Effects of Personality on Hearing Aid/FM Benefit

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Introduction

It is reasonable to hypothesize that an individual's personality can affect hearing aid and/or frequency modulation (FM) benefit. To date, however, there remains a paucity of data concerning personality and subjective benefit from various amplification technologies. Cox et al (1999) examined the relationship between extroversion/introversion, locus of control (LOC), and hearing aid benefit in 83 individuals with sensorineural hearing loss (SNHL). Results indicated that extroverted individuals received more communication benefit from their hearing aids than individuals who exhibited more introverted personalities. Moreover, subjects with an external LOC tended to exhibit more negative reactions to loud environmental sounds both with and without amplification.

The purpose of this investigation was to examine patient benefit with hearing aids and/or FM technology and personality type. Subjects (N=46) were fit with Phonak dAZ 311 BTE hearing aids and/or Microlink FM systems. Hearing aid benefit was evaluated via the ***Abbreviated Profile of Hearing Aid Benefit*** (***APHAB***). ***The Keirsey Temperament Sorter (KTS)*** was used to determine Myers-Briggs personality types. Locus of Control was evaluated with ***Levenson's LOC scale.*** The APHAB was administered on 7 separate occasions: pre-fitting, 1 month, 2 months, 3 months, 4 months, 5 months, and 6 months post fitting. The KTS and LOC questionnaires were administered only at pre-fitting.

Methods

Subjects

Subjects were recruited from the audiology clinics at the University of Florida (UF) and at the Washington University School of Medicine (WU). These subjects ranged in age from 24 to 84 years, with a median age of 73 years. Pure-tone test results revealed mean thresholds consistent with a mild sloping to severe SNHL bilaterally and a moderate sloping to severe SNHL bilaterally at UF and WU respectively (see Figures 1 and 2). Mean word recognition scores of 78% and 77% were obtained for the right and left ears respectively at UF and 73% and 77% were obtained for the right and left ears respectively at WU.

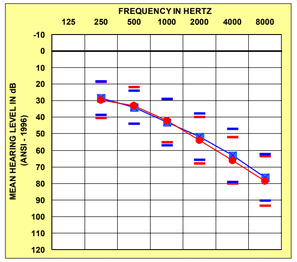

Figure 1. Mean pure-tone air-conduction thresholds for the right and left ears (± 1 SD) at UF.

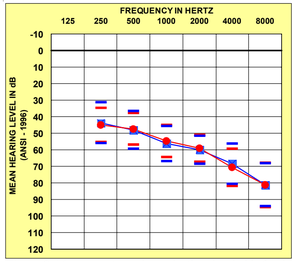

Figure 2. Mean pure-tone air-conduction thresholds for the right and left ears (± 1 SD) at WU.

Amplification Systems

All subjects were fit with digital Phonak Claro 311 dAZ BTE hearing aids and Phonak Microlink ML8 FM receivers bilaterally. The Phonak TX3 HandyMic FM transmitter served as the FM transmitter.

Abbreviated Profile of Hearing Aid Benefit (APHAB)

Communicative benefit was assessed by the APHAB (Cox & Alexander, 1995). The APHAB consists of 24 questions that are divided into four subscales: (1) ease of communication (EC); (2) speech in background noise (BN); (3) speech in reverberation (RT); and (4) aversiveness to sound (AV). Responses range from always (99%) to never (1%). Communicative benefit was determined by examining the difference between unaided and aided responses.

Keirsey Temperament Sorter (KTS)

The KTS is a 70 question, self-report questionnaire designed to identify the sixteen variants of the four temperaments/preferences as outlined by the Myers Briggs Type Indicator (MBTI). The KTS is essentially an abridged version of the MBTI and is designed to assess one's preferences on four scales. Each scale represents two opposite preferences. The four scales are: Extroversion vs. Introversion (E/I), Sensing vs. Intuition (S/N), Thinking vs. Feeling (T/F) and Judgment vs. Perception (J/P). A description of the 16 possible Myers-Briggs personality types is presented in Figure 3.

Figure 3. Myers-Briggs Personality Types

Levenson's Locus of Control (LOC) IPC Scale

Levenson's LOC Scale consists of 24 items divided into 3 subscales, the I, C, and P Scales, which establish an individual's tendency to believe in a particular source of control - internality (I), chance (C), and powerful others (P) (see Table 1). Levenson's scales utilize a Likert construct, which allows the dimensions to be statistically independent. Scores on each subscale range between 8 and 48. A high score on a subscale represent a greater tendency to believe in that source of control.

Table 1. LOC characteristics (Levenson, 1981).

Internality (I)	Chance (C)	Powerful Others (P)
• Expect that their actions will produce predictable outcomes. • Believe that they have the ability to perform behaviors necessary to control events. • Place a large amount of effort into mastering situations. • Obtain greater satisfaction from situations involving personal control.	• Believe that the world is unordered, and events are due to nonhuman forces, such as chance or fate. • Believe outcomes are unpredictable, and control is impossible.	• Believe that the world is ordered, and powerful others are in control. • Believe outcomes are predictable, and the potential for control exists.

Procedures

Personality and LOC were evaluated via the KTS and Levenson's LOC IPC scale respectively at pre-fitting. Subjects were then fit with the Phonak amplification systems in one of the following conditions: (1) Phonak 311 dAZ BTE hearing aids only or (2) Phonak 311 dAZ BTE hearing aids used in conjunction with the Phonak Microlink FM system. Subjects utilized the devices in the given condition for three months. At the end of the three months, the subjects switched experimental conditions. Each subject was evaluated with the APHAB at pre-fitting and three times (one time per month) in each experimental condition.

Table 2. Personality types for the average population and 46 subjects within this investigation (Percentages)

Temperament/Type	Average population	Subject population
STJ	11.04	16.21
ISTJ	10.58	35.13
ESFJ	12.18	10.81
ISFJ	9.65	8.10
ENFJ	7.44	2.70
NTP	8.60	8.11
INFJ	7.30	5.41
INFP	6.80	2.70
ENTJ	3.19	5.41
ENTP	2.23	0.00
INTJ	5.24	2.70
INTP	3.09	0.00
ESTP	2.71	0.00
ISTP	2.16	2.70
ESFP	4.79	0.00
ISFP	2.98	0.00

Table 3. Significant Correlations at UF between personality status and hearing aid benefit score.

Time Interval	MB	Scale	Condition	Correlation
1 Month Post-Fitting	E	BN	HA + FM	(+0.61, p=.000)
2 Months Post-Fitting	E	BN	HA + FM	(+0.57, p=.002)
3 Months Post-Fitting	E	BN	HA Only	(+0.64, p=.002)
	E	RV	HA Only	(+0.66, p=.002)
	E	BN	HA + FM	(+0.42, p=.010)
	J	BN	HA + FM	(+0.75, p=.001)

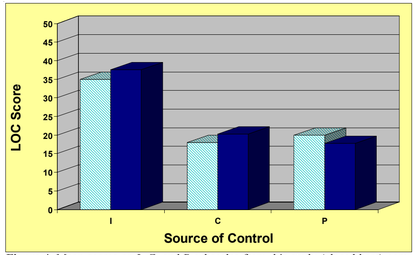

Figure 4. Mean scores on I, C, and P subscales from this study (closed bars) compared to typical scores from American adults (dashed bars).

Table 4. Significant correlations between LOC and HA benefit at various time intervals.

Time Interval	LOC	Scale	Condition	Correlation
1 Month Post-Fitting	P	BN	HA+FM	(-0.16, p = .005)
	C	BN	HA Only	(-0.14, p = .008)
2 Months Post-Fitting	C	RV	HA+FM	(-0.21, p = .002)
	C	RV	HA Only	(-0.16, p = .008)
3 Months Post-Fitting	C	RV	HA Only	(-0.16, p = .008)

Results

Results are shown in Tables 2 to 4. Table 2 presents mean personality types from the 46 subjects as compared to the normal population. As can be noted, subjects in this investigation were relatively consistent with reported data with the exception that study participants exhibited a greater degree of ISTJ types than the general population. Statistical analyses, using repeated measures analysis of variance, indicated no significant differences between the two study sites at the p<.01 level. Overall, results from these analyses indicated no significant relationship between personality type and hearing aid/FM benefit when data were collapsed across both sites. Significant correlations, however, were found at UF. These significant correlations are reported in Table 3. Figure 4 presents mean scores on the three LOC scales from the 46 subjects compared to national norms. As can be noted, subjects in this investigation were similar to reported adult data. Statistical analyses, using repeated measures analysis of variance, indicated no significant differences between the two study sites at the p<.01 level; therefore the data were collapsed across sites. All significant correlations are reported in Table 4.

Conclusions

The present investigation examined the relationship between personality status, LOC, and patient benefit measured in HA only and HA+FM conditions. Results indicated that several personality types exhibited significant moderate to high correlations to hearing aid and/or FM benefit at UF only. No significant correlations were found at WU or via cumulative site data. Specifically, at the 1-month testing interval, individuals at UF with an extroverted personality (E) were receiving significant benefit from HA+FM utilization in noisy environments. This trend remained consistent through the third month of the investigation. Moreover, at the third month testing interval, extroverted individuals were obtaining greater improvements in communicative efficiency when utilizing their hearing aids in noisy and reverberant environments. In addition, individuals with a judgmental personality (J) obtained significant correlations in communication improvement in noise when using their HA+FM system. Results also indicated that several LOC types exhibited statistically significant, yet low, correlations to HA and/or FM benefit in adverse listening environments. Specifically, at the 1-month testing interval, subjects' chance subscale scores were significantly correlated with HA benefit in background noise and FM utilization in reverberation. Powerful others LOC scores were related to benefit in background noise with the use of FM technology. Interestingly, at the 2-month testing interval, only the chance LOC scores were correlated to HA and FM benefit in reverberation. At 3 months, chance LOC scores were still significantly related to amplification system benefit in reverberant environments. While these data suggest that an individual's personality status, particularly individuals with extroversion, or an external LOC, can influence benefit from HA and/or FM utilization, we are currently conducting additional investigations to examine this relationship in greater detail. If substantial relationships can be found, it seems reasonable to assume that HA counseling and orientation programs should incorporate personality tests such as Myers-Briggs and/or LOC type measurements into their paradigm.

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