, Strebinger and Rusetski utilized a non-parametric two-tailed hypothesis test called the Wilcoxon Signed Rank Test (290).

Gap in the Literature

Preexisting literature establishes an inextricable link between hearing aid use and cognitive, social, and physical lifestyle improvements. Despite the widely accepted benefits of wearing hearing aids, consumers experience six common concerns to purchasing devices: cost, sound quality, self-image, fit, connectivity, and lifestyle improvement. Yet, there is ambiguity in the current literature over the hierarchy of consumer concerns, as it is unclear if cost or self-image is more pressing to consumers. The marketing language on websites utilized by major hearing aid brands for their products has never been studied, despite the future of hearing aids relying on this method to distribute products. The website language of these brands can also reveal insights into the companies' perceptions of consumer concerns. Thus, this study seeks to evaluate, how effective is website hearing aid marketing in addressing Tampa Bay consumer concerns? By establishing a clear hierarchy of consumer concerns, the results of this study can be used to refine marketing language to address the needs of consumers and improve the low application rate of hearing aids.

Research Design and Methodology

Study Design

To address this goal, a mixed-methods study was developed, allowing for a more thorough understanding of the situation through survey research and content analysis. As my study focuses on the initial barriers to purchasing hearing aids, it is crucial to understand the language consumers interact with when researching the devices and if it aligns with their own concerns. As such, it is important to use these two methods together to clarify the concerns of consumers and then understand if marketing language effectively addresses these concerns.

Survey research was conducted first to clarify the ambiguity in the existing literature over a hierarchy of consumer concerns. MarkeTrak, EuroTrak, Kochkin, and Bridges have also utilized an online survey to gauge large audiences for hearing aids. In keeping with this precedent, this study utilized the same format and online distribution method.

After the hierarchy of consumer concerns was clearly established, the effectiveness of website marketing language could then be addressed. The results of the survey revealed that out of current users who tried multiple styles, 58% had tried Inside Ear styles. Despite Outside Ear styles consisting of the majority of the domestic market, consumers in this study were more attracted to Inside Ear styles, and thus, may have been more attracted to Inside Ear marketing language. As a result, a semi-automatic conceptual analysis was conducted on a narrowed scope of the subpages of hearing aid websites related to Inside Ear devices. While the current literature on hearing aids lacks any similar website analysis, a content analysis on luxury brands in the Journal of Global Marketing aligns with the objectives of this inquiry (Strebinger and Rusetski 282). A text mining technique could have also been utilized but the limitation of detecting single words rather than phrases made it unsuitable for this study (Aureli 21). As both techniques can be used to quantitatively analyze business language, content analysis was a preferential choice as it provides the entire context of the sentence leading to more accurate interpretations (Aureli 20).

Subjects

The subjects of the survey were anonymous individuals with hearing loss who have experience using hearing aids in the Tampa-St. Petersburg-Clearwater Metropolitan Area, as they are the consumer base being targeted by marketing language for brands.

For the content analysis, fifteen Inside Ear product subpages of six public brand websites were analyzed: Signia, Starkey, Widex, Resound, Rexton, and Oticon; these are owned by the six largest hearing aid manufacturers and were brands worn by almost all the participants in the survey.

Research Instruments

The questionnaire was based on the six major concerns identified in the literature review. By incorporating logical flow conditioning with the use of coded if statements, each survey was customized to ask relevant follow-up questions to barriers or important factors. Statistical analysis was then conducted using the Pearson Correlation Coefficient and the Wilcoxon Signed Rank Test.

Procedures

The survey participants were reached across a variety of platforms to encourage an entire community evaluation. The survey was distributed through eleven cities via Nextdoor, a community social media platform, in an attempt to reach the general consumer. As well as facilitated via a segment on a local news station and email blasts to members of the Senior Living Guide and a Hearing Loss Association of America chapter. The nature of an online survey aligns with past studies and also simulates the distribution method of OTC hearings aids and attracts the ideal online consumer base.

To conduct the content analysis, fifteen Inside Ear product subpages and 4,761 words describing hearing aid products were analyzed. In alignment with McMillian's recommendations, Iteration One consisted of developing coding guidelines to identify clear definitions for what constitutes each concern and to ensure a more objective process (see table 1). Iteration Two consisted of coding and identifying the frequency of references to each of the six concerns throughout the marketer-generated language on websites. The main pages describing an entire line of hearing aids were disregarded unless that was the only option to analyze the products. Like Strebinger and Rusetski, the proportion of this frequency relative to the overall language for each page, was then calculated, to create a universal method to compare the different websites (Strebinger and Rusetski 290). The frequency of references to these concerns were combined across the websites (Strebinger and Rusetski 290). This created a mean value that could be compared to the number of survey respondents to evaluate the effectiveness of marketing language using a Wilcoxon Signed Rank Test (Strebinger and Rusetski 290).

Delimitations

To narrow the subjects of the survey, individuals with hearing loss who have never tried hearing aids or live outside of the Tampa Bay St. Petersburg Metropolitan Area were excluded. For the content analysis, Phonak was excluded from this study as one of their Inside Ear styles, Lyric, is the only Federal Drug Administration approved version of such a device. As this style could not be compared to the other brands, this specific site was excluded, so Rexton, which is owned by Phonak and may use similar marketing, was selected instead.

Table 1. Coding Guidelines For the Six Major Consumer Concerns. This indicates key themes and examples from website language to create a more objective text analysis.

Factor	Key Themes	Example
Sound Quality	• Clarity • Different noise environments • Speech comprehension	"crystal clear sound" "filtering unwanted background noise" "superior wireless binaural processing"
Self-image	• Social stigma • Appearance • Invisible, small, discreet, or hidden • Sleek or trendy	"give you the confidence of knowing that no one even notices you're wearing them." "Looking good" "ultimate in discretion" "hidden by selecting colors that match your skin color."
Design	• Custom • Comfort • Fit	"Custom fit to your ear" "won't get tangled or pulled off when wearing or removing face masks." "great for on-the-go people who need their hearing aids to stay in place" "Perfectly positioned"
Lifestyle Improvement	• Social interaction • Durable all-day wear	"All day long. In every situation." "A child's happy laughter, a phone call from a loved one, birds singing in the trees – it's these sounds that make moments special and enrich our lives." "Whether you're spending time with the special people in your life or meeting a new special someone"
Cost	• Affordable • Free trial	"Request a no-obligation trial" "Affordable"
Connectivity	• Remote control • Bluetooth streaming	"Easily connects with smartphones, TV and other devices" "remotely controlled via remote or app"

Results

Survey of Hearing Aids Consumer Preferences

The survey was completed by 274 participants but was constrained to 197 participants after further review of their qualifications, for instance, some participants did not have hearing loss, have never tried hearing aids, were minors, or lived outside of the surveyed area. Of the qualified individuals, 142 were consistent users of hearing aids, 22 were inconsistent users, and 33 discontinued use of their hearing aids. The average age of the participants was 66.26 years

old. The guiding six major concerns used in this study were sound quality, self-image, fit, lifestyle improvement, cost, and connectivity.

Hearing Aid Selection Process

The results obtained by this study illustrate a crucial gap in the education process of consumers.

Table 2. The Fitting Process For All Participants.

	Frequency of Participants	Percentage of Participants (n = 194)
Researched via hearing aid brand website or marketing materials	23	12%
Given ONE hearing aid option by a professional	75	39%
Given MULTIPLE hearing aid options by a professional	108	56%

A concerningly low level of consumers, only 12%, are conducting their own research via website and pamphlet research (see table 2). Furthermore, 39% of total consumers were given only one option of hearing aids.

Table 3. The Fitting Process of Participants Stratified by Use Situation.

		Consistent Hearing Aid Users (n = 141)	**Inconsistent Hearing Aid Users (n = 21)**	**Discontinued Hearing Aid Users (n = 32)**
Researched via hearing aid brand website or marketing materials	Frequency	19	2	2
	Proportion within subset	0.13	0.10	0.06
Given ONE hearing aid option by a professional	Frequency	53	6	16
	Proportion within subset	0.38	0.29	0.50
Given MULTIPLE hearing aid options by a professional	Frequency	78	14	13
	Proportion within subset	0.55	0.67	0.41

This is compared to 50% of those who tried hearing aids but do not currently use them (see table 3). Individuals who discontinued use of hearing aids were more likely to have only been given one option after consulting with

a professional. Furthermore, consumers who discontinued hearing aid use were less likely to conduct research via hearing aid brand websites or marketing materials, only 6% as opposed to 13% of consistent users. Thus, the low application rate of hearing aids may not fall on marketing language fitting consumer preferences but on the consumer's burden to research and professionals giving more options. Furthermore, the low visit rate to the websites may be a potential obstacle in the implementation of Over-the-Counter hearing aids which rely solely on websites as the direct dispenser.

Hierarchy of Consumer Concerns

There was only a minor insignificant difference in the initial concerns of consumers based on their situation: whether they were consistent users, inconsistent users, or discontinued users. Participants were allowed multiple selections of the concerns if applicable.

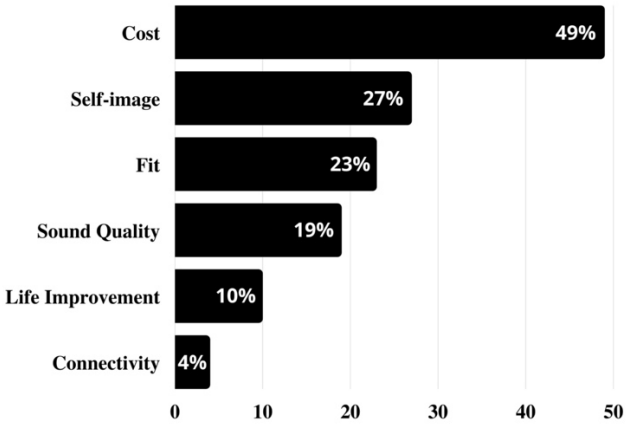

Figure 1. Hierarchy of Concerns for Tampa Bay Consumers

To fulfill a lacuna in the existing literature, a clear hierarchy of consumer concerns was developed for the Tampa Bay area (see figure 1). For users, cost was by far the most significant concern, as 49% of the participants selected this response. This was followed by self-image (27%), which includes the appearance and social stigma of users when wearing their devices. The two major concerns of users, as described in the literature were cost and self-image, but contradicting Almani's work, cost was a more significant concern. The lesser concerns for users were fit (23%), sound quality (19%), life improvement (10%), and connectivity (4%).

Figure 2. Styles Tried by Current Users

58% of current users who tried more than one style, had tried Inside Ear styles (see figure 2). Despite Outside Ear styles consisting of the majority of the domestic market and were eventually those worn by current users, consumers in this study were initially more attracted to Inside Ear styles. Thus, consumers may have been more attracted to Inside Ear marketing language. As a result, the scope of the next step, website content analysis was narrowed to analyzing Inside Ear products.

Follow-Up Questions

Each respondent received relevant follow-up questions based on the multiple reasons they identified as key to their continued use or rejection of the devices. Multiple selection was allowed for all of the questions except for regarding insurance coverage as only one situation can apply to individuals.

Cost

Table 4. Levels of Insurance Coverage

	Frequency	**Proportion (n = 20)**
No coverage	14	0.70
Partial coverage	4	0.20
Full coverage	2	0.10

As cost was a major concern for users, those who chose to discontinue or continue using their devices due to cost were asked to evaluate the affordability of their devices (see table 4). 70% had no insurance coverage and 20% had only partial insurance coverage. This solidifies cost as a barrier and may justify why many Tampa Bay consumers felt this was a significant concern. The low size of this subset of respondents, only 20, limits the generalizations that can be made; however, this aligns with existing research on little insurance coverage in the United States.

Lifestyle Improvement

Table 5. Areas of Lifestyle Improvement Due to Hearing Aid Use

	Frequency	**Proportion (n = 135)**
Engagement with family and friends	114	0.84
Confidence in the workplace	68	0.50
Happier mental state	55	0.40

81% of current users experienced substantial life improvement due to hearing aid use, and this represented the largest subset of respondents, 135, who were prompted with a follow-up question (see table 5). This is 6% higher than the finding in Kochkin and Rogin's study. Respondents emphasized engagement with family and friends, 84.4%, as a predominant factor in their improvement of quality of life. 50% described confidence in the workplace and only 40.4% described experiencing a happier mental state, which is much lower than previous studies.

Website Content Analysis Results

For each Inside Ear product subpage of the website, following the predetermined coding guidelines, the frequency of references to each concern was calculated. Like, Strebinger and Rusetski, the proportion of this frequency relative to the overall language for each page, was then calculated as well, to create a universal method to compare the different websites. 1.0 means that the language referencing consumer concerns focused exclusively on the concern. While 0.0 means that the language never mentioned the concern. Of the fifteen pages analyzed, the subpages most frequently utilized language associated with self-image, at an average of 45% (see table 6). Thus, across all hearing aid brands for Inside Ear styles, marketers view self-image as the most significant concern for consumers. Advertisers utilized phrases such as "incredibly discreet" and gives you the "self-confidence to savor the important things in life" "without having to worry about your hearing and appearance". There was no mention of cost and very little to no mention of lifestyle improvement, so advertisers view these two concerns as insignificant to consumers.

Table 6. Descriptive Statistics for Average References to Concerns in Websites

	Sound Quality	Self-image	Fit	Lifestyle Improvement	Cost	Connectivity
Mean	0.25	0.45	0.16	0.04	0	0.15
Std. Deviation	± 0.12	± 0.14	± 0.12	± 0.04	± 0	± 0.18
Minimum	0.14	0.32	0	0	0	0
Maximum	0.42	0.67	0.35	0.09	0	0.42

The Pearson Correlation formula was used to obtain a correlation coefficient, r.

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

The content analysis revealed an r-value, of -0.73, demonstrating the relationship between the size of Inside Ear devices and the proportion of marketing language focusing on self-image (see figure 3A). Since the absolute value of the correlation index is between 0.7 and 1, there is a very strong negative correlation. This means that as the size of the device increased, less focus was placed on self-image.

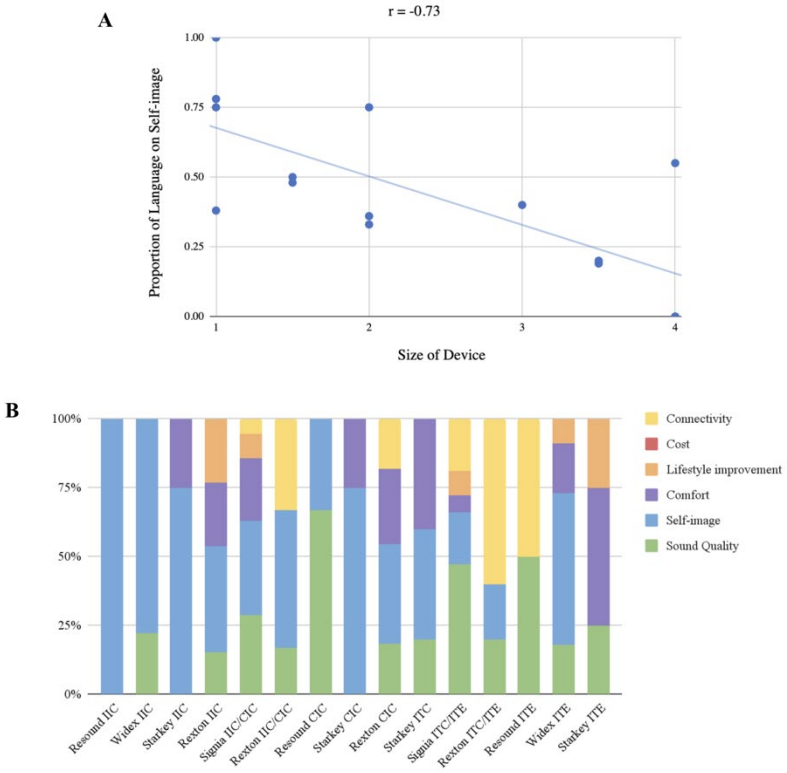

Figure 3. Proportion of Consumer Concerns in Website Marketing Language Based on the Size of the Device. Figure 3A, indicates a strong negative correlation between the proportion of language on self-image and the size of the hearing aid. Figure 3B, depicts the concern hierarchy for each individual subpage analyzed, with the smallest devices on the far left and the largest devices on the far right.

As seen in Figure 3B, the smallest devices that sit deep within the ear canal are called invisible-in-canal and focused almost exclusively on the small appearance and discreet nature of the device. For instance, Resound had a proportion of 1.0 and discussed this concern exclusively for the product. As the size of the device increased, such as the next smallest completely-in-canal, the focus shifted with an increased proportion to sound quality and less on appearance, but again Bluetooth capabilities were still absent as the module was too small to fit it. Language for these larger in-the-canal and in-the-ear styles, still focused primarily on self-image but as the size increased, a greater emphasis was placed on connectivity, comfort, and sound quality. Larger devices that sit fully within the concha, the opening depression of the ear, are larger and more noticeable than the small in-canal devices. The marketing language for these styles did not discuss self-image and focused entirely on other factors such as sound quality or connectivity as more advanced technology is able to fit in the larger devices.

Based on the average across all websites, the hierarchy of concerns for Inside Ear marketer generated content, what the brands believed to be the most crucial concerns for consumers, were self-image, sound quality, fit, connectivity, lifestyle improvement, and cost. In reminder, the hierarchy of Tampa Bay consumer concerns identified in this study was: cost, self-image, fit, sound quality, lifestyle improvement, and connectivity. To understand if these two hierarchies align enough for consumer concerns to be effectively addressed by marketing language, a hypothesis test for association needed to be conducted.

Wilcoxon Signed Rank Test Analysis

As established by Strebinger and Rusetski, the nature of website content analysis will result in the skewness of the data that shifts the distribution out of normality, removing the potential of utilizing a t-distribution to test for association (290). Instead, a nonparametric hypothesis test such as the two-tailed Wilcoxon Signed Rank Test that does not depend on a normal or t-distribution, must be utilized (Strebinger and Rusetski 290). The unequal sample sizes of the website and survey do not factor into this test (Strebinger and Rusetski 291).

Table 7. Null and Alternative Hypotheses

H_1 ***Null Hypothesis***	**No difference** in mean value for concerns between website marketing and survey participants.
H_2 ***Alternate Hypothesis***	**Difference** in mean value for concerns between website marketing and survey participants.

Before conducting the test, a null hypothesis and alternate hypothesis must be developed (see table 7). The goal of the test is to reject or fail to reject the null hypothesis. The null hypothesis, H_1, for this study, is that there is no difference in the mean value for concerns between the marketing language and survey participants. This means that brands aligned concerns with consumers. While the alternative hypothesis, H_2, is that there is a difference in the mean value for concerns between the methods. This means that brands did not align concerns with consumers.

The nature of this test establishes paired measurements based on the concern. This means that the Wilcoxon Signed Rank Test identifies if there is a difference in the mean value for each individual concern such as by comparing sound quality in the website marketing language versus the consumer survey. The sample size, n, for this study is the number of consumer concerns, six. At the end of the test, if the null hypothesis fails to be rejected, then the marketing language effectively aligned with consumer concerns in Tampa Bay. If the null hypothesis is rejected, then the marketing language ineffectively addressed consumer concerns in Tampa Bay.

Table 8. Wilcoxon Signed Rank Test Results For rank, 1 represents the lowest difference and 6 represents the greatest difference.

	Website Marketing	**Survey Participants**	**Paired Difference**	**Absolute Difference**	**Rank (sign)**
Cost	0	97	-97	97	6 (-)
Self-Image	76	53	23	23	5 (+)
Sound Quality	52	37	15	15	3 (+)
Fit	34	30	4	4	1 (+)
Lifestyle Improvement	12	20	-8	8	2 (-)
Connectivity	25	8	17	17	4 (+)

For each concern pair, the difference between the website marketing and survey participants was calculated (see table 8). The sign, whether positive or negative, is vital to the Wilcoxon Signed Rank Test, in determining effectiveness. The absolute difference for each pair was then calculated. The lowest absolute difference was given the rank of 1 and then subsequently, each value was ranked, with the greatest absolute difference given the rank of 6. These ranks were then determined by analyzing the paired difference to be a positive rank or a negative rank.

The sum of all the positive ranks, W+, was calculated, for a value of 13 (see table 9). The sum of all the negative ranks, W-, was also calculated, for a value of 8. The lower of the two sums is then utilized as the test statistic, so W has a value of 8. Following the precedent of Strebinger and Rusetski, a significance level, a = 0.05, was used to determine the Wilcoxon critical value. For a two-sided test with a sample size of 6 and a significance level of 0.05, the Wilcoxon critical value, W*, would be 0. If the test statistic is less than or equal to the critical value, $W \leq W^*$, then the null hypothesis is rejected. Since, the test statistic exceeds the critical value, $8 > 0$, the null hypothesis fails to be rejected. This means that the marketing language overall effectively aligned with consumer concerns in Tampa Bay. However, upon further examination of each matched pair, a major discrepancy in the absolute differences for certain pairs limits the overall effectiveness of the marketing language.

Table 9. Wilcoxon Signed Rank Test Summary

W-	8
W+	13
W	8
W*	0
Decision	$W > W^*$ $8 > 0$ Since the test statistic exceeds the critical value, we **fail to reject the null hypothesis.**

The highest two ranks, those with the most significant differences between the website marketing and consumer survey for each concern, were the most significant concerns for consumers (see table 10). This means that the marketing language did not address the two most important concerns of cost and self-image, for consumers effectively. The largest barrier, that impacted 49% of all consumers in the survey, was cost and yet, this was addressed in none of the marketing language. This represented the largest rank and was negative as it did not address the concern. The second most significant concern was self-image, and the marketing language did fully address this concern, as indicated by the positive rank. However, the large absolute difference and high rank indicate that the marketer-generated content overemphasized this and did not align with the actual concerns of consumers.

Table 10. Effectiveness of Website Marketing in Addressing Consumer Concerns

Consumer Concerns	Effective
1. Cost	
2. Self-image	
3. Fit	X
4. Sound Quality	X
5. Lifestyle Improvement	X
6. Connectivity	X

As such, the website marketing language was only moderately effective in addressing the hierarchy of consumer concerns in Tampa Bay, as it did not address the two most significant concerns effectively.

Discussion

Fulfillment of the Gap

This cross-sectional study fulfills multiple gaps in the current literature. The survey method sought to clarify ambiguity in the literature regarding whether cost or self-image was a more significant concern for consumers. This formed the basis of the study and generated a new understanding through the development of a clear hierarchy of consumer concerns for Tampa Bay: cost, self-image, fit, sound quality, lifestyle improvement, and connectivity (see figure 1).

Furthermore, no previous study evaluated the effectiveness of website marketing language in addressing concerns, despite the low application rate in the United States and distribution for OTC. Utilizing the clear hierarchy generated by this study, an analysis of the website marketing language could be conducted.

Conclusion

The current website marketing language does not effectively meet the concerns of Tampa Bay consumers. The sites were only moderately effective because the most significant concern (49%) of cost was addressed in none of the language. While the language effectively addressed four concerns, the two most significant concerns were ineffectively addressed. Only 12% of all consumers conducted research with the marketing materials or website language, indicating that few even read the language analyzed.

Yet, the results also indicated that the low application rate of hearing aids can be attributed to other stakeholders beyond the marketers including consumers and hearing professionals. 13% of consistent users visited the website or marketing materials compared to 6% for discontinued users, indicating that consumers need to conduct greater research to make informed decisions (see table 3). Furthermore, discontinued users (50%) were more likely than consistent users (38%) to have only been given one option by professionals. As such, by giving more options, the likelihood of consistent or inconsistent use increases.

Implications

The current website marketing language should be refined to emphasize cost, the most significant concern for consumers, and de-emphasize the importance of self-image. With Over-the-Counter hearing aids depending solely on website distribution, it is crucial the marketing language aligns with consumer concerns.

As consumers were significantly concerned about the cost of devices, the affordable nature of OTC hearing aids may be highly attractive to new users. Yet, the current low visit rate in Tampa Bay to brand websites may be an obstacle to the success of these new devices.

Limitations

This study has a lower average age than the previous literature and may not be reflective of the entire population in Tampa Bay. To simulate OTC distribution, participants received the survey via online sources, however, respondents that are uncomfortable with technology or in retirement homes may have been excluded. Thus, the non-response bias could have influenced the younger age metric. However, like much of the existing literature, this was considered the ideal distribution despite the limitations.

The survey did not ask consumers about the severity of their hearing loss. It was assumed that any individual with hearing loss who had tried hearing aids in the past was suitable.

Furthermore, to conduct the website content analysis there was only a single coder who analyzed the marketing language, and as such a lack of inter-reliability checks. These reliability checks between multiple coders serve to verify the coding guidelines and to ascertain an accurate measure of the analysis. To minimize this risk, strict coding guidelines were implemented. But the generalizations made from this study must be limited.

Areas of Future Research

As this study only focused on Inside Ear subpages, evaluating Outside Ear subpages could generate a more nuanced understanding of the effectiveness of website marketing and if the hierarchy of concerns within the language shifts depending on the style.

Additional comments by respondents revealed a lack of concern for some consumers toward purchasing hearing aids as they have dealt with hearing loss since birth and always relied on the devices. Since the severity of hearing loss was not considered, greater research could reveal that the hierarchy of consumer concerns shifts depending on severity. This is crucial for brands to understand so that they can adjust language for more powerful amplification devices to match a potentially different hierarchy of concerns.

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