Customer Satisfaction & Subjective Benefit With High Performance Hearing Aids

By
Sergei Kochkin, PhD

A consumer study with nearly 5000 subjects across 13 hearing instrument samples was conducted to determine if advanced hearing instrument features (e.g., programmability, multiple memory, multiple channel, etc.) impact customer satisfaction and subjective benefit. The results lead us to believe that current programmable technology can achieve over 75% longer-team overall satisfaction (compared to the MarkeTrak average of 655).

Reprinted with permission from The Heaing Review®
Vol. 3, No. 12, December 1996, pgs. 16-26.

Customer Satisfaction & Subjective Benefit with High Performance Hearing Aids

By Sergi Kochkin, PhD

A consumer study with nearly 5000 subjects across 13 hearing instrument samples was conducted to determine if advanced hearing instrument features (e.g., programmability, multiple memory, multiple channel, etc.) impact customer satisfaction and subjective benefit. The results lead us to believe that current programmable technology can achieve over 75% longer-term overall satisfaction (compared to the MarkeTrak average of 64%).

MarkeTrak' research conducted at Knowles Electronics has shown that overall customer satisfaction with hearing instruments declined to 53% (from 58%) while satisfaction with new (less than one year old) instruments improved to 71% (from 66%). Nearly 18% of hearing instrument owners do not use their hearing instruments. New users have declined from 53% of sales in 1989 to 29% of sales in 1994. In addition, the mean age of instruments has increased from 3.2 years in 1991 to 4.1 years in 1994. Clearly, the trends indicate that both the new user and replacement markets have declined.

Previous research with hearing-impaired individuals who do not own hearing instruments[2] estimated 11.1 million individuals, or more than half of the market the industry is trying to reach, question the value of hearing instruments. Some of the more common excuses for not purchasing: hearing instruments do not perform in noisy situations (7.1 million), provide too much whistle or feedback (6.4 million), do not work well (4.8 million), work only in limited situations quality (3.9 million), break down too much (3.4 million) and can't be used on the telephone (3.1 million). In addition, 3.9 million hearing-impaired subjects indicated that the negative experiences of their friends who owned hearing instrument(s) were the reason for non-purchase. Thus, it would appear that this industry has lost significant sales due to poor end-user satisfaction and the negative image that "hearing aids don't work."

If this industry is to grow, it is imperative to improve end-user satisfaction. One such way is to examine which hearing instruments have higher end-user satisfaction and what features the instruments share. Only through systematic feedback from the end-user, either in the clinical laboratory or in the field, can the necessary adjustments be made to improve end-user satisfaction in our markets and increase positive word-of-mouth advertising.

Inferences can be made about the extent to which a particular technology satisfies end-user needs by comparing populations of users of specific technologies with the average technology as measured by Knowles MarkeTrak research.[3] Thus, the objectives of this article are to report consumer satisfaction and benefit with a wide variety of high-performance hearing instruments and to compare that satisfaction level to that of consumers wearing typical hearing instruments.

Most manufacturers of programmable hearing instruments were approached by this author to participate in an omnibus survey of "high performance" hearing instruments. Unfortunately, there is no consensus to the definition of "high performance" hearing instrument. While the focus is on digitally programmable instruments, also included in this study are non-programmable products which would otherwise be considered high performance (e.g., wide dynamic range compression). As a result, only linear peak clipping instruments were excluded for consideration.

Ten manufacturers agreed to participate in this study. Close to 5000

Sergei Kochkin, PhD, is director of market research and market development at Knowles Electronics, Inc., and is an officer on the board of directors of the Better Hearing Institute.

consumers of hearing instruments reported on their experience with a wide range of technologies.

Survey Methods

➢ ***Instruments:*** Both the Knowles MarkeTrak Satisfaction Survey and the Abbreviated Profile of Hearing Aid Benefit (APHAB) were administered by mail to each subject in this study.

With respect to customer satisfaction, 34 areas were measured using a five-point Likert scale (very satisfied, satisfied, neutral [defined as equally satisfied and dissatisfied], dissatisfied and very dissatisfied). The 34 items were grouped as follows: overall index (1 item), hearing instrument product features (8 items), performance and value (9 items), performance in specific listening situations (10 items), and dispenser service (6 items). Additionally, five behavioral measures were addressed (hours worn per day, impact on quality of life, likelihood of repurchasing hearing instrument brand, repurchasing from dispenser, and in recommending hearing instruments to friends).

The APHAB4 consists of 24 items scored on four 6-item subscales: Ease of communication (EC), background noise (BN), reverberation (RV) and aversive-ness of sounds (AV). The respondents completed the APHAB under both aided and unaided conditions in the same administration by indicating the percent of time they experience problems hearing under the situations described in the inventory. A person's score on each subscale is the mean rating of the six items making up each of the subscales. An APHAB subscale was scored only if the respondent answered four or more items within a specific subscale. Benefit is defined as the difference between unaided and aided conditions; benefit can thus be operationally defined as a score change indicative of hearing problem reduction or reduction in handicap.

In addition, total APHAB scores were computed by taking the mean of subscales EC, BN and RV. The rationale for combining these subscales was based on the results of a factor analysis[3] of the subscale total unaided scores.

Each participating manufacturer sent the MarkeTrak customer satisfaction survey to consumers who had purchased their specific hearing instrument at least 90 days, but less than two years, in the past. The average age of all hearing instruments reported in this study is one year. Some manufacturers sent the surveys to the consumers directly using names and addresses from warranty information (two samples) or computer lists supplied by their dispensers (two samples). Other manufacturers recruited dispensers to affix addresses to survey packages with the names of the instrument purchasers
already identified based on random selection by computer (seven samples). Each manufacturer assured that a reasonable effort was made to select an unbiased sample of users from their database of purchasers. All surveys were confidential and were returned either directly to Knowles Electronics or to the manufacturer, who then forwarded them to Knowles. Knowles Electronics keypunched all data and computer-scored all surveys.

The reader should be aware that, because Knowles was not in control of the names and addresses, that the potential for sample biasing does exist. However, it is our experience after conducting more than two-dozen customer satisfaction studies that bias is minimal.

➢ *Classification scheme:* Each of the technologies reported in this study was classified on two dimensions: number of channels and memories! responses, based on the recommendation of Bray.[5] *(Note: memories and responses are used interchangeably throughout this article since the term "memory" is associated only with digitally programmable devices).* Four classes of instruments were composed: **Class** 1: Single channel, single memory (4 samples, total n=1256); **Class** 2: Single channel, multiple memory (2 samples, n=964); **Class 3:** Multiple channel, single memory (3 samples, n=992); **Class 4:** Multiple channel and multiple memory (4 samples, n=1573).

It should be pointed out that hearing instruments within a particular class are not necessarily homogenous in their technologies. Additional technological features were not included in this analysis (e.g., type of non-linear processing, remote control, compression knee-point, directional microphone, etc.).

Eleven of the 13 samples in this study used non-linear signal processing. The remaining two used linear amplification with compression limiting. Eight were digitally programmable by the dispenser with an external apparatus. Three were programmed either manually (by multiple calibrated trimmers) or directly from the factory. Two were non-programmable but were included for comparison because they used wide dynamic range compression. Details on the identity of the 13 samples cannot be provided for competitive reasons. However, the value of this report should not be diminished since its purpose is to compare and contrast generic "advanced" features to that of the average (MarkeTrak) hearing instrument.

The sample sizes, which are reported for each technology, ranged from 79 to 753 for an average of 368. The sample size for the MarkeTrak normative sample was 659. The incidence of bilateral loss ranged from 78-94% (MarkeTrak =82%) while the incidence of binaural fit ranged from 55-84% (MarkeTrak=65%). The average age of subjects varied from 67-73 years old (MarkeTrak=68) and the average price of instruments varied from a low of $804 to a high of $1861 (MarkeTrak=$718). In addition, 98-100% of subjects wore their hearing instruments at least a half-hour per day (MarkeTrak = 93%), with an average use/day ranging from 10.4-12.7 hours (MarkeTrak=9.4 hrs/day).

Results

Table 1 documents detailed satisfaction ratings for the MarkeTrak IV norm sample (first column) for each of the 13 hearing instrument samples, satisfaction ratings of instruments in the four respective technology classes, and total ratings for the digitally programmable instruments (last column). Products #1 and #2 in Class 1 may be considered as two additional norm groups since they are non-programmable wide dynamic range compression products. The reader should be aware that products #1, #2 and #3 are the only products which cannot be programmed (electronically or manually) by the dispenser.

Table 2 documents the level of statistical significance achieved for each of the 13 samples on all satisfaction variables measured. Results from product #10 are excluded from this table since its sample size (n=79) was not adequate for statistical analysis. A detailed description of the development of the MarkeTrak norms are presented elsewhere[3] and will not be repeated here.

➢ *Overall Indices of Satisfaction:* Fig. 1 shows that overall customer satisfaction ratings among the 13 samples ranged from 66-90% (MarkeTrak=64%). The results are impressive. Seven of the 13 samples (all programmable) have satisfaction ratings that exceed 75%. Four samples exceeded an 80% satisfaction rating. If one sets a 10% point increase in satisfaction as the basis for practical significance, it can be seen that the results differed by the class of instrument. Among Class 1 devices, only the digitally programmable product (#4) meets this criterion. Among the Class 2 devices (single channel, multiple memories) both samples had significantly higher satisfaction ratings. One of the three samples

among the Class 3 devices (multiple channel single memory) and three-out-of-four of the Class 4 devices (multiple channel multiple memory) met this criterion. All but one of the programmable products (#9) had overall satisfaction ratings that were statistically higher than MarkeTrak (see Table 2). The reader will also notice that only product #4, a single-channel, single-memory programmable product, is the only Class 1 device which had statistically higher overall satisfaction ratings than MarkeTrak.

The high-performance products also have a greater likelihood of receiving higher ratings on other overall indices (Table 1, 10% practical significance): likelihood of recommending hearing instruments to friends (2-of-13 samples), likelihood of repurchasing the product (6-of-13 samples), perceptions that quality of life has improved (7-of-13 samples) and likelihood of recommending the dispenser and rating their service high (all 13 samples). In reviewing the overall indices profile in Table 1 (percent satisfaction) and Table 2 (significance level), it is clear that products #4-13 (digitally or manually programmable) consistently outperform products #1-3 (non-linear and non-programmable).

➢ *Factors Most Important:* Prior to discussing detailed satisfaction ratings, factors that are most important to hearing instrument owners should first be considered. The MarkeTrak III

Table 1. Percent satisfaction by high performance hearing instruments compared to MarkeTrak IV norms.

	U.S. MarkeTrak Norms	Class 1 Instruments Single channel Single memory					Class 2 Instruments Single channel Multiple memory		
Product Number		1	2	3	4*	Class 1	5	6	Class 2
Hearing instrument style	85% ITE	CIC	ITE	ITE	ITE	Total	BTE	BTE/ITE	Total
Sample size	659	275	409	279	293	1256	211	753	964
Demographics									
Bilateral loss (%)	82	87	82	78	80	82	94	na	94
Binaural fit (%)	65	71	61	55	62	62	84	na	84
Average age subject	68	67	70	73	70	70	68	na	68
Average price ($) paid per instrument	718	1517	955	804	867	1028	1516	na	1517
Behavioral Measures (%)									
Wear hearing aids (Note 1)	93	99	98	99	98	99	100	99	99
Wear aids 4+ hours per day	78	92	91	92	88	91	95	93	93
Average hours worn per day (mean)	9.4	11.2	10.4	10.3	10.4	10.6	12.7	12	12.1
Would recommend hearing aids (Note 2)	84	85	85	83	91	86	98	90	92
Would recommend dispenser (Note 2)	77	93	88	88	91	90	96	89	90
Would repurchase brand (Note 2)	51	61	58	47	66	58	72	54	58
Quality of life improvement (Note 3)	68	69	66	64	74	68	88	83	83
Satisfaction (% satisfied)									
Overall satisfaction	64	69	66	68	76	69	90	78	81
Product features									
Fit/comfort	82	79	81	85	82	82	88	82	83
Visibility	62	87	74	56	69	72	69	71	71
Frequency of cleaning	63	73	68	75	72	72	64	63	73
Ease/battery change	86	86	87	91	86	88	89	87	88
Battery life	59	61	56	51	66	58	56	43	46
Reliability	73	75	75	77	81	77	84	78	79
On-going expense	44	61	59	53	64	59	66	58	59
Performance/value factors									
Improves my hearing	78	78	77	77	83	79	95	85	87
Clearness tone/sound	61	62	59	60	67	62	83	68	72
Natural sounding	56	63	58	57	66	61	75	61	64
Value (price vs performance)	55	53	55	55	61	56	67	63	64
Directionality	50	60	55	54	56	56	64	54	56
Whistling/feedback/buzzing	40	61	44	46	47	49	65	53	56
Use in noisy situations	29	38	26	26	31	30	67	46	51
Listening environments									
One-on-one	91	91	89	92	92	91	97	93	94
T.V.	69	76	72	73	75	74	78	68	71
Small groups	63	68	67	67	66	67	85	69	72
Place of worship	56	69	59	60	61	62	67	55	58
Outdoors	56	71	58	55	61	61	67	63	63
Car	55	54	54	53	54	54	67	54	57
Concert/movie	47	51	48	52	48	49	62	47	50
Restaurant	45	49	43	45	45	45	67	43	48
Telephone	34	58	45	44	40	46	45	40	41
Large group	26	34	24	21	26	26	51	29	34
Dispenser service									
Professionalism	89	96	97	95	96	96	99	96	97
Knowledgeability	91	96	96	92	96	95	98	93	94
Quality of service (during fitting)	89	97	96	95	95	96	97	na	97
Explained care of H.I.	91	96	96	94	94	95	96	90	91
Explained what to expect from H.I.	83	90	89	88	89	89	94	88	89
Post-purchase service	79	91	89	91	94	91	94	93	93

*Only class 1 product which is digitally programmable by the dispenser
Note 1: subtract from 100% to get hearing aids owned and not used (in the drawer)
Note 2: satisfied = 'yes' response
Note 3: satisfied = 'most of the time or always' response

research[9] demonstrated that the following factors explained nearly all (96%) of the variance that account for the overall satisfaction rating:

- Value (performance of the hearing instrument relative to price) and perceived benefit;
- Sound quality of the hearing instrument;
- Reliability of the hearing instrument; and
- Satisfaction in multiple listening situations.

With respect to the latter, overall satisfaction is related highly to the number of listening situations in which the users believe their needs are met. For example, MarkeTrak III showed that hearing instruments which satisfied wearers in only 1-out-of-lO listening situations measured in MarkeTrak received an overall satisfaction rating of 15%, while hearing instruments which satisfied customers in all 10 listening situations received an overall satisfaction rating of 92%. The hearing instrument which simultaneously provides value, benefit, sound quality, reliability and multi-environmental utility is expected to garner very high levels of end-user satisfaction.

➢ *Product Features:* Reliability is the most important factor within this category. Seven of the 13 samples were rated statistically higher than the MarkeTrak norm (Table 2). None of the non-linear non-programmable product achieved this level of performance. Ten of the 13 samples received higher scores on frequency of cleaning. In general, the high-performance products are equal to MarkeTrak on fit and comfort, ease of battery change and battery life. It is interesting to note that, while the visibility rating for the CIC product (87%) is significantly higher than the other high-performance products a number of the BTE samples (3) also achieved statistically higher ratings than MarkeTrak (62%) on visibility.

➢ *Performance Factors:* All multiple channel or multiple memory products (Classes 2-4) received significantly higher ratings than MarkeTrak on perceptions of benefit (Table 2). Only four of the samples received higher ratings on use in noisy situations; all were instruments with multiple memory. All but one of the programmable products (#9) received statistically higher ratings than MarkeTrak on clearness of sound/tone while all three of the non-programmable instruments were rated average. Eight of the samples were rated significantly higher than MarkeTrak on naturalness of sound; the only class in which all samples were rated significantly higher was the Class 4 product (multiple channel, multiple memory). Although four of the samples received significantly higher ratings on directionality, it is unclear if any hearing instrument feature per se affected the enhanced level of performance on this dimension. One of the areas traditionally difficult for hearing instrument owners is

Class 3 Instruments Multiple channel Single memory				Class 4 Instruments Multiple channel Multiple memory					Digitally Programmable Total
7 BTE 435	8 ITE 272	9 ITE 285	Class 3 Total 992	10 75% ITE 79	11 BTE 645	12 ITE 516	13 67% ITE 333	Class 4 Total 1573	3289
86	82	78	82	84	88	86	86	87	85
62	60	63	62	53	75	71	67	71	68
70	74	73	72	72	68	71	67	69	70
1493	1456	1266	1417	1216	1726	1861	1575	1714	1467
100	100	99	99	100	99	99	98	99	99
96	93	87	93	90	96	93	92	94	93
13	11.8	10.8	12	11.4	12.2	11.5	11.5	11.8	11.6
92	90	85	89	95	92	90	87	90	90
94	95	88	92	94	93	94	88	92	92
57	60	53	57	63	65	63	53	61	59
86	82	67	79	85	82	81	73	80	78
79	72	66	74	83	81	81	73	79	77
83	84	79	82	84	83	86	84	84	83
68	66	66	67	67	69	66	65	67	67
76	71	62	74	78	73	70	65	73	73
95	87	89	91	92	92	87	86	89	89
71	58	52	62	66	57	54	56	56	53
84	79	71	79	76	85	83	78	82	80
64	58	56	60	49	57	60	52	57	58
87	86	79	84	88	89	88	82	87	85
69	71	64	68	70	76	75	70	74	71
72	71	59	68	61	71	71	68	70	66
63	61	50	59	58	62	62	49	59	60
53	58	55	55	69	61	62	56	61	58
68	57	50	60	42	65	59	60	61	56
37	37	27	34	42	36	34	38	36	38
94	92	89	92	96	95	95	90	94	93
66	73	70	69	75	74	74	69	73	72
66	70	62	66	79	74	72	72	73	71
53	62	56	56	65	61	62	59	61	60
67	64	53	62	67	71	65	57	66	63
56	61	48	55	61	55	58	56	57	56
45	44	38	43	56	50	50	50	50	49
37	46	38	40	45	42	40	53	42	44
42	42	41	42	42	36	52	42	43	42
26	26	20	24	39	26	25	28	27	28
96	98	93	96	96	97	98	96	97	96
95	97	94	95	94	96	98	95	96	95
96	96	94	95	96	97	99	94	97	96
95	95	93	94	95	96	97	94	96	94
92	90	89	91	91	93	93	88	92	90
93	95	88	92	91	95	94	90	93	93

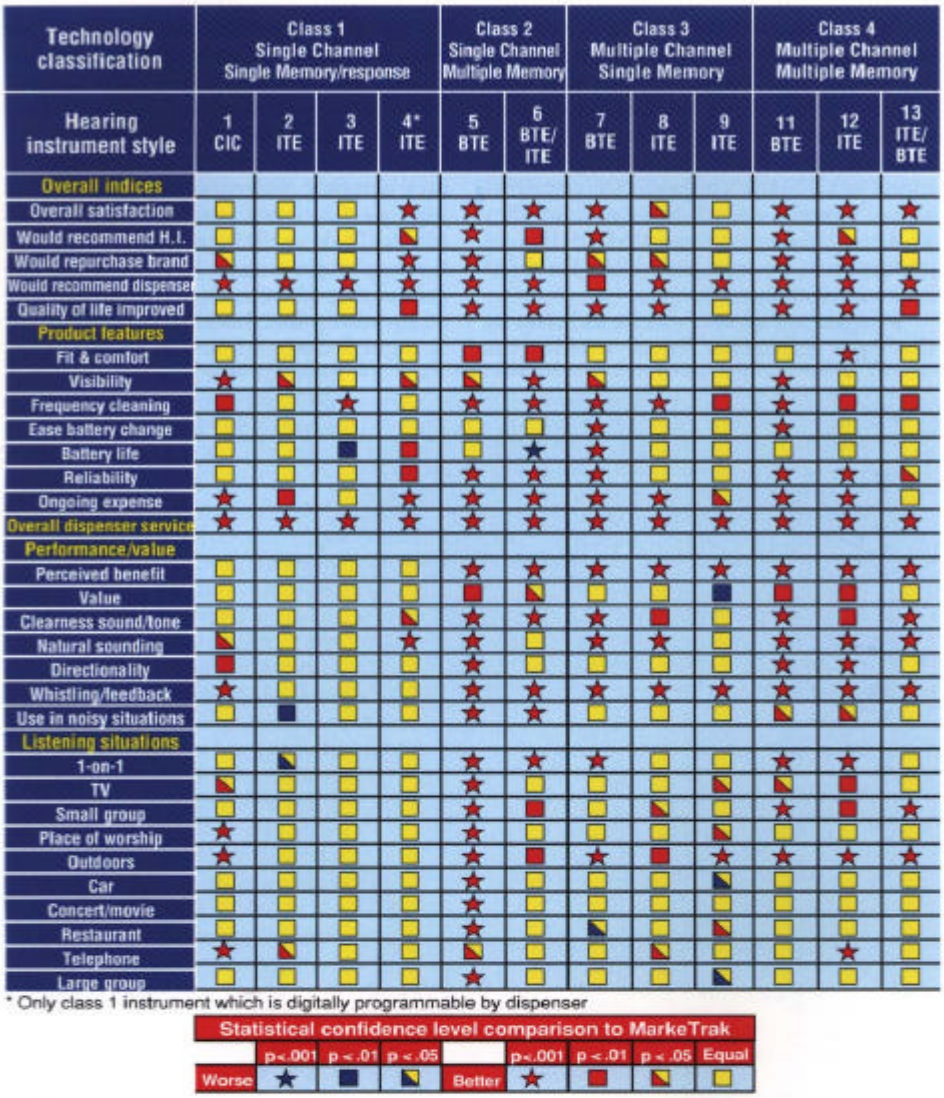

Table 2: *Statistical comparison of high-performance hearing instruments to MarkeTrak.*

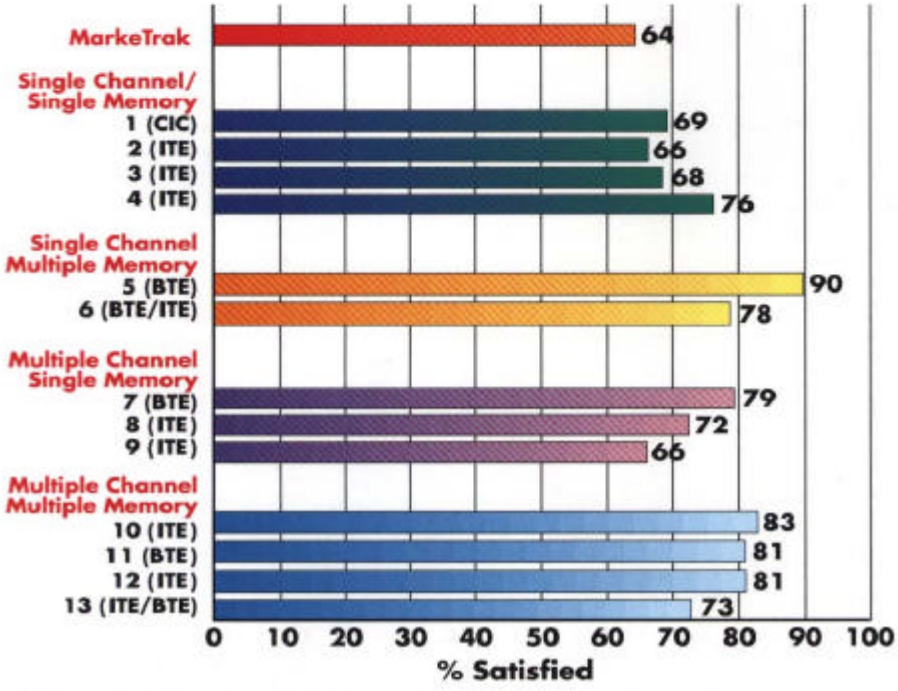

Fig. 1: *Overall satisfaction with high-performance hearing instruments.*

whistling and feedback. However, all Class 2-4 products and the Class 1 CIC were statistically higher than MarkeTrak—sometimes by 20% or more (products #1, 5, 7, 11, 13).

➢ *Multiple Listening Sit-uations:* The MarkeTrak III research[6] demonstrated that overall satisfaction with hearing instruments is highly related to the number of listening situations in which consumer needs are met. Thus, it is not enough to simply satisfy consumer needs in one-on-one communication in a quiet situation. Product #5 (Class 2, single channel, multiple memory) was the only product with statistically higher ratings than MarkeTrak in all 10 listening situations. One can conclude that the higher performance (9-of-12 samples, all programmables) product satisfies consumer needs better than the average (MarkeTrak) instrument in outdoor environments. In addition, they usually can satisfy consumer needs in 2-4 additional listening situations which tend to be less difficult (oneon-one, TV, small group). Among Class 1 products, the wide dynamic range compression CIC would appear to be superior to the other products in the same class, including that with the same signal processing strategy but in an ITE style (i.e., product #2), having achieved above average satisfaction in four listening situations.

➢ *Generic Features:* The previous tables provided a lot of information on a wide variety of technology. To appreciate the basis for their performance differences, one way is to compare generic features (e.g., single vs. multiple channel) on key dimensions of satisfaction. First, the data was subjected to a principle components factor analysis to extract orthogonal dimensions of outcomes (i.e., a method of aggregating variables). The factor analysis yielded six dimensions explaining at least one eigenvalue (e.g., variable):

1) Multi-environmental value (noise, directionality, 9-of-lO MarkeTrak listening situations);
2) Typical usage satisfaction (overall ratings, value, sound quality, reliability, fit and comfort, and one-on-one satisfaction);
3) Dispenser service;
4) Marketing/product factors (warranty, packaging, batteries, cleaning);
5) Communication benefit (APHAB subscores for EC, BN and RV); and
6) Aversiveness of sounds (APHAB subscore for AV).

The results of factor 1 (multi-environmental value), factor 2 (typical usage satisfaction) and factor 5 (subjective benefit) are presented in Figs. 2-4. The composite satisfaction scores were derived by summing z-trans-

formed variables (mean=5, std=2) correlated most highly with the underlying dimension. These results are presented in four generic hearing instrument features, which are available across each of the technologies in this study. These features are: programmability (digitally, manually or not programmable), number of channels (one, two), number of memories (one, two or more), and number of microphones (one, two).

Referring to Fig. 2, no difference is found in typical usage satisfaction between digitally and manually programmable instruments. However, a significant difference between programmable and non-programmable instruments is noted. In addition, typical usage satisfaction is positively impacted by the use of number of channels, memories and microphones.

With respect to multi-environmental value satisfaction (Fig. 3), no difference is found in satisfaction with programmability and number of channels, but a significant difference is found with number of memories and number of microphones in a hearing instrument.

Finally, Fig. 4 shows the total average subjective benefit scores, as measured by the APHAB by generic feature. We found no difference between digital and manually programmable instruments, but significant differences between programmable and non-linear non-programmable instruments. We found no difference based on number of channels, but significant differences with number of memories and number of microphones in the instruments. Detailed APHAB data is not presented in this study since we found that it did not differentiate between technology samples. We suspect this might be due to the roughness of the APHAB scale which measures benefit in 25% point increments between scale points 25-75% of the day. A psychometric evaluation of the APHAB will be the subject of another paper.

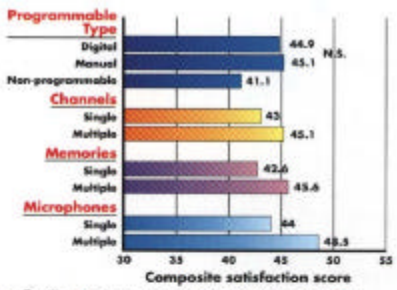

Fig. 2: *Typical usage satisfaction by generic feature. Composite score: overall, value, sound quality, 1-on-1, reliability and perceived benefit.*

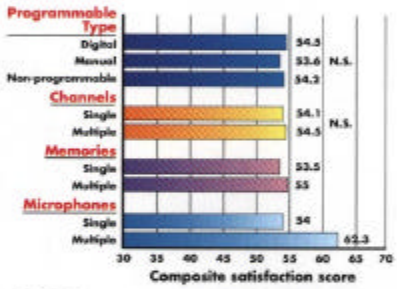

Fig. 3: *Multi-environmental value satisfaction by generic feature. Composite score: nine listening situations, noise, directionality.*

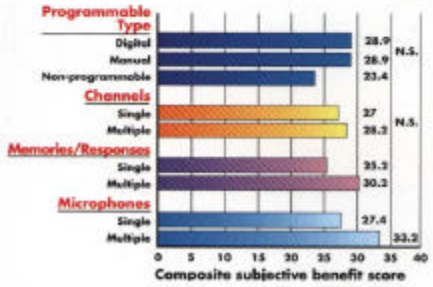

Fig. 4: *Total subjective benefit by generic feature. Composite APHAB score: EC, BN and RV.*

Conclusions

- High performance instruments achieved consistently higher-than-average ratings on key outcome factors including: overall satisfaction, likelihood of repurchase, positive word-of-mouth advertising, perceptions of improvement in the quality of life, value of the hearing instrument, product reliability and perceptions of benefit.
- High-performance instruments, as a class, improve multi-environmental value in the less-trying hearing situations (e.g., one-on-one, small group, outdoors), but not consistently in noisy, difficult listening situations (e.g., restaurant, car, large group).
- In general, instruments with multiple features were rated superior to instruments with single features. This would include channels, memories and microphones.
- With respect to multiple listening situations, it would appear that multiple memories and multiple microphones enhance consumer satisfaction with their hearing instruments more than did multiple channels.
- Digital programmables as a class received consistently higher satisfaction scores than non-programmables, but not manually programmable instruments (e.g., instruments with finely-calibrated, multiple trimmers).
- Multiple combined effects enhance satisfaction and value even more. This would include: multiple memories and multiple channels, and multiple microphones and multiple memories. However, the results are not consistent in difficult listening situations.
- The CIC results are consistent with previous studies by this author.[7] Subjects report consistently higher satisfaction ratings on the telephone and outdoors and are significantly more satisfied with directionality, feedback and, of course, visibility of the instrument.
- Technology exists now to achieve consistently 75%+ longer-term overall satisfaction (compared to the MarkeTrak average of 64%). In this study, 7-of-lO programmable samples achieved this lofty rating. Four samples (all programmable) achieved higher than 80% overall satisfaction ratings.

It is clear this industry has the technology *now*, even before the widespread utilization of digital signal processing (DSP), to achieve impressive customer satisfaction results. Yet, programmable technology is nearly ignored by the vast majority of hearing care professionals in America. Perhaps the superior user satisfaction with multiple-channel, multiple-memory or multiple-microphone programmables is one of the best-kept secrets in our industry. If we want to transform this market, hearing care professionals should consider choosing instruments using high-performance technology for their customers due to their higher-than-average chance of satisfying customers. Further adoption of programmable technology (and associated advanced signal processing) will lead to greater positive word-of-mouth advertising and growth of the hearing instrument market. ♦

References

1. Kachkin 5: MarkeTrak IV: 1 0 year trends in the hearing aid market; has anything changed? HearingJour 1996; 48 (1): 23-34.
2. Kochkin 5: MarkeTrak Ill: Why 20 million in U.S. don't use hearing aids for their hearing lass. Hearing Jour 1994; 46 (1): 20-27; 46 (2): 26-31; 46 (4): 36-37.
3. Kochkin S: MarkeTrak IV Norms: Subjective measures of satisfaction and benefit. Presented at the American Academy of Audiology Convention, Dallas, TX, March 31, 1995. Also in Seminars in Hearing (in press, 1997).
4. Cox RM & Alexander GC: The abbreviated profile of hearing aid benefit (APHAB). Ear and Hear 1995; 16:176.186.
5. Bray V: Programmable hearing instruments: Let's compare apples to applesl Presented at the American Academy of Audiologists Convention, Dallas, TX, April, 1995.
6. Kochkin 5: MarkeTrak Ill identifies key factors in determining customer satisfaction. Hearing Jour 1993; 46 (8): 39-44.
7. Kochkin 5: Consumer satisfaction and benefit with CIC hearing instruments. Hearing Review 1995; 2 (4): 16.26.

Correspondence can be addressed to HR *or to Sergei Kochkin at Knowles Electronics, Inc., 1151 Maplewood Drive, Itasca, IL 60143.*