

Customer satisfaction with hearing instruments in the digital age

By Sergei Kochkin

INTRODUCTION

Digital hearing instruments as a percent of fittings have grown from 5% in 1998 to nearly 90% in 2005.¹ In terms of active hearing instruments in consumers' ears over the last 5 years, nearly half of consumers (48%) are using hearing instruments with digital signal processing (DSP). A study of customer satisfaction with hearing instruments is especially relevant at this time when there are nearly 5 million digital hearing instrument fittings in the marketplace. With a binaural rate of 74%, this equates to 2.9 million users of DSP instruments.

It is generally agreed that digital hearing instruments offer significant advantages to the hearing-impaired that 10 years ago were not available with analog hearing instruments:²⁻⁷ These include:

- ❖ Superior signal processing (DSP) capabilities, increasing the chances that noise sources will be removed and that the instrument will capture and understand more of the speech signal, or that some sounds will be enhanced to aid speech intelligibility.
- ❖ Active noise reduction and cancellation and therefore greater user comfort in noisy situations.
- ❖ Greater flexibility in fitting the instrument to the unique hearing loss characteristics of the consumer.
- ❖ Better ability to reduce internal noise in the hearing instrument through suppression of acoustic and mechanical feedback.
- ❖ Superior optimization of microphones in directional hearing instruments.
- ❖ Better overall shaping of the frequency response.
- ❖ The ability, through datalogging, to use DSP to better monitor hearing instrument use, which will aid the fine-tuning process for some consumers.
- ❖ Overall cleaner sound delivered to the consumer's ears.

In a survey of hearing instrument specialists and audiologists, most reported greater patient satisfaction with

digital hearing instruments.⁸ Dispensers reported that their patients were either "somewhat" or "much more satisfied" with DSP in comparison with older technology as follows: overall satisfaction (78% believe DSP is better for their patients), sound quality (89%), listening comfort (82%), understanding speech in noise (77%), understanding speech in quiet (62%), feedback suppression (70%).

In a double-blinded comparison of three levels of hearing instrument technology, 74% of consumers preferred the second-generation digital over a single-channel analog

programmable and a first-generation, two-channel DSP.⁹ The advanced digital was rated significantly higher on word recognition, need fulfillment as measured by the Client Oriented Scale of Improvement (COSI), numerous listening situations, situational preference (i.e., speech in noise), and overall preference.

This article is the second installment of a series of publications that will cover significant issues and trends in the hearing instrument mar-

ket. Its purpose is to explore in detail the customer satisfaction ratings of hearing instruments, with an emphasis on fittings over the past 5 years.

METHOD

In November 2004, 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 U.S. census information with respect to market size, age of household, size of household, and income within each of the nine census regions, as well as by family versus non-family households, state (*with the exception of Hawaii and Alaska*), and the nation's 25 largest metropolitan statistical areas.

The screening survey covered only three issues: (1) physician screening for hearing loss, (2) whether the household had a person "*with a hearing difficulty in one or both ears without the use of a hearing aid*," and (3) whether the house-

"...The use of digital hearing instruments is associated with significantly higher ratings on satisfaction and benefit and greater utility in a number of important listening situations..."

hold had a person who was the owner of a hearing instrument. This short survey helped identify close to 16,000 people with hearing loss and also provided detailed demographics on those individuals and their households, which was reported in the first publication in this series.¹⁰ The response rate to the screening survey was 66%.

In January 2005, an extensive survey was sent to 3000 random hearing instrument owners and 3000 random people with hearing loss who had not yet adopted hearing instruments. The response rates for the detailed surveys were 75% and 77%, respectively.

The data presented in this article refer only to households as defined by the U.S. Bureau of Census, that is, people living in a single-family home, duplex, apartment, condominium, mobile home, etc. People living in institutions have not been surveyed; these would include residents of nursing homes, retirement homes, mental hospitals, prisons, college dormitories, and the military.

Detailed demographics of the hearing instrument owner population are documented in the first publication,¹⁰ so they will not be repeated here. In evaluating customer satisfaction with hearing instru-

ments and hearing health services, this paper will focus on hearing instruments less than 6 years of age ($n=1511$). The hearing instrument owners responded to a seven-page survey consisting of 188 questions or response scales in the following areas: hearing instrument owner demography, hearing loss measures, product features, customer satisfaction and usage, future behavior, factors influencing hearing instrument adoption, and perceptions of hearing health providers.

With respect to customer satisfaction measurement, consumers were asked to rate their hearing instrument experiences on 46 items, using a 7-point Likert scale: "Very dissatisfied," "Dissatisfied," "Somewhat dissatisfied," "Neutral" (equally satisfied and dissatisfied), "Somewhat satisfied," "Satisfied," and "Very satisfied." The attitude items covered overall satisfaction, product features, product performance, dispenser service, and satisfaction in 15 listening situations.

RESPONDENT DEMOGRAPHICS

Table 1 documents the hearing loss characteristics of the hearing instrument owner population responding to the customer satisfaction survey as well as information

concerning their hearing instruments. The average age of respondents is 71, 6 out of 10 are male, and household incomes are slightly more than \$53,000; the majority (64%) are married and retired (66%) and 62% have attained a high school degree or less.

Regarding their hearing loss, 84% report bilateral loss and 52% subjectively evaluate their loss as "moderate"; 48% report their best level of hearing is the ability to "hear a shout across a room" (Gallaudet scale), and on average they report difficulty hearing in the presence of background noise about 60% of the time (Unaided Abbreviated Profile of Hearing Aid Ability).

With respect to product features, three-fourths indicate they wear binaural hearing instruments. The modal style is "a visible in-the-canal" instrument (41%). The reader will recall that 48% of hearing instruments fitted over the last 5 years were digital; 47% of this sample reported their instruments were digital. One in four consumers report their hearing instruments have directional and telecoil features and 7 out of 10 report they have a volume control. Only 6% have a remote control and fewer than 1% indicate they have FM on their hearing instruments.

Table 1. Hearing instrument user demography, hearing loss characteristics, and perceptions of hearing instrument features.

Sample Demography		Hearing Loss Characteristics		Consumer Perception Product Features	
Age (mean)	71	Bilateral Loss (%)	84	Binaural Loss (%)	74
Gender—male (%)	62	Subjective hearing loss (%)		Style of hearing instrument (%)	
Household income (\$000)	53.3	Mild	9	Behind the ear	18
Marital Status (%)		Moderate	52	In the ear—full	16
Now married	64	Severe	35	In the ear—partial	12
Never married	7	Profound	4	In the canal—visible	41
Divorced	29	Gallaudet Score (%)		In the canal—invisible	13
Adult Employment (%)		Hear whisper across room	5	Programmable (%)	51
Full time	17	Hear normal voice across room	33	Digital (%)	47
Part time	9	Hear shouts across room	48	Directional (Multiple mic %)	25
Retired	66	Hearing loud sounds better ear	8	Telecoil (%)	25
Not employed	7	Tell speech from other sounds or worse	6	Volume control (%)	69
Adult Education (%)		Average Unaided APHAB (%)		Remote control (%)	6
Less than high school	8	Ease communication	53.2	On-off switch (%)	53
Some HS or HS graduate	54	Reverberation	57.5	Musical connection to HI (%)	0.5
Some college or college graduate	38	Background noise	58.4	FM Boot on HI (%)	0.5

Table 2. Detailed customer satisfaction ratings (in percent) with hearing instruments and hearing health services. All hearing instruments are LE 5 years of age (n=1511).

Factor	Total Dissatisfied	Very Dissatisfied	Dissatisfied	Somewhat Dissatisfied	Neutral	Somewhat Satisfied	Satisfied	Very Satisfied	Total Satisfied
Overall satisfaction*									
Overall satisfaction	19	5	5	10	10	23	29	20	71
Benefit	10	3	2	5	5	21	38	26	85
Value	18	5	5	8	18	16	30	17	64
Product Features									
Ease/battery change	5	1	1	3	6	12	47	30	89
Fit/comfort	8	2	2	4	6	14	46	26	86
Reliability	8	3	2	3	13	15	44	20	79
Visibility	5	1	1	3	17	11	48	19	78
Frequency of cleaning	7	1	2	5	19	18	43	12	74
Packaging	4	1	1	2	24	10	45	18	73
Battery life	18	3	4	11	11	20	37	14	71
Warranty	12	2	4	5	19	15	37	18	69
Ease/volume adjustment	13	3	4	6	20	14	36	16	66
On-going expense	11	3	3	5	23	12	37	18	66
Sound Quality/Signal Processing									
Clearness of tone/sound	15	3	4	8	11	23	37	14	74
Sound of voice	11	2	3	6	20	18	39	13	70
Natural sounding	15	4	3	9	16	19	36	14	69
Directionality	18	4	4	10	17	22	32	12	66
Able to hear soft sounds	22	4	6	13	14	23	30	10	64
Richness of sound/fidelity	16	4	4	8	22	19	32	10	61
Comfort with loud sounds	26	5	8	13	14	23	28	9	60
Whistling/feedback/buzzing	28	5	7	16	16	19	26	10	55
Chewing/swallowing sound	23	4	7	12	24	18	27	9	54
Use in noisy situations	35	9	10	16	14	22	20	9	51
Wind noise	30	5	8	16	21	21	21	7	49
Listening Situations									
One-on-one	6	2	2	2	4	13	40	37	90
Small groups	10	2	3	5	6	22	41	21	85
TV	10	2	3	5	8	19	40	22	81
Outdoors	9	2	2	5	13	23	39	16	78
Listening to music	9	2	3	5	14	17	42	18	77
Leisure activities	9	3	2	4	16	19	40	16	76
Car	13	2	4	7	13	21	36	18	75
Place of worship	11	3	3	6	14	19	35	20	74
Restaurant	15	3	4	9	10	24	34	16	74
Concert/Movie	13	3	3	7	15	21	34	16	71
Telephone	20	4	5	10	11	18	32	18	69
Workplace	11	3	3	6	22	16	34	17	66
Large group	23	4	5	13	13	26	24	13	63
School/classroom	13	4	3	6	28	14	30	15	59
Cell phone	21	6	6	9	20	17	27	16	59
Dispenser									
Explained how to care for H.I.	2	0	0	1	4	9	36	50	94
Knowledge of dispenser	2	0	1	1	4	8	35	51	94
Professionalism of dispenser	3	1	1	1	4	8	35	51	94
Quality of service (during fitting)	3	1	1	1	4	8	33	51	93
Front office staff	2	1	0	1	8	8	39	44	90
Explained what to expect from H.I.	4	1	1	2	6	11	37	43	91
Post-purchase service	6	2	1	2	8	9	33	44	87
Usage**									
Wear H.I.	11								89
Wear H.I. 4+ hours	26								74
Behavioral***									
Recommend H.I. to friend	16				5				79
Recommend dispenser	13				14				73
Would repurchase H.I. brand	13				43				44
Quality of life improvement	7								93

* Note—totals may not add up to 100 due to rounding to whole numbers.

** Wears means the consumer uses the hearing aid any amount of time in a given year.

*** Recommendations are positive if rated "Yes" and negative if the consumer answers "No." Responses of "Not sure" are scored Neutral.

RESULTS AND DISCUSSION

What's important?

Before examining the detailed findings, it's useful to consider the top 10 factors related to overall customer satisfaction with hearing instruments in this sample. In rank order the factors that are most correlated with overall hearing instrument satisfaction (correlation in parentheses) are:

- (1) Overall benefit (.74)
- (2) Clarity of sound (.72)
- (3) Value (*performance of the hearing instrument relative to price*) (.69)
- (4) Reliability of the hearing instrument (.69)
- (5) Natural sounding (.68)
- (6) Ability to hear in small groups (.66)
- (7) Richness or fidelity of sound (.64)
- (8) One-on-one conversation (.63)
- (9) Leisure activities (.63)
- (10) Listening to TV (.62)

These are the factors that tend to covary the most with overall satisfaction. The implication is that incremental improvements in these areas will drive improvements in overall satisfaction. The factors least correlated with customer satisfaction are:

- (1) Visibility of hearing instrument (.34)
- (2) Hearing instrument usage: hours worn (.36)
- (3) Front office staff (.38)
- (4) Ease of changing battery (.41)
- (5) Battery life (.41)
- (6) Ease of adjusting volume (.44)
- (7) Dispenser service (.46)
- (8) Packaging (.48)

In Table 2, we have referenced the detailed ratings for the 46 satisfaction items, hearing usage (hours worn), and three behavioral measures. The figures to follow collapse the satisfaction into three categories: dissatisfaction (red), satisfaction (green), neutral (not shown).

Overall indices (Figure 1). Customer satisfaction with hearing instruments less than 6 years old is currently 71%; 85% of consumers are satisfied with the benefit they get from their hearing instruments, while nearly two-thirds (64%) believe they have received good value in their purchase.

For comparison purposes, we have plotted the satisfaction ratings for these three variables in Figure 1b for the total

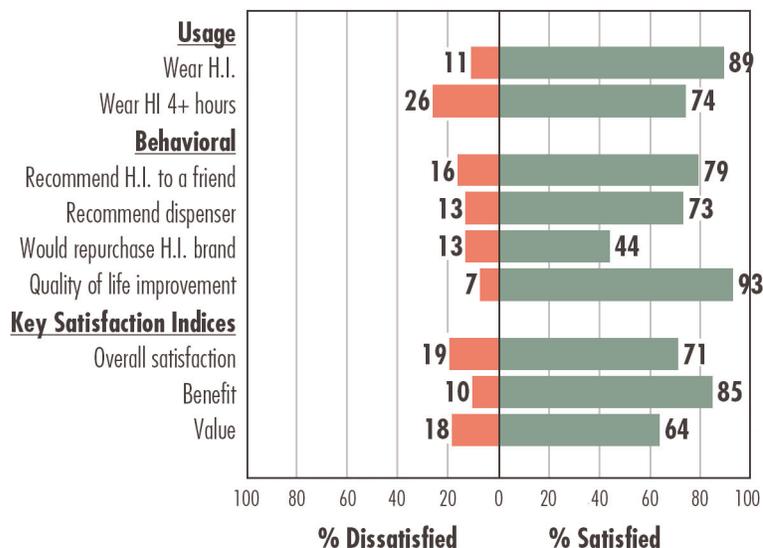


Figure 1. Overall indices of customer satisfaction with hearing instruments (HI <6 years old).

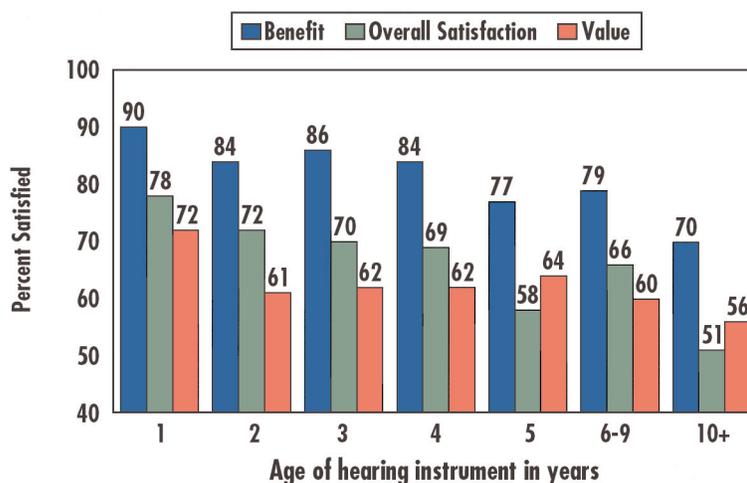


Figure 1b. Key customer satisfaction ratings by age of hearing instrument.

population of hearing instrument owners based on the age of the instrument. For hearing instruments less than a year old, the ratings are stellar: 90% satisfaction with benefit, 78% overall satisfaction, and 72% with value. Although ratings drop over time, customer satisfaction with benefit is nearly 80% for products 6-9 years old, while overall satisfaction is 66%.

Another way of determining satisfaction is to measure the percentage of hearing instrument owners who actually wear their hearing instruments. Nearly 9 out of 10 currently wear their instruments; a

hearing aid user is defined as someone who wears his or her hearing instrument at least once a year. However, perhaps a better behavioral measure of satisfaction can be derived from consumers who wear their instruments at least 4 hours a day. In the latter case, one could say that three out of four consumers are satisfied with their hearing instruments. It should be noted that the correlation between overall satisfaction and usage is only modest ($r=.36$).

Behaviorally the ratings for hearing instruments are strong. Eight out of 10 (79%) current users would recommend

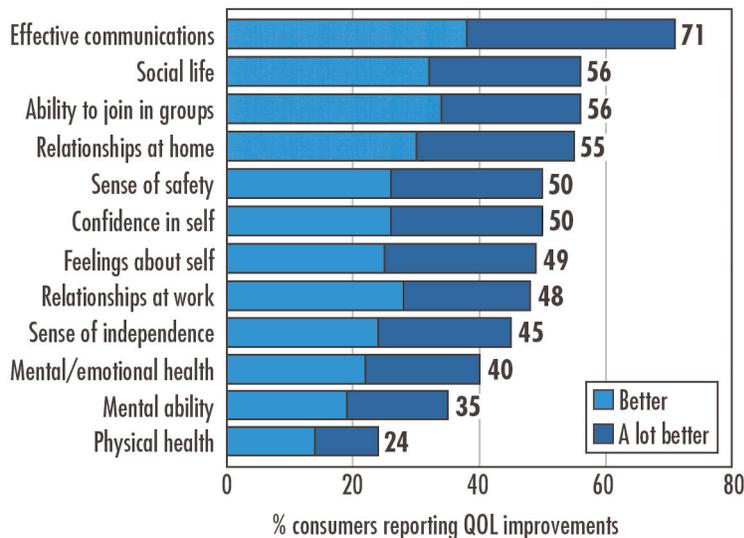


Figure 1c. Percent of current hearing instrument users reporting improved quality of life (QOL), due to hearing instruments (HI <6 years old).

hearing instruments to their friends and 7 out of 10 (73%) would recommend the person who fit them with hearing instruments. However, only 44% indicate they would repurchase their current brand of hearing instrument next time around; a large percent (43%) indicated they were unsure what they would do when it came time to replace their instruments.

More than nine out of ten (93%) consumers indicate that their quality of life has been positively impacted by their hearing instrument usage at least “some of the time.” Areas most affected (“better” or “a lot better”) by hearing instrument usage are in rank order as follows (see Figure 1c):

- ❖ Seven out of 10 cite more effective communications.
- ❖ Five in 10 say their social life, ability to join in groups, relationships at home, feelings and confidence in self, sense of safety, and relationships at work have improved due to hearing instruments.
- ❖ Four in 10 report improvements in their sense of independence and emotional health.
- ❖ About a third report improved mental/cognitive ability.
- ❖ One in four report improved physical health.

Product features (Figure 2). Except for fit and comfort (86% satisfaction) and

reliability (79%), most items in this category should be considered of secondary importance in terms of their potential to impact customer satisfaction. The lowest correlate of overall satisfaction, “visibility of hearing instrument,” garners a 78% customer satisfaction rating. The item receiving the most negatives in this category is battery life; nearly one in five consumers are dissatisfied with the battery life of their hearing instruments, while seven in ten are satisfied.

Signal processing and sound quality (Figure 3). This is clearly the most important category to the consumer, since it includes three of the top ten correlates of overall customer satisfaction: clarity of sound, richness of sound/ fidelity, and naturalness of sound. Three out of four consumers are satisfied with the clearness of the tone and the sound of their instrument; seven out of ten are satisfied with their voice and believe the instrument is natural sounding. Two out of three are satisfied with their ability to tell the direction of sounds and their ability to hear soft sounds.

Only six out of ten are comfortable with loud sounds, while one out of four are dissatisfied; slightly more than half are satisfied with the ability of their hearing instruments to control annoying feedback and the sound of chewing or swallowing. Only half are satisfied with wind noise and their instruments in noisy situations. Clearly there is a major opportunity for manufacturers and dispensers to improve the consumer’s experience on these factors.

Consumer satisfaction in selected listening situations (Figure 4a). MarkeTrak measures satisfaction in 15 listening situations. Ninety percent of consumers are satisfied with the ability of their hearing instrument to improve communication in one-on-one situations, and slightly more

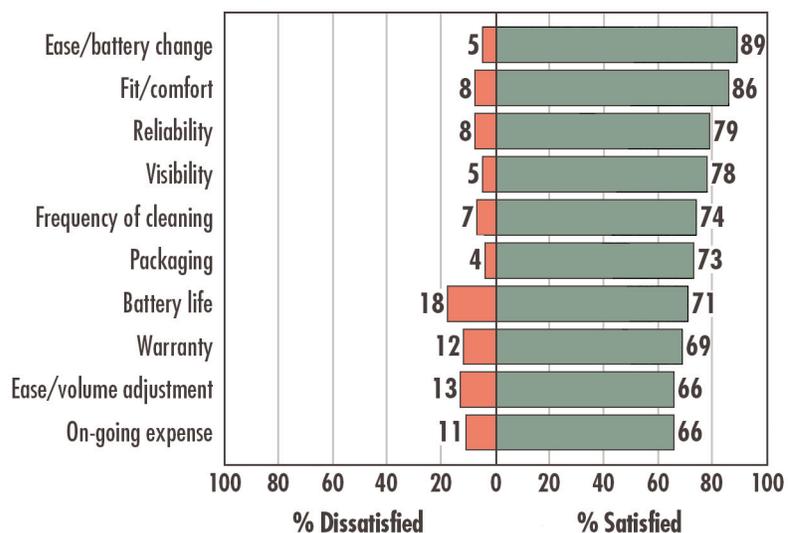


Figure 2. Customer satisfaction with hearing instrument product features (HI <6 years old).

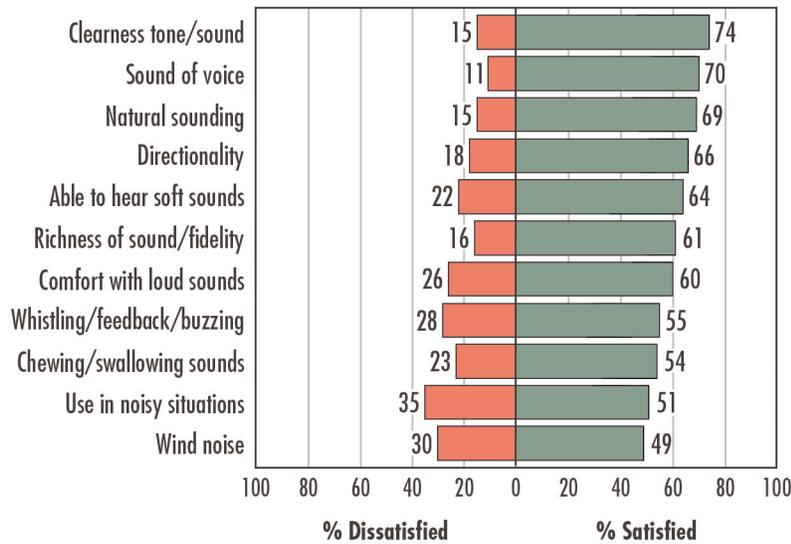


Figure 3. Customer satisfaction with signal processing and sound quality (HI <6 years old).

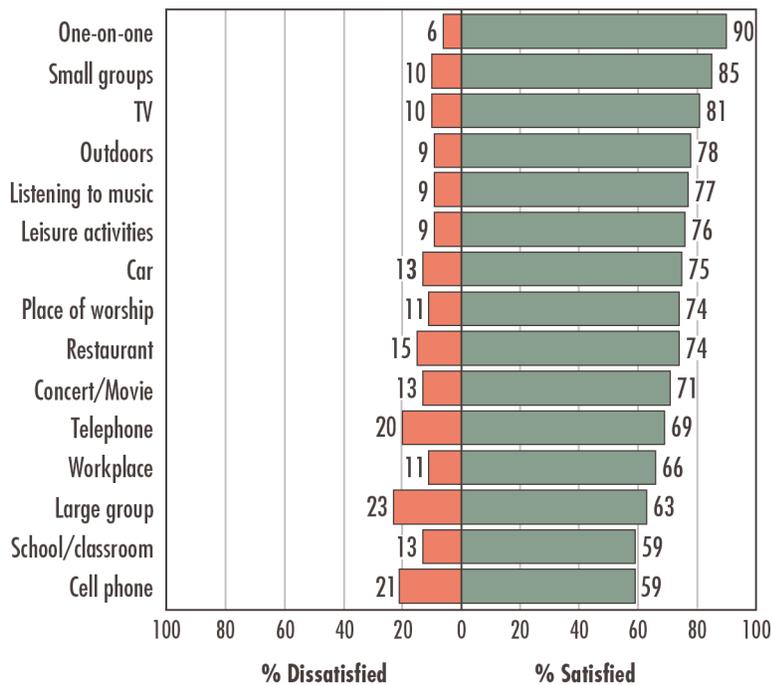


Figure 4a. Customer satisfaction with hearing instruments in selected listening situations (HI <6 years old).

than eight out of ten are satisfied by its performance in small groups and while watching television. About three of four consumers are satisfied with their instruments outdoors, while listening to music, while participating in leisure activities, in the car, at a house of worship, and in a

restaurant. Seven out of ten are satisfied with their instruments at concerts and movies and on the telephone. Among those still in the workforce, two out of three are satisfied with their hearing instruments.

The three most difficult listening situations are in large groups (63%), school/

classroom situations (59%), and while using a cell phone (59%). Three listening situations received a dissatisfaction rating from one in five consumers: using the telephone, using a cell phone, and large group situations.

Figure 4b shows the powerful impact of improving multiple environmental listening utility (MELU) for the consumer. In this chart, we are expressing MELU as the percent of environments (from our list of 15) in which consumers are either “somewhat satisfied,” “satisfied,” or “very satisfied” with their aided hearing. Consumers who are not satisfied in any listening situation (*they could be dissatisfied or neutral*) can be expected to be satisfied with their hearing instruments only 17% of the time. Consumers who achieve satisfaction in half of their listening situations report an overall satisfaction rating of 63%. Clearly, consumers expect their hearing instruments to perform in most of the listening situations they encounter. We are estimating that hearing instruments must provide value (i.e., listening utility) in 70% of listening situations to achieve an 80% or higher overall customer satisfaction rating.

Using the MELU yardstick measure on hearing instruments less than 6 years old, we are estimating the following (see Figure 4c):

- ❖ 7% of users are satisfied in no listening environment (not even one-on-one).
- ❖ 18% of users are satisfied in 25% or fewer listening situations.
- ❖ 61% of users are satisfied in 80% or more listening situations.
- ❖ 42% of users are satisfied in 100% of listening situations.

The dispenser experience (Figure 5). In general, most of the ratings of dispensers (*the person who fit the hearing instrument*) are impressively high, exceeding 90% in consumer satisfaction. The lowest rated area is post-purchase service at 87% satisfaction.

According to consumers, dispensers spend on average three-quarters of an hour (std=.6 hours) instructing them on the use and care of their hearing instruments, explaining hearing instrument features and styles, and creating realistic expectations. The average dispenser spends half an hour (std=.5 hours) on

Table 3. Customer satisfaction with hearing instruments based on consumer report that hearing instrument was digital.

	Consumer uses digital hearing instrument			Percent Difference Yes versus No	Significance Level Means*
	Yes (n=703)	No (n=450)	Not sure (n=326)		
Overall satisfaction					
Overall satisfaction	77	66	65	11	p<.05
Benefit	90	82	80	8	p<.05
Value	67	61	61	6	
Product Features					
Ease/battery change	92	87	86	5	
Fit/comfort	90	82	83	8	p<.05
Reliability	83	74	74	9	p<.01
Visibility	83	74	74	9	p<.01
Frequency of cleaning	78	70	69	8	
Packaging	76	71	67	5	
Battery life	74	71	66	3	
Warranty	75	66	62	9	
Ease/volume adjustment	62	73	65	-11	
On-going expense	70	65	59	5	
Sound Quality/Signal Processing					
Clearness of tone/sound	80	68	71	12	p<.02
Sound of voice	76	64	66	12	p<.05
Natural sounding	74	62	67	12	p<.04
Directionality	71	60	62	11	p<.01
Able to hear soft sounds	70	56	63	14	p<.007
Richness of sound/fidelity	69	52	58	17	p<.0001
Comfort with loud sounds	68	48	57	20	p<.0001
Whistling/feedback/buzzing	63	46	51	17	p<.003
Chewing/swallowing sound	60	48	49	12	
Use in noisy situations	57	42	48	15	p<.04
Wind noise	56	41	47	15	p<.001
Listening Situations					
One-on-one	94	86	86	8	p<.03
Small groups	89	80	81	9	p<.04
TV	85	79	76	6	
Outdoors	82	72	76	10	p<.01
Listening to music	82	71	73	11	
Leisure activities	81	70	71	11	p<.004
Car	77	71	73	6	
Place of worship	78	72	69	6	
Restaurant	77	70	72	7	
Concert/movie	76	66	67	10	p<.01
Telephone	76	62	63	14	p<.02
Workplace	73	57	63	16	p<.02
Large group	65	60	62	5	
School/classroom	64	53	55	11	
Cell phone	66	52	51	14	p<.003
Dispenser					
Explained how to care for H.I.	95	93	93	2	
Knowledge of dispenser	96	92	92	4	p<.005
Professionalism of dispenser	95	92	93	3	p<.04
Quality of service (during fitting)	95	90	93	5	p<.04
Front office staff	92	88	90	4	
Explained what to expect from H.I.	93	88	89	5	p<.01
Post-purchase service	90	84	83	6	

* Significance level based on analysis of convenience controlling for age of hearing instrument, style of hearing instrument, presence of multiple microphones, binaural usage and telecoil. Mean score differences are on hearing instruments where the consumer reported they either used or did not use digital hearing instruments.

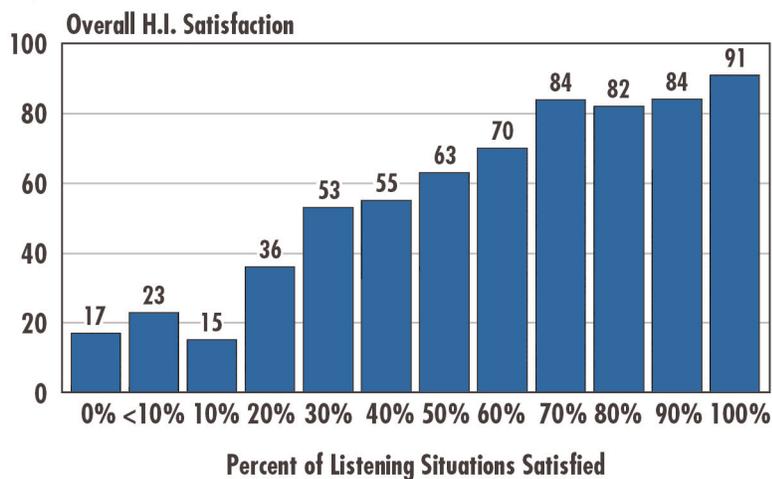


Figure 4b. Impact of improving multiple environmental listening utility (MELU) on overall satisfaction; hearing instruments <6 years old (n=1368).

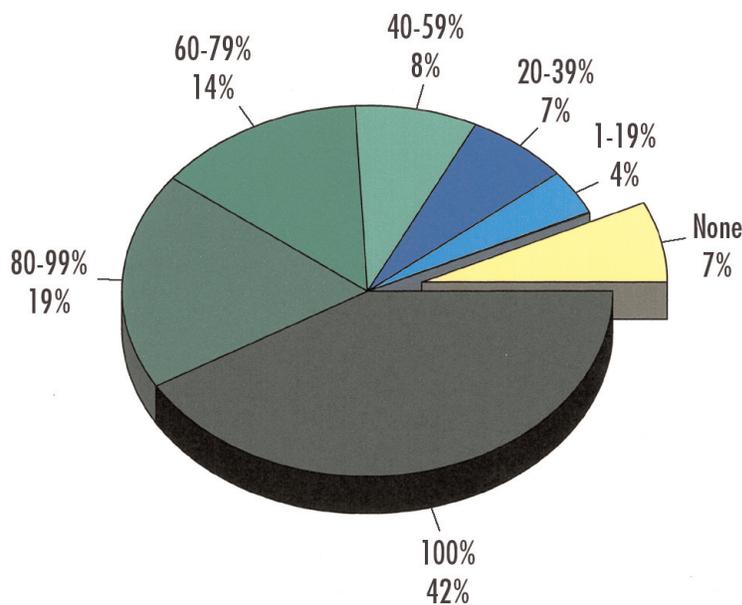


Figure 4c. Estimated percent of listening environments in which hearing instrument users are satisfied (HI <6 years old).

aural rehabilitation counseling, which could include communication techniques, lip reading, exploration of feelings about hearing loss, etc.

Six out of ten consumers indicate that it took only one or two visits before their hearing instrument sounded just right to them; about one in four indicate between three and five visits, while 12% indicate their hearing instrument is still not right. Overall, consumers report that it took 2.5 visits (std=1.6 visits) before

they were satisfied with the instrument's sound quality and two visits before they had gained competence in caring for their hearing instrument (*i.e.*, cleaning, storing, operation, battery change, etc.). Thirty-six percent of consumers indicate they have never had to return their hearing instrument because it was wasn't working; the average returns for service were 1.6 (std=1.7 returns). Of those returning their instruments, 79% are satisfied with the service they received.

The impact of digital technology (Table 3). In MarkeTrak we query the consumer on the presence or absence of certain features on their hearing instruments. One such factor is whether or not their hearing instrument is digital. Forty-seven percent of consumers indicated "yes" to our question, and 53% "no" or "not sure." The reader will recall that 48% of hearing instruments sold over the past 5 years were digital.

In Table 3, after controlling for age of instrument, presence of multiple microphones, telecoil, and binaural usage, 27 of the 56 MarkeTrak items are shown to be significantly higher if the consumer identifies the product as digital. Focusing on factors with a "practical" significance of 10% point satisfaction, the most notable improvements associated with digital hearing instruments in rank order are:

- ❖ 20% points higher: comfort with loud sounds.
- ❖ 15%-19% points higher: richness or fidelity of sound, feedback suppression, use in noisy situations, wind noise, use in workplace.
- ❖ 10%-14% points higher: overall satisfaction, clarity of sound, sound of voice, natural sounding, localization of sound, able to hear soft sounds, sound of chewing and swallowing, use outdoors, listening to music, leisure activities, at a concert/movie, on the telephone, in school/classroom situation, on a cell phone.

Satisfaction and severity of hearing loss

Consumers were segmented into one of five groups (called quintiles) based on their responses to four measures of hearing loss:

- ❖ Number of ears impaired (1 or 2)
- ❖ Score on the Gallaudet Scale (an 8-item inventory taking the values "can hear a whisper across a room" to "cannot hear loud sounds")
- ❖ Score on the Unaided Abbreviated Profile of Hearing Aid Benefit (APHAB), an inventory of how difficult it is to hear without hearing instruments in 18 listening situations. The APHAB consists of four scales: ease of communication (EC), reverberation (RV), background noise (BN), and aversiveness of sounds (AV). We did not administer the AV subscale and we

Table 4. Customer satisfaction with hearing instruments by degree of hearing loss (n=1374). Quintiles are in five equal groups.

	Degree of Hearing Loss					% Difference Quintile 1 and Quintile 5 in customer satisfaction	Significant Difference Due to Hearing loss level*
	Quintile 1 20%	Quintile 2 40%	Quintile 3 60%	Quintile 4 80%	Quintile 5 100%		
Bilateral loss %							
Subjective loss - mode (%)	62% moderate	82% moderate	88% moderate	91% severe	98% severe		
Subjective loss - secondary (%)	34% mild	9% severe	25% severe	35% moderate	18% profound		
Unaided APHAB (Mean)	41%	52%	55%	58%	75%		
Overall satisfaction							
Overall satisfaction	73	70	71	71	71	2	
Benefit	87	88	84	86	82	5	
Value	67	64	64	63	64	3	
Product Features							
Ease/battery change	88	91	88	90	88	0	
Fit/comfort	87	83	87	87	87	0	
Reliability	82	81	77	76	78	4	
Visibility	83	74	81	77	74	9	
Frequency of cleaning	78	75	75	73	68	10	
Packaging	75	76	73	69	70	5	
Battery life	73	73	70	70	71	2	
Warranty	73	70	70	67	67	6	
Ease/volume adjustment	66	63	60	67	72	-6	
On-going expense	68	68	68	65	64	4	
Sound Quality/Signal Processing							
Clearness of tone/sound	79	75	73	73	70	9	p<.05
Sound of voice	74	72	67	67	69	5	
Natural sounding	76	65	70	66	65	11	p<.01
Directionality	74	69	67	62	57	17	p<.0001
Able to hear soft sounds	73	64	67	64	54	19	p<.0001
Richness of sound/fidelity	68	62	66	60	56	12	p<.004
Comfort with loud sounds	71	58	63	57	52	19	p<.0002
Whistling/feedback/buzzing	65	54	54	54	52	13	p<.001
Chewing/swallowing sound	57	55	56	56	48	9	
Use in noisy situations	58	53	51	48	46	12	p<.002
Wind noise	59	52	49	48	41	18	p<.002
Listening Situations							
One-on-one	89	89	90	93	88	1	p<.009
Small groups	86	86	86	87	78	8	p<.007
TV	87	84	84	81	73	14	p<.0011
Outdoors	83	80	78	76	72	11	
Listening to music	83	83	77	76	68	15	p<.0001
Leisure activities	82	78	75	76	69	13	p<.02
Car	80	78	75	74	69	11	p<.004
Place of worship	76	76	80	77	63	13	p<.0001
Restaurant	77	80	78	73	66	11	p<.0004
Concert/movie	78	74	75	71	61	17	p<.0006
Telephone	77	74	66	71	60	17	p<.0001
Workplace	70	66	70	67	58	12	
Large group	71	67	65	62	54	17	p<.0001
School/classroom	64	61	64	59	46	18	p<.02
Cell phone	71	68	60	57	43	28	p<.0001
Dispenser							
Explained how to care for H.I.	96	95	94	96	92	4	
Knowledge of dispenser	95	94	93	96	94	1	
Professionalism of dispenser	96	93	93	95	91	5	
Quality of service (during fitting)	93	94	94	95	91	2	
Front office staff	91	89	90	93	91	0	
Explained what to expect from H.I.	91	90	92	90	92	-1	
Post-purchase service	88	88	86	88	86	2	

* Significance level determined based on Chi-Square analysis of 5 levels of hearing loss and 3 levels of satisfaction (satisfied, neutral, dissatisfied).

changed the scaling to 0% to 100% of the day in 10% increments. Based on a factor analysis of BN, EC, and RV, which revealed that the APHAB was one-dimensional, the unaided APHAB score for each individual was the mean of the three subscales.

❖ Subjective hearing loss score: mild to profound (a score of 1-4).

A factor analysis of these subjective measures was performed revealing a single measure of hearing loss. Factor scores were computed and each consumer was placed into one of five groups in which Quintile 1=the mildest hearing loss, the lower 20% of people with hearing loss, and Quintile 5=the most serious hearing loss, the 20% of people with the greatest hearing loss. Customer satisfaction measures are documented in Table 4 for each of the five hearing loss groups, as well as difference scores between the mildest and most severe hearing loss groups, and an indication as to whether there are significant differences in satisfaction based on severity of hearing loss.

There were no significant differences on overall measures of satisfaction, product features, or dispenser service. However, the majority of sound quality/signal processing variables show significant differences in satisfaction based on hearing loss severity. When comparing mild and severe hearing loss, the most notable are: comfort with loud sounds and ability to hear soft sounds (19% points), wind noise (18%), and ability to tell direction of sounds (17%). With respect to listening situations, satisfaction was related to severity of hearing loss in 13 of 15 listening situations. The most notable are: cell phone (28% points), school/classroom situations (18%), large group (17%), telephone (17%), concerts (17%), and listening to music (15%).

SUMMARY

In a survey of more than 1500 current users of hearing instruments, half of which were digital, overall customer satisfaction was measured at 71% for hearing instruments 0-5 years old. Customer satisfaction with 1-year-old instruments was 78%, which placed hearing instruments in the top third of all products and services in the United States as measured by the University of Michigan.¹¹

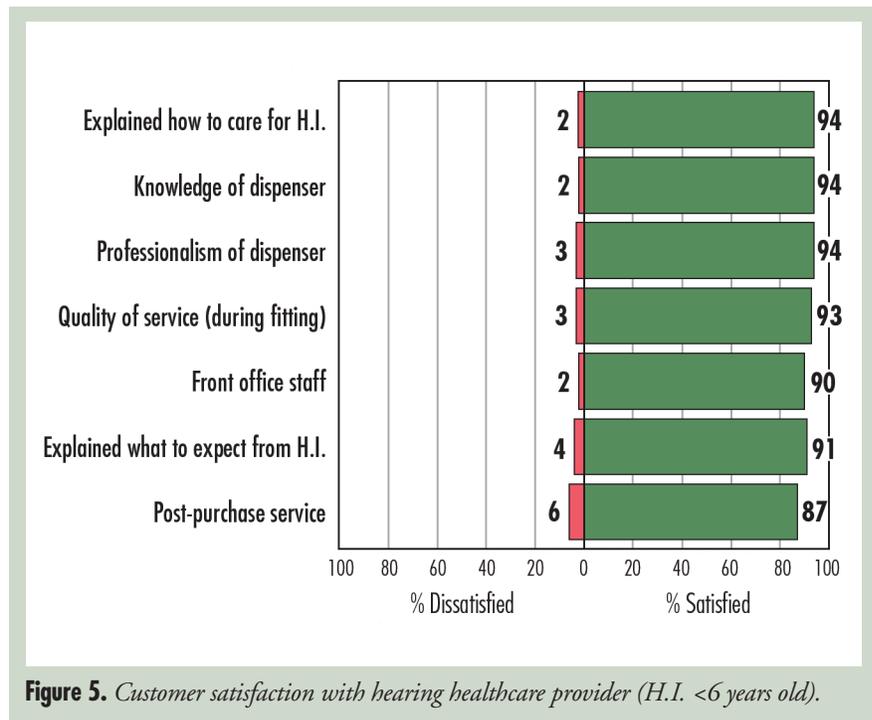


Figure 5. Customer satisfaction with hearing healthcare provider (H.I. <6 years old).

Hearing care professionals received stellar ratings approaching perfection. Overall they achieved a 92% satisfaction rating.

Eighty-five percent of consumers are satisfied with the ability of their instruments to improve their hearing, meaning they are deriving tremendous benefit. In 15 listening situations, customer satisfaction ranges from 90% (one-on-one) to 59% (cell phone). Six out of ten consumers are satisfied with their instruments in 80% of the listening situations measured in this study.

Hearing instruments are beneficial all along the hearing loss continuum. However, ratings are significantly lower for the severe-to-profound hearing loss population (i.e., the 20% of people with the most severe hearing loss). Significant opportunity remains to meet the needs of people with the greatest hearing losses. For example, fewer than 1% of consumers own an FM assistive listening system and only 25% use directional microphones or telecoils.

The use of digital hearing instruments is associated with significantly higher ratings on overall satisfaction and benefit, improved sound quality, reduction in feedback, improved performance in noisy situations, and greater utility in a number of important listening situations.

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