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DIRECT-MAIL HEARING AIDS

Survey of direct-mail hearing aids suggests
higher-than-expected value to consumers

A Solution for Music Listeners 28

2013 Dispenser Metrics Survey, Part 2 32

Hearing Loss and Dementia 42

A Comparison of Consumer Satisfaction, Subjective Benefit, and Quality of Life Changes Associated with Traditional and Direct-mail Hearing Aid Use

BY SERGEI KOCHKIN, PhD

A survey involving customers of one of the largest and longest-established US direct-mail hearing aid companies reveals surprising data on benefit, satisfaction, and value. Overall, it shows that consumers are willing to make trade-offs in benefit for substantial reductions in price. The direct-mail hearing aids in this survey delivered “about average” real-world benefit, but significantly less real-world benefit than hearing aids dispensed by those professionals who adhere to the highest levels of best practices.

In the last national consumer study of the United States hearing aid market (MarkeTrak VIII database),¹ 3.28% (280,000 people) of hearing aid owners indicated they received their hearing aids through the mail. In the 2004-2008 surveys, 5.1% of first-time users of hearing aids were by direct-mail.² Within the last few years, one would expect that direct-to-consumer hearing aids (direct-mail and over the counter or OTC) have grown even more, given the number of products offered in big-box stores (eg, Walmart, Sam’s Club) as well as the Internet sites devoted to this product segment. These products vary from one-size-fits-all (analog and digital) to fully programmable digital when the consumer supplies their audiogram. Some companies even provide the consumer with an earmold impression kit through the mail, allowing the consumer to customize their hearing aid shell.

Little is known about the consumer of direct-mail hearing aids. MarkeTrak VIII¹ contained a small sample of 187 direct-mail consumers. The results suggested that direct-mail hearing aid purchasers: were more likely to be male, had significantly lower household income, were less likely to be a college graduate, had hearing loss profiles similar to the traditional hearing aid user, were less likely to purchase binaural, on average paid out-of-pocket costs that were about 17% of traditional hearing aids, and wore their hearing aids less.

From a consumer experience perspective, we know virtually nothing about their satisfaction with the product, their behaviors (ie, Do they use them and would they recommend them to their friends?), their perceived benefit (ie, Do they experience reduced hearing handicap in the environments important to them?), and quality of life changes associated with their usage of this product (ie, Do they improve their lives socially, mentally, emotionally, or physically?). One 2009 clinical study³ on two consumers comparing hearing aids fitted through the mail (and tested over the Internet) versus

professionally fitted in a clinic concluded that the clinic provided a superior ear-impression and prescriptive fitting. Another case study on one consumer raised concerns about the safety of direct-mail hearing aids following the discovery of a “sleeve” found in a consumer’s ear, who also had a history of otitis media; yet the authors failed to determine that this individual was a direct-mail hearing aid consumer or quantify their safety concerns.⁴

In a recent study⁵ conducted at the Michigan Ear Institute on 9 consumers and presented at the 2012 American Academy of Otolaryngology-Head & Neck Surgery Foundation (AAO-HNSF), it was demonstrated that a behind-the-ear (BTE) hearing aid sold by direct mail offered a reasonable low-cost hearing solution to those who are not using hearing aids or other amplification devices because of cost concerns. The researchers found that the hearing aid met the acoustic targets. In addition, all participants demonstrated user satisfaction scores that were within the standard range for consumers with mild to moderately-severe hearing loss.

In one of the few clinical studies⁶ on 15 consumers, the researchers compared the real-ear response provided by traditional hearing aids to the closest matching fixed-format disposable hearing aids in consumers with precipitous high-frequency hearing loss. The results revealed that relatively close approximations to the real-ear aided responses of the traditional hearing aids were possible for most participants. No significant differences in mean performance for aided speech recognition or field ratings of aided performance were found. Patient satisfaction was lower for disposable hearing aids probably due to fit and comfort and deep insertion of the hearing aid.

As indicated, our clinical knowledge of direct-mail or OTC hearing aids is based on fewer than 30 consumers and our consumer knowledge is based on fewer than 200 subjects (with only demographic information on the subjects for the latter).



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ket Research at Knowles Electronics, a supplier of components to the hearing aid industry.

Objectives

The purpose of this study is to expand our knowledge of the hard-of-hearing population who are the users of direct-mail hearing aids. Specifically, it explores the nine issues comparing a large sample of direct-mail consumers versus a nationally representative sample of traditional hearing aid consumers who had owned their hearing aids from 6 months to 3 years:

- 1) Demography;
- 2) Hearing loss characteristics;
- 3) Factors influencing first-time purchase;
- 4) Behavioral outcomes including hearing aid usage patterns, whether they would recommend hearing aids and repurchase their hearing aid;
- 5) Detailed consumer satisfaction ratings on benefit, value, product features, sound quality, and the hearing health professional or direct-mail firm staff;
- 6) Multiple environmental listening utility (MELU);
- 7) Estimates of the ability of the hearing aid to reduce their hearing handicap;
- 8) Quality of life changes that the consumer attributes to their use of a hearing aid; and
- 9) Positioning of direct-mail hearing aids within the traditional market based on degree of best practices used in fitting the hearing aid.

In this paper, the term *traditional hearing aid fittings* specifically refers to the fact that the hearing aids were prescriptively fitted in-person in an office or clinic by an audiologist or hearing instrument specialist to compensate for a consumer's hearing loss. The author is not referring to the earmold, since the hearing industry in recent years has moved away from custom earmolds in favor of small thin-tube open-fit or receiver in the canal (RIC) BTE hearing aids,⁸ and about one-quarter (26%) of hearing aids in the direct-mail sample used what would be viewed by professionals as "custom earmolds."

Method

The author developed a tracking survey of the hard-of-hearing population and hearing aid market in 1988 titled MarkeTrak. The MarkeTrak survey was administered periodically, with six extremely detailed surveys being conducted in 1991, 1994, 1997, 2000, 2004, and 2008. The latter two surveys

were conducted while at the Better Hearing Institute, Washington, DC. The methodology has never varied from the 2008 survey method described below.

Over the 20-year period of this tracking survey, various items were included in each survey to research specific issues about hard-of-hearing persons or hearing aids. The full body of research emanating from this longitudinal survey currently resides on the Better Hearing Institute website (www.betterhearing.org/publications).

The present study compares data from MarkeTrak surveys (normative sample) and from a recent survey of direct-mail hearing aid users.

Normative sample (MarkeTrak). In November and December 2008, a short screening survey was mailed to 80,000 members of the National Family Opinion (NFO) panel. The NFO panel consists of households that are balanced to the latest US Census information with respect to market size, age of household, size of household, and income within each of the 9 census regions, as well as by family versus non-family households, state (with the exception of Hawaii and Alaska), and the nation's top 25 metropolitan statistical areas. The screening survey, which was completed by close to 47,000 households, helped identify consumers who were hearing aid owners. In January 2009, an extensive 7-page survey was sent to the total universe of hearing aid owners in the panel database; 3,174 completed surveys were returned representing an 84% response rate. It should be noted that this unusually high response rate to such a lengthy survey is partly due to the fact that the panel was recruited to specifically participate in surveys for incentives and the topic, hearing loss and hearing aids, was specifically targeted to people who had previously admitted to their hearing loss.

The data presented in this normative sample refer only to households as defined by the US Bureau of Census; that is, people living in a single-family home, duplex, apartment, condominium, mobile home, etc. Institutionalized people living in institutions are not included in this sample. The full MarkeTrak survey can be found on the BHI website.⁷

Including hearing aids prescriptively fitted only through traditional channels (direct mail were excluded) within the time frame of 6 months to 3 years, the resulting sample size

was 1,721. During this time frame, approximately 94% of the hearing aids sold were digital and 6% analog.⁸

Direct-mail sample. A nationally representative sample of all direct-mail consumers is not available and would be extremely difficult to obtain. Thus, the direct-mail consumers studied were the customers of Hearing Help Express, DeKalb, Ill, which claims to be the largest US direct-mail hearing aid firm, with close to 30 years of experience. The firm provided the author with the complete population of customers (anonymous ID# in an Excel file) who purchased hearing aids in the previous 6 months to 3 years as of July 2013. In turn, a random sample of consumers was selected and the customer IDs were supplied to Hearing Help Express, which then mailed out a 6-page MarkeTrak-type survey to these randomly selected customers. To motivate participation, the envelope was clearly labeled as a hearing aid satisfaction survey (versus a direct-mail catalog), and the letter from the Chairman of the Board of Hearing Help Express did not solicit favorable responses. He also assured consumers that their surveys were completely anonymous and would be processed and analyzed by completely independent sources. A free package of batteries was offered as an incentive to participate in the survey.

The surveys were returned to Hearing Help Express and then delivered unopened to a data entry firm in the Chicago area. Under no circumstance were the surveys viewed by Hearing Help Express, and at no time did Hearing Help Express participate in the processing, data entry, or analysis of the data. All surveys were confidential. The battery incentive card included in the returned envelopes was delivered by the data processing firm to Hearing Help Express for redemption. A notarized letter confirming the anonymity and integrity of the data entry process is on record with the author and with Hearing Help Express.

Considering usable surveys, the sample size achieved was 2,332, representing a 16% return rate. It should be noted in 15 years of household political polling, mail surveys with a 20% response were shown to be more accurate than telephone surveys with a 60% response rate. In addition, extraordinary efforts (follow-up, pre-notification, incentives) to increase response rates in a telephone survey from 36% to 61% yielded virtually identical results in one study in 1997. A replication of this study in 2003 yielded the same results. A meta-analysis of

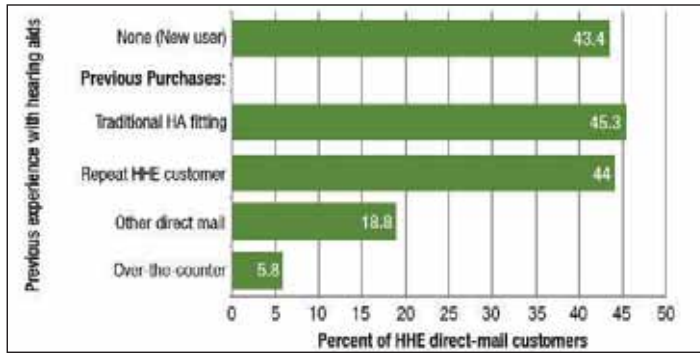


Figure 1. Direct-mail survey respondents: hearing aid purchase experience.

Demography	Direct-mail Hearing aids (n=2332)	Traditional Hearing aids (n=1721)	Difference	Significance of Differences
Gender (%)				
Male	73.6	59.2	14.4	p<.0001
Female	26.4	40.8	-14.4	
Age distribution (%)				
18-34	0.1	1.8	-1.7	p<.0001
35-44	0.1	2.4	-2.3	
45-54	1.3	5.4	-4.1	
55-64	7.1	13.5	-6.4	
65-74	22.8	26.2	-3.4	
75-84	43.5	33.4	10.1	
85+	25.1	17.3	7.8	
Mean	77.9	72.4	5.5	
Median (50%)	79.0	75.0	4	
Mode (% most frequent age)	82.0	76.0	6	
Household income distribution (%)				
<\$26k	38.1	23.9	14.2	p<.0001
\$26-49k	35.5	37.4	-1.9	
\$50-74k	16.5	13.3	3.2	
\$75-99k	5.5	13.2	-7.7	
\$100k or more	4.3	12.2	-7.9	
Employment (%)				
Retired	81.6	70.7	10.9	p<.0001
Full time	6.4	14.1	-7.7	
Part time	3.7	4.3	-0.6	
Unemployed	0.7	1.3	-0.6	
Homemaker	2.9	4.3	-1.4	
Disabled/medical	2.1	4.2	-2.1	
Other	2.5	1.0	1.5	
Education (%)				
Elementary graduate	5.9	1.5	4.4	p<.0001
Some high school	10.9	4.9	6.0	
High school graduate	33.3	25.3	8.0	
Some college	21.6	25.3	-3.7	
College graduate - AA degree	6.3	8.0	-1.7	
College graduate - Bachelors	11.3	19.3	-8.0	
Graduate degree	10.7	15.7	-5.0	
Marital Status				
Married	62.5	63.8	-1.3	p<.0001
Never Married	3.1	7.2	-4.1	
Divorced/widow/separated	34.4	28.9	5.5	
Hearing Aid Information				
First-time user (%)	43.4	47.3	-3.9	p<.01
Binaural (%)	55.3	78.0	-22.7	p<.0001
Style of hearing aid worn (%)				
BTE - ear mold or ear tip	37.8	21.2	16.6	p<.0001
BTE - thin tube	20.6	23.6	-3.0	
ITE - full	3.6	8.3	-4.7	
ITE - partial	7.8	7.5	0.3	
ITC - visible	24.0	29.0	-5.0	
ITC - invisible	6.2	10.4	-4.2	
Price paid per hearing aid (\$)*				
Mean (average)	389	1495	-1106.0	p<.0001
Median (50%)	299	1500	-1201.0	
Hearing aid experience (years)				
Mean (average)	14.2	9.6	4.6	p<.0001
Median (50%)	10	4	6.0	
Mode (% most frequent years)	3	2	1.0	

Table 1. Demography of owners of direct-mail and traditional hearing aids. Difference in practical significant (≥10 percentage points) noted by colored cells. Green = in favor of direct-mail; blue = in favor of traditional. *Includes free custom hearing aids from VA.

previous survey research has shown that higher response rates do not necessarily reduce bias in the survey, and that response rates have at most a modest effect on survey accuracy.⁹⁻¹¹

Hearing Help Express offers a full line of hearing aids: ITC, ITE, power BTE, and thin-tube BTE with a range of full-on gain of 17-66 dB and maximum SSPL90 range of 103-131 dB. During this time frame, approximately 95% of the hearing aids sold were analog and 5% digital. In addition, 26% of the hearing aids had custom earmold impressions provided by the consumer through the mail. All products had a volume control and frequency response consistent with the most common hearing aid fittings. Some had high-and low-cut tone controls, MPO adjustments, a telecoil, directional microphones, and pre-programmed acoustic settings that the consumer could switch manually, depending on the listening situation. Consumers received a catalog with information to help them self-assess the amount of amplification they needed together with suggested hearing aids corresponding to needed amplification. Customers self-selected their preferred hearing aid style, features, and price. Each customer received instruction manuals for their hearing aid that included directions for adapting to the hearing aid. All customers had essentially unlimited access to licensed hearing aid dispensers for recommendations, and all received a “free home trial” and 100% money-back guarantee.

Demography

Table 1 documents the demography of the direct-mail and traditional hearing aid consumer samples. The direct-mail consumer is more likely to be male (73.6% versus 59.2%), is older on average by 5.5 years, and more likely to be 75 years or older (68.6% versus 50.7%). The direct-mail consumer is also more likely to be retired (81.6% versus 70.7%), to have a household income less than \$26,000 (38.1% versus 23.9%), and more likely to have an education of high school graduate or less (50.1% versus 31.7%).

A total of 43.4% of direct-mail hearing aid users are first-time users, compared to slightly more than 47% for traditional hearing aid users. Nearly half of direct-mail customers were previous traditional hearing aid users (45.3%), 5.6% had previously tried over-the-counter hearing aids, and about one-fifth (18.8%) were previous customers of other direct-mail firms (Figure 1). The direct-mail

consumer has been a hearing aid user significantly longer than the traditional hearing aid user (14.2 versus 9.6 years).

The main style of hearing aid used by direct-mail customers is the larger BTE hearing aid with an earmold or eartip (37.8% versus 21.2%). Considering slim-tube BTEs, nearly 6 out of 10 direct-mail consumers use BTE hearing aids compared to nearly 45% for the traditional users; however, since this 2008 MarkeTrak data was published, traditional hearing aid dispensers now fit far more BTEs, including slim-tube and receiver-in-the-canal, than any other style (73.5% in Q3 2013). The direct-mail consumer is more likely to purchase one hearing aid (45%) than the traditional hearing aid consumer (22%). The median out-of-pocket cost per hearing aid for the direct-mail customer is \$299 compared to \$1,500 for the traditional user; the latter price includes discounts due to third-party pay and free hearing aids from the Veterans Administration.

Hearing Loss Demography

Table 2 compares the subjective degree of hearing loss of direct-mail and traditional hearing aid users. Subjective measures of hearing loss captured in the MarkeTrak survey are described in the last MarkeTrak survey² and rely on: the number of ears impaired (1 or 2), score on the 8-point Gallaudet Scale,¹² subjective hearing loss score (mild to profound), difficulty hearing in noise (a 5-point scale based on the work of Plomp¹³), and the BHI Quick Hearing Check based on the revised American Academy of Otolaryngology-Head & Neck Surgery (AAO-HNS) 5-minute hearing test.^{14,15}

Direct-mail hearing aid owners are less likely to report having a bilateral loss (82.9% versus 88.5%), are more likely to have a perceived loss of severe to profound (45.6% versus 38.2%), have more difficulty hearing normal speech across a room without visual cues (71% versus 62%), have equal difficulty hearing in noise (“quite difficult” to “extremely difficult”), and are more likely to score in the top quartile (75th percentile) of the BHI Quick Check (58.8% versus 44.4%). Their estimated pure-tone average (predicted from the BHI Quick Check hearing check¹⁵) is 54.6 dB compared to 52.5 dB for the traditional consumer. They are also roughly equivalent in terms of the years they waited to get hearing aids once they learned of their hearing loss (median years = 4 and 3, respectively).

In Table 3, the direct-mail and traditional first-time users are compared on 22 factors

Hearing loss Measure	Direct-mail Hearing aids (n=2332)	Traditional Hearing aids (n=1721)	Difference	Significance of Differences
Ears impaired (%)				
Unilateral loss	17.1	11.5	5.6	p<.0001
Bilateral loss	82.9	88.5	-5.6	
Perceived loss (%)				
Mild	5.6	7.2	-1.6	p<.0001
Moderate	48.8	54.6	-5.8	
Severe	39.4	34.8	4.6	
Profound	6.2	3.4	2.8	
Gallaudet Scale (%)				
Hear whisper	3.5	6.3	-2.8	p<.0001
Hearing normal speech	25.5	31.8	-6.3	
Hear shouts	53.8	47.1	6.7	
Hear shout better ear	11.5	8.3	3.2	
Tell speech from loud noise or worse	5.7	6.5	-0.8	
Difficulty hearing in noise (%)				
Extremely difficult	31.7	34.3	-2.6	n.s.
Quite difficult	34.2	31.0	3.2	
Somewhat difficult	23.4	25.6	-2.2	
Slightly difficult	9.3	7.8	1.5	
Not at all difficult	1.4	1.3	0.1	
BHI Quick Hearing Check (%)				
Quartile 1	3.4	8.2	-4.8	p<.0001
Quartile 2	10.2	17.4	-7.2	
Quartile 3	27.6	30.0	-2.4	
Quartile 4	58.8	44.4	14.4	
Est. dB loss 5 PTA both ears	54.6	52.5	2.1	p<.0001
Years aware of hearing loss				
Mean (average)	6.6	6.6	0.0	n.s.
Median (50th percentile)	4	3	1.0	
Mode (Most frequent response)	2	1	1.0	

Table 2. Hearing loss characteristics of owners of direct-mail and traditional hearing aids. Difference in practical significant (≥10 percentage points) noted by colored cells. Green = in favor of direct-mail; blue = in favor of traditional.

Influencing factors	Percent			Significance of Differences
	Direct-mail Hearing aids (n=979)	Traditional Hearing aids (n=779)	Difference	
Hearing loss got worse	47	53	-6	p<.0001
Family members	57	51	6	p<.0001
Audiologist	21	30	-9	p<.0001
Ear doctor	13	17	-4	n.s.
Hearing aid specialist	8	10	-2	n.s.
Hearing aid owner	22	8	14	n.s.
Received free hearing aid	2	7	-5	p<.0001
Family doctor	5	5	0	n.s.
Price of hearing aid	61	5	56	p<.0001
Safety concerns	13	5	8	p<.0001
Direct mail	25	3	22	p<.0001
Financial situation improved	4	3	1	n.s.
Boss or co-worker	8	2	6	p<.0001
Advertisement - newspaper	7	3	4	p<.001
Hearing loss literature	23	3	20	p<.0001
Advertisement - television	10	1.3	8.7	p<.0001
Advertisement - magazine	26	0.3	25.7	p<.0001
Internet	2	0	2	p<.0001
Telemarketing phone call	1	0.5	0.5	n.s.
Celebrity	1.1	0.1	1	n.s.
Advertising radio	0.8	0	0.8	n.s.
Better Hearing Institute	3	0.5	2.5	p<.0001

Table 3. Factors influencing first-time hearing aid users to purchase hearing aids. Difference in practical significant (≥10 percentage points) noted by colored cells. Green = in favor of direct-mail; blue = in favor of traditional.

Behavioral outcome	Direct-mail Hearing aids	Traditional Hearing aids	Difference	Significance of Differences
Hearing aid usage (hours per day)				
In the drawer (0 hours)	3.0	8.2	-5.2	p<.0001
Infrequent (<1 hour)	9.2	8.1	1.1	
Light (2-4 hours)	15.8	11.5	4.3	
Moderate (6-9 hours)	14.3	11.9	2.4	
Heavy (10-14 hours)	36.7	32.0	4.7	
Very heavy (15+ hours)	20.9	22.4	-1.5	
Average hours per day	9.5	9.3	0.2	n.s.
Recommendations (%)				
Would recommend hearing aids	91	82	9	p<.0001
Would recommend HHP/DM staff	84	75	9	p<.0001
Would repurchase brand of HA	55	47	8	p<.0001

Table 4. Behavioral outcomes: owners of direct-mail and traditional hearing aids. Difference in practical significant (≥10 percentage points) noted by colored cells. Green = in favor of direct-mail; blue = in favor of traditional.

that influenced their hearing aid purchase. Focusing only on the most important differences (10 percentage point differences or more), the direct-mail consumer is more likely to be influenced by the price of the hearing aid (61% versus 5%), magazine advertisements (26% versus .3%), direct-mail pieces (25% versus 3%), hearing loss literature (23% versus 3%), and the opinions of other hearing aid owners (22% versus 8%).

Results

Behavioral outcomes. Four behavioral variables were surveyed and are documented in Table 4: How often the person wears their hearing aid in a typical day and whether they recommend hearing aids, the person who fitted their hearing aid, and whether they would repurchase their current brand of hearing aid.

Direct-mail and traditional hearing aid

owners both wear their hearing aids on average more than 9 hours per day. Although none of the factors rise above our 10 percentage point criterion, the data suggest that the direct-mail owner is slightly less likely to place their hearing aid in the drawer (3% versus 8.2%), and more likely to recommend hearing aids to others (91% versus 82%), recommend the professionals at the direct-mail firm over a licensed dispenser (84% versus 75%), and have

Overall Satisfaction	% Satisfaction			Mean Scores			
	Direct-mail Hearing aids	Traditional Hearing aids	Difference	Direct-mail Hearing aids	Traditional Hearing aids	Difference	Significance of Differences
Overall satisfaction	81	78	3	5.4	5.3	0.1	n.s.
Benefit	89	86	3	5.7	5.7	0	n.s.
Value	79	65	14	5.5	5	0.5	p<.0001
Product Features							
Ease/battery change	88	89	-1	5.9	5.9	0	n.s.
Fit/comfort	83	87	-4	5.2	5.8	-0.6	p<.0001
Ease of insertion/removal from ear	84	85	-1	5.6	5.7	-0.1	p<.001
Reliability	81	80	1	5.5	5.6	-0.1	n.s.
Visibility	70	78	-8	5.3	5.6	-0.3	p<.0001
Length of trial period	83	77	6	5.8	5.7	0.1	p<.0001
Frequency of cleaning	78	77	1	5.4	5.4	0	n.s.
Battery life	82	72	10	5.4	5.1	0.3	p<.0001
Warranty	67	67	0	5.1	5.2	-0.1	n.s.
On-going expense	71	67	4	5.3	5.3	0	n.s.
Ease/volume adjustment	76	60	16	5.3	5	0.3	p<.0001
Sound Quality/Signal Processing							
Clearness tone/sound	77	77	0	5.2	5.3	-0.1	n.s.
Sound of voice	74	73	1	5.3	5.3	0	n.s.
Natural sounding	72	71	1	5.2	5.2	0	n.s.
Directionality	70	71	-1	5	5.1	-0.1	n.s.
Able to hear soft sounds	60	68	-8	4.6	4.9	-0.3	p<.0001
Whistling/feedback/buzzing	66	69	-3	4.9	5.1	-0.2	p<.0001
Richness of sound/fidelity	64	68	-4	4.9	5.1	-0.2	p<.0001
Comfort with loud sounds	60	67	-7	4.7	4.9	-0.2	p<.0001
Chewing/swallowing sound	62	63	-1	5	5	0	n.s.
Use in noisy situations	54	60	-6	4.4	4.6	-0.2	p<.0001
Wind noise	52	57	-5	4.5	4.6	-0.1	p<.001
Hearing Health Professional or DM Staff							
Professionalism	92	93	-1	6.2	6.3	-0.1	p<.0001
Knowledgeable	90	94	-4	6.1	6.3	-0.2	p<.0001
Explain care of hearing aid	90	94	-4	6	6.3	-0.3	p<.0001
Explain hearing aid expectations	86	91	-5	5.8	6.1	-0.3	p<.0001
Quality of service - during fit	76	93	-17	5.7	6.3	-0.6	p<.0001
Quality of service - post fit	84	89	-5	5.8	6.1	-0.3	p<.0001
Hours of operation	83	88	-5	5.8	6	-0.2	p<.0001
Empathy demonstrated	83	91	-8	5.8	6.2	-0.4	p<.0001
Listening Situations							
One-on-one	91	91	0	5.8	5.9	-0.1	p<.01
Small groups	82	85	-3	5.3	5.6	-0.3	p<.0001
T.V.	75	80	-5	5.1	5.5	-0.4	p<.0001
Outdoors	77	78	-1	5.2	5.4	-0.2	p<.001
Listening to music	70	79	-9	5.1	5.5	-0.4	p<.0001
Leisure activities	68	78	-10	5.1	5.4	-0.3	p<.0001
While shopping	70	77	-7	5.1	5.4	-0.3	p<.0001
Car	70	76	-6	5	5.3	-0.3	p<.0001
Place of worship	68	74	-6	5	5.3	-0.3	p<.0001
Restaurant	69	75	-6	4.9	5.3	-0.4	p<.0001
Telephone	63	73	-10	4.8	5.2	-0.4	p<.0001
Concert/Movie	62	72	-10	4.8	5.2	-0.4	p<.0001
Cell phone	59	69	-10	4.7	5.1	-0.4	p<.0001
Recreation and exercise	59	68	-9	4.9	5.2	-0.3	p<.0001
Large group	59	78	-19	4.6	4.9	-0.3	p<.0001
At sports events	60	66	-6	4.9	5.1	-0.2	p<.0001
Workplace	60	65	-5	4.9	5.2	-0.3	p<.0001
School/classroom	52	59	-7	4.7	5	-0.3	p<.0001
While in bed	48	53	-5	4.7	4.9	-0.2	p<.001
MELU % - Median (50th %)				41	63	-22	p<.0001

Table 5. Consumer satisfaction with direct-mail and traditional hearing aids. Difference in practical significant (≥10 percentage points) or 1/2 of a Likert scale point noted by colored cells. Green = in favor of direct-mail; blue = in favor of traditional.

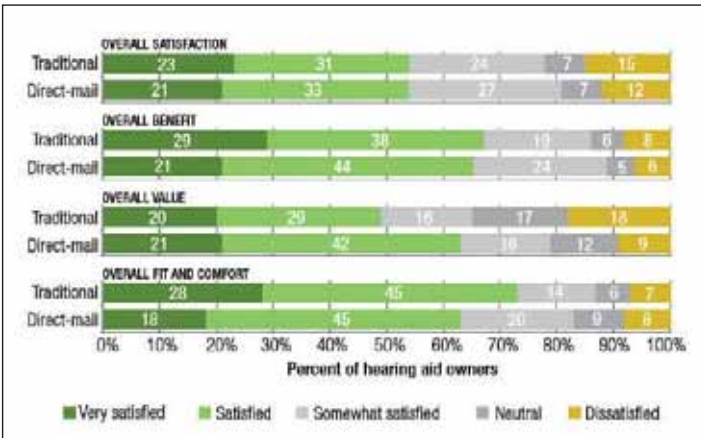


Figure 2. Consumer satisfaction on overall satisfaction, benefit, value, and fit & comfort comparing traditional and direct-mail hearing aids.

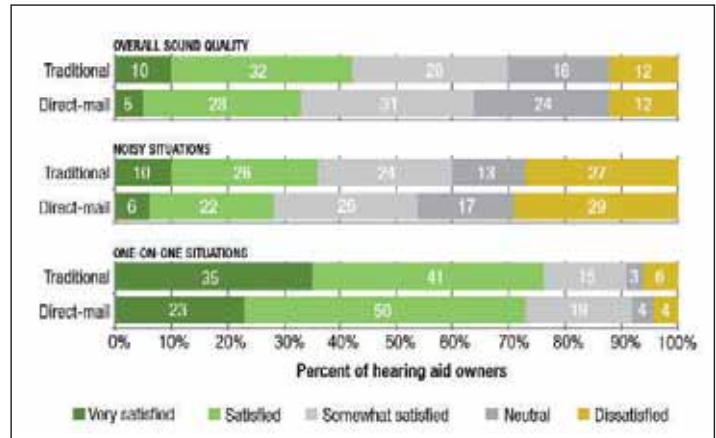


Figure 3. Consumer satisfaction on overall sound quality, performance in noise, and one-on-one situations comparing traditional and direct-mail hearing aids.

greater brand loyalty for their hearing aid than traditional consumers (55% versus 47%).

Consumer Satisfaction. Consumers were asked to rate their experience with their hearing aid on a 7-point Likert scale with scale points ranging from very satisfied (7) to very dissatisfied (1). Ratings were captured in 5 key areas: overall experience (3 factors), product features (11), sound quality and signal processing (11 factors), hearing health professional or DM staff (8), and multiple environmental listening utility or MELU (19 listening situations).

In Table 5 and Figure 2, direct-mail and traditional hearing aids are nearly equivalent on overall satisfaction and perceived benefit by the consumer. However, the direct-mail consumer rates their hearing aid significantly higher on value (79% versus 65%). Toward the end of this report, the author will demonstrate the value proposition as the amount of dollars the consumer paid for every percentage-point reduction in their hearing handicap.

With respect to product features, direct-mail and traditional hearing aids are statistically equivalent on ease of battery change, reliability, frequency of cleaning, warranty, and ongoing expense. Again focusing on practical significance (10+ percentage points or at least a 1/2 Likert scale point), traditional hearing aids receive higher ratings on fit & comfort (87% versus 83%, see Figure 2) while direct-mail hearing aids are rated higher on battery life (82% versus 72%) and ease of volume adjustment (76% versus 60%).

With respect to the all-important sound quality ratings, direct-mail and traditional hearing aids are statistically equivalent on clarity of tone/sound, sound of voice, natural

sounding, directionality (ability to localize sound), and sound of chewing/swallowing. While the traditional hearing aids are rated statistically higher on 6 factors, none of these differences is practically significant at the cut-off of 10 percentage points or more. The highest difference is seen on ability to hear soft sounds (+8%), comfort with loud sounds (+7%), and performance in noisy situations (+6%). The latter is graphed in Figure 3, where it can be seen nearly 30% of hearing aid users are dissatisfied with their direct-mail and traditional hearing aids in noisy situations. A factor analysis of the 11 sound quality variables revealed one underlying factor; thus, the average of these ratings is plotted in Figure 3 as “overall sound quality.” Traditional hearing aids are rated better overall on sound quality (70% versus 64%), but only by a margin of 6 percentage points, which is quite remarkable considering this is a digital-to-analog comparison.

The hearing care professional was rated statistically higher on all measures if the hearing aid was traditional versus direct-mail, with quality of service during the fitting process being most significant (93% versus 76%).

Multiple Environmental Listening Utility (MELU). People with hearing loss purchase hearing aids to enhance their ability to communicate in or enjoy many listening situations varying from one-on-one in quiet to noisy situations with many people (such as a family celebration) to musical appreciation. The utility of a hearing aid is its ability to help a hard-of-hearing person reclaim their ability to hear in as many listening situations as possible.

MarkeTrak measures satisfaction in 19

listening situations, only if the situation is important to the consumer. Table 5 documents consumer satisfaction in these 19 listening situations. *Traditional hearing aids are rated statistically higher in all 19 listening situations* and achieve practical significant ratings in five listening situations: large group (+19%), leisure activities, telephone, concert/movie, and cell phone (all +10%).

At the bottom of Table 5 are their respective MELU median percentages, with the sample distributions plotted in Figure 4. This measure indicates the percent of consumer-relevant situations in which the individual was “very satisfied” or “satisfied.” In the author’s opinion, a MELU figure quantifying situations where the consumer was satisfied or higher is most important, since “somewhat satisfied” has been shown earlier to be nearly equivalent to a “neutral” rating and contributes nothing to consumer loyalty.¹⁶ Traditional fittings are shown to be notably superior to direct-mail hearing aids on multiple environmental listening utility (63% versus 41%).

It should be noted, as shown in Figure 4, that for both direct-mail and traditional consumers the two biggest segments of consumers are those who report satisfaction in *all* listening situations and in *no* situations. In fact, more than 1 in 5 direct-mail consumers report little utility of the hearing aid in no situation using this rigorous metric (satisfied or very satisfied). A sizable portion (17%) of the traditional consumer segment reports poor utility using this metric.

Hearing handicap reduction. The consumer was presented with the 10 listening situations detailed in Table 6 and was asked

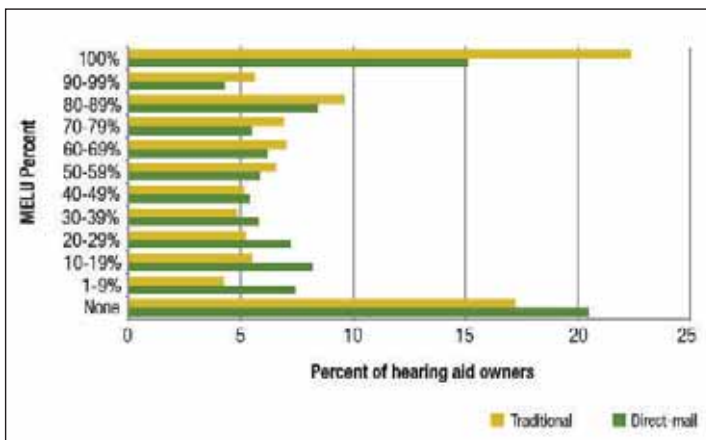


Figure 4. Distribution of MELU scores comparing direct-mail and traditional hearing aids. MELU is defined as the percent of situations where the consumer indicated they were satisfied or very satisfied in up to 19 situations important to them.

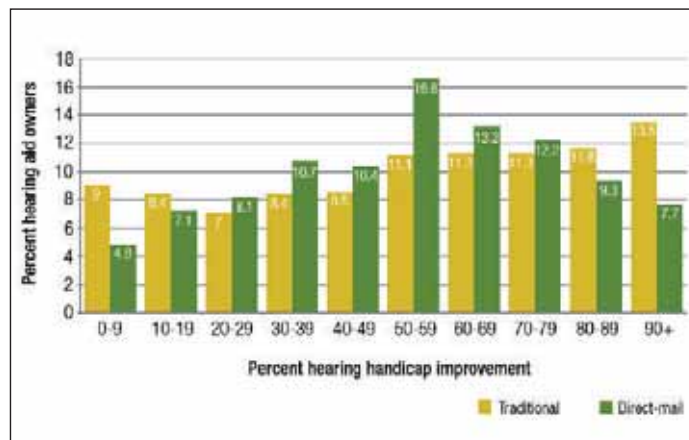


Figure 5. Hearing handicap improvement in percent comparing traditional and direct-mail hearing aid owners.

to rate them on a scale of 0% to 100% the “percent of time your hearing problem has been resolved due to the use of your hearing aids.” Participants were instructed not to respond if they did not participate in the particular listening situation.

A comparison of average handicap reduction in these 10 listening situations for direct-mail and traditional hearing aid consumers is documented in Table 6. A factor analysis of consumer perceptions of hearing handicap improvement in these listening situations determined that there was only one factor in the ratings. Thus, the average benefit score is also documented. Direct-mail hearing aids and traditional fittings provide equivalent benefit according to the consumer in business meetings, while watching TV, in places of worship, while talking on the telephone, in small gatherings, and while engaging in conversations in quiet. Traditional fittings are statistically superior in restaurants, at large public lectures, and in conversations on the street. Direct-mail hearing aid owners report higher ratings while listening to

music. But none of these differences exceeds a 7 percentage point differential. On average, consumers report that traditional fittings and direct-mail hearing aids reduce their hearing handicap slightly more than 50%, and only conversation in quiet approaches a 70% hearing handicap reduction.

Figure 5 shows the distribution of hearing handicap improvement for the traditional and direct-mail samples. It should be acknowledged that 17.4% of traditional consumers report trivial hearing handicap reduction (<20%) compared to 11.9% of direct-mail consumers. In contrast, 25.1% of traditional consumers experience spectacular hearing handicap reduction (>80%) compared to 17% of direct-mail consumers.

Quality of Life changes associated with hearing aid usage. With respect to quality of life (QOL), the consumer was asked to “rate the changes you have experienced in the following areas, that you believe are due to your hearing aids.” The 14 quality of life areas assessed were based on a 5-point scale from “a lot better” to “a lot worse”:

- 1) Emotional health
- 2) Mental ability-memory
- 3) Physical health
- 4) Relationships at home
- 5) Relationships at work
- 6) Social life
- 7) Feelings about yourself
- 8) Ability to participate in group activities
- 9) Sense of independence
- 10) Sense of safety
- 11) Confidence in yourself
- 12) Sense of humor
- 13) Romance in my life
- 14) Overall ability to communicate more effectively in most situations

In addition, the consumer was asked to rate how satisfied (7-point Likert scale) they were with the changes they have experienced in their life specifically due to hearing aid use. A factor analysis of the 14 quality of life factors yielded one factor. The range of QOL changes for the direct-mail sample ranged from a high of 66% for effectiveness of communication to a low of 22% for changes in physical health. The range of QOL changes for the traditional sample ranged from a high of 65% for effectiveness of communication to a low of 21% for changes in physical health. Both samples are basically equivalent in their reporting of quality of life changes due to amplification.

Summary of Findings

In Table 7, the differences between direct-mail and traditional hearing aids are summarized showing differences that were equivalent, statistically significant, and practically significant (ie, differences were at least 10

Listening situation	% hearing handicap reduction			Significance of Differences
	Direct-mail Hearing aids	Traditional Hearing aids	Difference	
In business meetings	49	48	1	n.s.
In a restaurant	42	47	-5	p<.0001
Watching TV	48	51	-3	n.s.
Large public lecture	45	52	-7	p<.0001
Listening to music	57	51	6	p<.0001
Conversation in street	46	51	-5	p<.0001
Place of worship	55	55	0	n.s.
Talking on telephone	56	57	-1	n.s.
Small gatherings	56	58	-2	n.s.
Conversation in quiet	68	69	-1	n.s.
Total Averages				
Mean	53.2	54.3	-1.1	n.s.
Median	54	57	-3	

Table 6. Perceptions of percent hearing handicap reduction due to direct-mail and traditional hearing aids.

percentage points or 1/2 Likert scale point). Of the 82 factors presented earlier, direct-mail and traditional hearing aids are equivalent on 32 factors, direct-mail hearing aids were rated significantly higher on 9 factors, and traditional hearing aids were rated higher on 41 factors. However, when considering practical significance (10 percentage points or 1/2 Likert scale point), direct-mail and traditional hearing aids were shown to be nearly equivalent on 72 factors; direct-mail customers had superior ratings on 2 factors and traditional hearing aids had superior ratings on 8 factors.

Positioning Direct-mail Hearing Aids in Hearing Healthcare

Earlier MarkeTrak studies demonstrated that there is an intimate relationship between perceived benefit and consumer perceptions of changes in quality of life,¹⁷ and indicated that best practices employed by the hearing healthcare professional are key drivers of real-world consumer success with hearing aids.¹⁸ A study of more than 16,000 Abbreviated Profile of Hearing Aid Benefit (APHAB) profiles—the absolute benefit divided by the unaided hearing handicap, and not including the aversiveness of noise (AV) scale—across 36 studies conducted between 1989 and 2000 by the author estimated that consumers experienced a 44% reduction in their hearing handicap when using analog hearing aids.¹⁹ As noted earlier, hearing handicap reduction has improved in a generation perhaps by only 10%, despite the fact that hearing aids in the traditional hearing aid market are nearly all digital. The following was learned from earlier studies:

- Price is not related to consumer success or happiness. But *value*—where value is expressed as how much the consumer

paid for every percentage-point reduction in hearing handicap—is a key driver of consumer satisfaction. *This means consumers are rationally willing to trade-off incremental changes in benefit for substantial reductions in price.*

- Higher levels of benefit are associated with higher levels of QOL changes.
- Higher levels of consumer success with amplification are related to comprehensive best practices protocols.

There is evidence that there are diminishing returns in the form of hearing handicap reduction even when we employ the very best comprehensive hearing aid fitting protocol. In all likelihood, this is due to the consumer's residual hearing and the fact that hearing aids *per se* do not offer the consumer a complete solution for many difficult listening situations due to poor signal to noise.

To understand how direct-mail hearing aids are positioned in the marketplace, note a few key issues:

Best Practices (BP) Index. In an earlier study on the impact of the hearing healthcare provider on hearing aid user success,^{17,18} aspects of the hearing aid fitting protocol were weighted based on their relationship to real-world success. An overall index of best practices was standardized to a z-score with a mean of 5 and standard deviation of 2 (stanine scores). In this study, the stanine scores were converted to percentile rankings and then grouped into 10 levels of best practices in deciles, where BP1 = a minimal hearing aid fitting protocol (10%), BP5 = an average protocol (50%), and BP10 = a comprehensive protocol (100%), compared to direct-mail (DM). Hearing healthcare providers with minimal hearing aid fitting protocols were shown earlier to be less likely to use a sound booth, use real-ear measurement to verify the

hearing aid fitting, use validation techniques, or provide aural rehabilitation services. The reader is referred to previous studies documenting hearing healthcare professional fitting behaviors for each of the best practices deciles.^{17,18}

Direct-mail hearing aids are devoid of most aspects of a hearing-aid fitting protocol, including verification and validation, loudness discomfort measures, use of a sound booth to measure hearing loss, face-to-face counseling/orientation, and aural rehabilitation. However, consumers *do* self-verify their hearing aid selection by their action of keeping, exchanging, or returning the hearing product they ordered. Direct-mail customers are empowered to judge for themselves the quality of the device they are trying, and many are counseled by mail and/or by telephone about how to adjust switches and controls, and encouraged to try alternative products if the first selection does not seem appropriate.

Most direct-mail hearing aids are basic amplifiers with high-frequency emphasis and some modest consumer customization through selection of hearing aid style and the availability of basic controls, such as a volume control, trimmers, and directional microphones—but they are not prescriptively fitted to compensate for a person's unique hearing loss. So it is of interest to understand how this segment of the marketplace, designated as DM in graphs to follow, performs compared to the 10 best practices groups (BP1-BP10).

Overall Quality of Life (QOL). The reader will recall that direct-mail and traditional fittings are basically equivalent considering consumer ratings of their hearing handicap improvement and quality of life changes associated with amplification. Figure 6 plots quality of life changes attributed to hearing

Outcome measure	N Measures	Statistical significance of p<.01 or better			Practical significance (10%+)		
		Direct-mail Hearing aids	Traditional Hearing aids	Equivalent	Direct-mail Hearing aids	Traditional Hearing aids	Equivalent
Behavioral	4	4	0	0	1	0	3
Hearing aid satisfaction							
Overall	3	1	0	2	1	0	2
Product features	11	3	3	5	0	1	10
Sound quality	11	0	6	5	0	0	11
HHP/DM staff	8	0	8	0	0	1	7
Listening situations	19	0	19	0	0	5	14
MELU	1	0	1	0	0	1	0
Hearing handicap reduction	10	1	3	6	0	0	10
Quality of life changes	15	0	1	14	0	0	15
TOTAL	82	9	41	32	2	8	72

Table 7. Outcome summary: differences between direct-mail and traditional hearing aids.

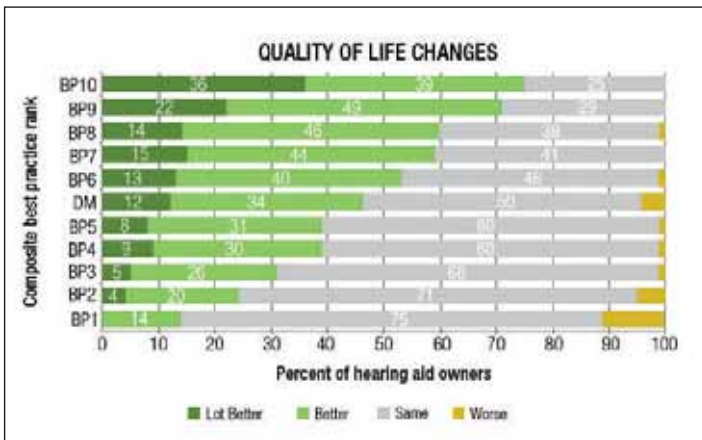


Figure 6. Quality of life changes attributed to hearing aids by hearing aid owners comparing direct-mail (DM) and traditional hearing aid fittings ranked by best practices (BP1-BP10). Ten levels of best practices are expressed in deciles, where BP1=minimal hearing aid fitting protocol, BP5=average protocol (50%), and BP10=comprehensive protocol compared to direct-mail.

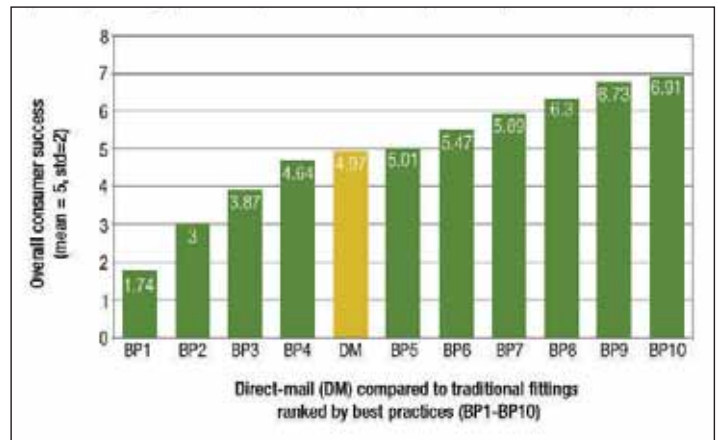


Figure 7. Overall success with hearing aids comparing direct-mail (DM) and traditional fittings ranked by best practices (BP1-BP10). Success = linear composite of benefit, usage, utility, positive attitudes toward hearing aids and quality of life changes with mean=5 and std=2. Ten levels of best practices are expressed in deciles, where BP1=minimal hearing aid fitting protocol, BP5=average protocol (50%), and BP10=comprehensive protocol compared to direct-mail.

aids by hearing aid owners segmented by best practices ranking scored in percentiles (eg, BP1 = lower 10%, BP10 = top 10%) compared to direct-mail (DM) hearing aids. Three out of four consumers experiencing the highest level of best practices (BP10) report their life is “better” or “a lot better” due to their amplification, while only 14% of consumers in BP1 (the lowest best practice group) report positive life changes. In comparison, 46% of the direct-mail consumers report positive changes in their lives, higher than QOL changes reported in the bottom 50% of best practices groups (BP1-BP5).

Overall success index. A composite measure of hearing aid user success was derived using principle components factor analysis of the following 9 outcome variables; only the first factor was chosen. (For the technically inclined, this represents 3.83 Eigenvalues, which is 43% of the common variance.) The correlation with the underlying factor (hearing aid user success) is shown in parentheses, with higher values signifying greater correlation to overall success:

- 1) Satisfaction with improvements in quality of life (.85);
- 2) Satisfaction with achieved benefit (.80);
- 3) MELU in 19 listening situations in which the consumer was satisfied or higher (.71);
- 4) Average quality of life change score (.64);
- 5) Average hearing handicap improvement (.61);
- 6) Would repurchase their hearing aid brand (brand loyalty) (.60);
- 7) Would recommend hearing aids to others (positive-word-of-mouth) (.59);

- 8) Would recommend the hearing health professional or DM staff (.59), and
- 9) Hours hearing aid worn per day and hearing aids in the drawer (.34)

The output factor score (overall success score) was standardized to a z-score with a mean of 5 and standard deviation of 2 (stanine scores). Mean total success scores are shown in Figure 7. As documented in previous publications,^{17,18} there is a strong relationship between best practices and overall real-world success. Consumers experiencing minimal best practices (BP1) report a success score of 1.74, which is more than one standard deviation below the mean, while consumers who experience the absolute best protocols (BP10) report a success score of 6.91, which is one standard deviation above the mean. Direct-mail consumers report an overall real-world success score of 4.97, equal to the average best practice segment (BP5) and superior to the lower best practices segments (BP1-BP4).

Value index. Consumers are rational. They look for the greatest value. For the hard-of-hearing person, the key question is “How much of my hearing problem is solved relative to how much money I have spent?” A three-dimensional model based on 16,000 consumers previously showed the following¹⁹:

- Price divided by hearing handicap reduction (value) is strongly related to consumer satisfaction.
- Consumers are willing to pay high prices for hearing aids if they get substantial benefit.

- You cannot generate happy consumers even with free hearing aids if they get no benefit.
- The most coveted hearing aid product sought by the consumer is a free hearing aid that completely restores their hearing to normal.

Using the same methodology, the out-of-pocket cost for the hearing aid system, taking into account whether the consumer was binaurally or monaurally fitted, was calculated. Next, the total price was divided by the consumer’s estimated hearing handicap reduction scores, yielding the dollars paid for each percentage point change in hearing handicap reduction. The value scores for the 10 best practice segments and the direct-mail segment are plotted in Figure 8. Value is highly related to best practices. The lowest best practices segments (BP1-BP2) cost the consumer \$66 for every percentage-point reduction in hearing handicap, while the best practices groups (BP8, BP10) are half this cost. The highest value is the direct-mail segment at about \$11 for every percentage point reduction in hearing handicap.

Finally, a plot of value and overall real-world success with hearing aids is shown in Figure 9. Direct-mail hearing aids are positioned as high-value products delivering “about average” real-world success compared to the traditional hearing aid market.

Conclusions

This study set out to determine if non-prescriptive basic hearing aid amplification through the mail has the ability to satisfy

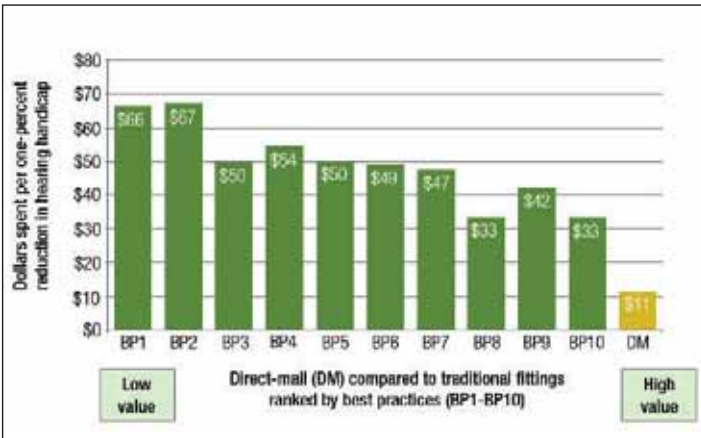


Figure 8. “Value” expressed as median dollars spent for each percentage-point reduction in hearing handicap. Ten levels of best practices are expressed in deciles, where BP1=minimal hearing aid fitting protocol, BP5=average protocol (50%), and BP10=comprehensive protocol compared to direct-mail.

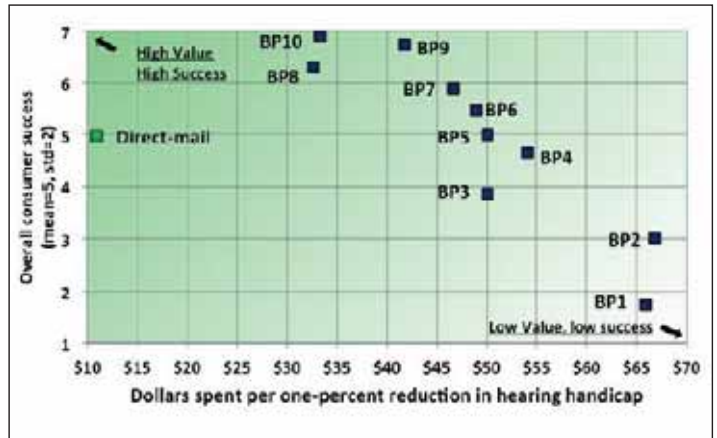


Figure 9. Overall consumer success with hearing aids by value, where value is expressed as the median dollars spent for each percentage-point reduction in hearing handicap. Ten levels of best practices are expressed in deciles, where BP1=minimal hearing aid fitting protocol, BP5=average protocol (50%), and BP10=comprehensive protocol compared to direct-mail.

consumers, reduce their hearing handicap by providing them with benefit, and therefore positively impact their quality of life. Given the substantial sample sizes in this study, it is easy to achieve statistically significant differences when comparing traditional and direct-mail consumers. Thus, the author focused on practical differences between the groups. The key findings with relevant commentary are as follows:

- 1) Nearly half (45.3%) of direct-mail consumers have previously tried or owned traditional hearing aids.
- 2) The direct-mail consumer has a hearing loss profile not dissimilar from the typical traditional hearing aid consumer.
- 3) The direct-mail user is older, is more likely to be retired, has a lower income, is a more experienced hearing aid user, and is more likely to wear only one hearing aid.
- 4) The direct-mail consumer wears their hearing aid more than 9 hours a day, the same as the traditional hearing aid consumer, although direct-mail consumers are slightly less likely to place their hearing aid in the drawer (3.0% versus 8.2%).
- 5) The out-of-pocket price per hearing aid to the direct-mail consumer is only 20% of the price in the traditional market. Not surprisingly, the #1 motivator to purchase direct-mail hearing aids by first-time users is price (56% of direct-mail first-time users). In a previous study by this author, hearing aid insurance coverage was rated as the #1 influence of future purchase intent among hard-of-hearing people who had not purchased hearing aids. In fact, nearly half of hard-of-

- hearing non-adopters with serious hearing loss indicated they would purchase a hearing aid within the next 2 years if the hearing aids were priced under \$500.²⁰ In the MarkeTrak VII series, it was shown that price was a significant barrier of accessibility to hearing healthcare. Half of non-adopters with the most severe hearing loss indicated they could not afford hearing aids. An analysis of household income confirmed that their income was lower by up to \$40,000 compared to people who indicated affordability was not a barrier to hearing aid adoption.²¹
- 6) From the consumer’s perspective, direct-mail and traditional hearing aids provide equivalent benefit and quality of life changes from the use of amplification. This is in agreement with the results of a clinical study⁶ comparing disposable and traditional hearing aids (although in this clinical study the disposable product offered greater flexibility with 7 fixed electroacoustic configurations).
- 7) Direct-mail consumers are more likely to have positive attitudes toward their hearing aids than traditional consumers, as evidenced by their brand loyalty and willingness to recommend hearing aids to others. However, traditional hearing aids provide superior multiple environmental listening utility (MELU), but not enough to impact overall satisfaction ratings, which are highly driven by perceptions of value.
- 8) Given the equivalence of perceived benefit, direct-mail hearing aids provide the consumer with high value compared to traditional fittings—especially for those

consumers who had their hearing aids fitted in settings utilizing below-average best practices. However, for traditional hearing aid fittings, the value proposition to the consumer *doubles* when their hearing aids are fitted in practices utilizing comprehensive hearing aid fitting protocols.

In general, it appears that most hard-of-hearing consumers can be satisfied with a hearing aid, but *significantly more satisfied if all best practices are employed by the hearing professional in the clinic or office*. Satisfaction from direct-mail purchases exceeds that from offices where best practices are not followed. The key factor in success appears to be improved audibility—a conclusion that has been reached repeatedly over the last 50 years by respected thought leaders in the field of hearing. ▀

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