COUNSELLING DURING REAL EAR MEASUREMENTS: THE CLIENTS' PERSPECTIVE

by

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The following individuals certify that they have read, and recommend to the Faculty of Graduate and Postdoctoral Studies for acceptance, a thesis entitled:

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Abstract

Objective: Amplification is one intervention to address hearing loss. When dispensing hearing aids, audiologists must follow validated fitting and verification procedures to ensure that the hearing aids are properly fitted to the client's hearing thresholds. Real ear measurements (REM) are best practice for verifying hearing aids. This study investigated informational counseling throughout REMs by gathering perspectives of first-time hearing aid users regarding the content and format of counselling.

Methods: Focus groups were conducted to elicit feedback on a demonstration of informational counselling during REM hearing aid verification. There were 17 adult participants (5 male, 12 female) who all had memory of REMs occurring during their own hearing aid verification. The data from the focus groups were transcribed verbatim and analyzed using qualitative content analysis.

Results: Analysis revealed positive aspects, negative aspects, and suggested changes in relation to verbal and visual information presented during the REM verification demonstration. These data fell into two broader categories: the interaction (i.e., relational) and transaction (i.e., content) of informational counselling.

Conclusion: Most clients were interested in learning more about REMs if the information was accessible. Results provide recommendations for clinical audiologists and REM system manufacturers to make the visuals and verbal information presented during informational counselling more client-friendly and individualized for client-centred care. To continue exploring this new inquiry, further experimental research is needed to determine if there is any added value of incorporating informational counselling during REMs.

Lay Summary

Hearing aids are one way to address hearing loss. When receiving hearing aids, it is important that they are fitted appropriately to the specific hearing level of the client. There are protocols set for audiologists to follow, ensuring that the hearing aids are programmed appropriately. One way to do this is to conduct a procedure called real ear measurement (REM). This study examines the inclusion of an explanation of this REM procedure so clients can learn more about their hearing aids. Feedback from first-time hearing aid users was gathered on a demonstration of REM that includes this detailed explanation throughout the procedure. The information gathered was divided by the positive aspects, negative aspects, and suggestions that the participants discussed, in terms of the visual and verbal information that was presented in the demonstration.

Preface

The work presented below was produced by A. Ryall, under the supervision of L. Jenstad, and co-supervision of T. Howe, and G. Grosjean. A. Ryall and L. Jenstad collaborated on the study topic, design, and data collection, with input from T. Howe on design. A. Ryall generated attached appendices and was responsible for the data analysis. Data analysis was reviewed by L. Jenstad and T. Howe.

This study was reviewed and approved by the Behavioural Research Ethics Board of the University of British Columbia on September 26, 2018, under the project title "Counselling During Probe Microphone Measures: The Clients' Perspective". The certificate number of the ethics certificate obtained is H18-00738.

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List of Abbreviations

AUDI= audiologist

dB= decibel

DSL v5= Desired Sensation Level version 5

HA= hearing aid

HL= hearing loss

MPO= maximum power output

NAL-NL2= National Acoustic Laboratories-nonlinear 2 prescriptive procedure

NAL-R= National Acoustic Laboratories-Revised prescriptive procedure

REAR= real-ear aided response

REIG= real-ear insertion gain

REM= real ear measurement

SADL= Satisfaction with Amplification in Daily Living

SPL= sound pressure level

Glossary

Client-centered care: "care that is respectful of and responsive to individual client preferences, needs, and values, and ensuring that client values guide all clinical decisions" (Institute of Medicine, 2001, p. 6).

Fitting: programming the hearing aid using a validated prescriptive fitting method to compute target gain and output across different input levels, signal types, and frequencies that are specific to the client's ear canal and hearing loss (Katz, Chasin, English, Hood, & Tillery, 2015)

Health literacy: "the wide range of skills and competencies that people develop to seek out, comprehend, evaluate, and use health information and concepts to make informed choices, reduce health risks, and increase quality of life" (Zarcadoolas, Pleasant, & Greer, 2005, p. 196)

Informational counselling: the act of providing relevant information to the client that is necessary for him/her to understand the nature of a disorder (e.g., hearing loss) and the steps recommended for managing it (Margolis, 2004)

Real Ear Measurement: process used for hearing aid verification. The performance of the hearing aid is verified in the client's ear canal through a small probe microphone (Katz et al., 2015)

Verification: process of confirming the hearing aid output relative to targets determined by a prescriptive fitting method (College of Audiologists and Speech-Language Pathologists of Ontario, 2016; Katz et al., 2015)

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To myself,

For the hard work, tears, and joy this project has brought.

SELF CARE IS THE BEST CARE

Chapter 1: Introduction

1.1 Hearing Healthcare

Hearing healthcare is the process by which individuals seek and receive care for their hearing health. The journey is initiated either by the individual, referring doctor, or family members (e.g., significant other or children). Knudsen, Oberg, Nielsen, Naylor, and Kramer (2010) argue there are four stages of the hearing healthcare journey when amplification is the treatment of choice: help seeking, uptake of amplification, continued use of amplification, and satisfaction. For example, an individual might seek help from an audiologist regarding his/her hearing loss and then he/she may acquire an amplification device such as a hearing aid or other hearing assistance technology. If the process is successful, then regular use of amplification will follow. In the end, the desired outcome is satisfaction with the amplification (Knudsen et al., 2010). The steps of the journey are progressive, and the individual may delay or withdraw from the process at any of the stages.

1.2 Hearing Loss

Hearing loss affects a substantial percentage of the population and is a leading cause of disability worldwide (Stevens et al., 2013). A recent survey by Statistics Canada found that about 40% of adults aged 20 to 79 years old had at least a slight hearing loss (>15 dB HL) (Statistics Canada, 2016). The prevalence of hearing loss increases with age; Statistics Canada reported that 15% of adults aged 20 to 39, 40% of those aged 40 to 59, and 78% of adults aged 60 to 79 had hearing loss (Statistics Canada, 2016). The population of older adults is steadily increasing, and thus the number of adults who have hearing loss will also increase. There are several consequences if hearing loss remains untreated: individuals may have reduced communication abilities,

especially in noisy environments, and hearing loss may also lead to social isolation, depression, and issues with employment and access to information sources, such as radio broadcasts (Davis, Smith, Ferguson, Stephens, & Gianopoulos, 2007).

In the first stage of the hearing healthcare journey, help-seeking, some people report having hearing loss for approximately ten years by the time they first visit an audiologist (Davis et al., 2007). Although individuals may visit a healthcare professional regarding hearing difficulties, it does not mean that the individual will be fitted with hearing aids, thus not progressing to the second stage of the hearing health journey, uptake of intervention. Gilhome Herbst, Meredith and Stephens (1991) found that out of all the clients[1] who visited their physician about hearing loss, less than half (44%) of the individuals were subsequently fitted with hearing aids. Many researchers have investigated specific factors that influence the uptake of amplification devices. For example, Winsor (2011) found four factors that may affect hearing aid uptake: (1) the client's self-perceived hearing ability; (2) the ability to gather information and make informed decisions; (3) the influence of others (such as client's family telling him/her to get hearing aids, the audiologist explaining benefits of hearing aids, or peers who share their experiences with hearing aids); and (4) the associated cost of hearing aids. Additional reasons why someone might be unwilling to use amplification devices are personality factors, stigma, the individual's personal control and attitude, perceived benefit, and the ability to manage with hearing aids and their basic function (Garstecki & Erler, 1998; Jenstad & Moon, 2011; Meyer, Hickson, Lovelock, Lampert,

[1]This paper will use the term 'client' to describe individuals who receive care from audiologists. Currently, there is no consensus on what terminology should be used. Lloyd, King, Bassett, Sandland, and Savige (2001) distributed surveys about terminology preference from individuals who received support from mental health services. The survey revealed the individuals preferred the term 'client' as it indicates that the individual has an active role in the rehabilitation process and assumes responsibility of the progress. This active role is similar to the individuals who receive care from audiologists.

& Khan, 2014). Those adults who obtain hearing aids may not proceed to the next stage of hearing health: using their hearing aids regularly. Davis et al. found that long-term use of amplification was very low unless the hearing loss was significant. Gianopoulos, Stephens, and Davis (2007) followed up with individuals eight to sixteen years after being fitted with hearing aids and found out that only 43% of individuals were still using their hearing aids.

Why would an individual go through the whole amplification process then stop wearing their hearing aids? A few researchers reported perceived poor benefit, uncomfortable fit, cost, and sound quality of the hearing aids as factors for the discontinued use (Kochkin, 2000; McCormack & Fortnum, 2013). Some of these reasons can be addressed by audiologists. For example, the physical fit of the hearing aid can be modified to be more comfortable and counselling can be provided on correct use for maximum benefit. Additionally, Vuorialho, Karinem, and Sorri (2006) investigated the role of counselling clients a few months after being fitted with hearing aids. Follow-up counselling was provided to all participants six months after the hearing aid fitting, to encourage long-term use. Participants were asked to fill out surveys about hearing aid use, quality of life, and satisfaction at the time of the follow-up counselling and again twelve months after the fitting. The researchers found that follow-up counselling six months after the fitting increased hearing aid use. At the time of the six-month follow-up, 30% of participants were occasional users and 9% were non-users. These groups were provided with additional counselling, then at twelve months after the fitting, 62% of the occasional users and 33% of the non-users became regular hearing aid users (Vuorialho et al., 2006). From this research it appears that follow-up counselling can be an effective intervention to increase hearing aid use. Since individuals can withdraw from the hearing healthcare journey at any step, it is important that there are opportunities for counselling incorporated throughout the rehabilitation process. By improving clinical practices,

audiologists will be able to provide evidence-based support to clients to ensure they are satisfied with amplification and with hearing healthcare.

1.3 Amplification

The use of amplification devices (i.e., hearing aids) to ameliorate hearing loss is an intervention often used by audiologists. During the process of hearing healthcare, fitting and verification procedures must be completed before the client receives the hearing aids. The purpose of fitting and verification is to ensure the hearing aids are physically fitted appropriately and provide a comfortable and beneficial amount of amplification for all signals at multiple input levels (College of Audiologists and Speech-Language Pathologists of Ontario, 2016; Katz et al., 2015; Valente et al., 2006). Best practice for hearing aid fitting procedures requires the use of a validated prescriptive fitting method to compute target gain and output across different input levels, signal types, and frequencies that are specific to the client's ear canal and hearing loss (Katz et al., 2015). Best practice for verification of hearing aids is to use a real ear measurement (REM) system in order to match the hearing aid output to targets determined by the prescriptive fitting method (College of Audiologists and Speech-Language Pathologists of Ontario, 2016; Katz et al., 2015). The audiologist adjusts the hearing aids to ensure that they match the prescriptive targets at all input levels (Katz et al., 2015). After the fitting and verification is completed, the client can begin to use the hearing aids regularly. The continued use of hearing aids requires ongoing communication between the audiologist and the client (Valente et al., 2006).

Using REMs for hearing aid verification is the most reliable and efficient way to verify hearing aids (Katz et al., 2015). Although there are no global standards established for verification procedures, it is mandatory to use REMs for verification when fitting hearing aids in various

jurisdictions across Canada. After the verification procedure is completed, the client is provided with an orientation to the hearing aids, covering topics such as how they work, how to clean the hearing aids, realistic expectations, and acclimatization to the amplified sound. Counseling is individualized for each client throughout the hearing aid fitting process.

1.4 Real Ear Measurement Verification

1.4.1 Procedure

During the process of REMs, the hearing aids are connected to the manufacturer's NOAH[2] program on the computer using a wired or wireless connection. A prescriptive fitting method is chosen, and the manufacturer's NOAH module is used to pre-set the hearing aids to be reasonably close to targets. Further changes are needed to this pre-setting to account for individual variability in hearing aid performance and ear canal acoustics (Hawkins & Cook, 2003). A small probe tube is placed in the client's ear canal within five millimeters of the tympanic membrane. Next, the hearing aids are placed into the individual's ears. The probe tube collects the amplified sound at the eardrum and carries it back to the REM system, which converts the sound into dB SPL and is plotted on the display of the REM system. The REM system will provide targets based on the prescriptive fitting method chosen and the clinician matches the output signal of the hearing aids as close as possible to the targets on the display. Modifications in the manufacturer's NOAH program may be required to change the output of the hearing aid to achieve the close match to targets.

[2] NOAH is a software product that allows hearing healthcare professionals to combine audiology assessments and amplification fitting modules from many different hearing aid manufacturers into one integrated system.

1.4.2 Real-Ear Aided Response

There are two methods that can be used for REM verification, either real-ear insertion gain (REIG) or real-ear aided response (REAR). The REAR is the most common way to verify hearing aids in North America. Mueller and Picou (2010) found that 78% of hearing aid clinicians use REAR for verification compared to REIG.

For the REAR method, the response from the REM system is shown on the SPL-o-gram, as depicted in Figure 1.1. The amplified sound from the probe tube is carried to a microphone attached to the REM system and the response on the SPL-o-gram is the REAR. The x-axis shows the frequency bandwidth in Hz and the y-axis shows intensity in dB SPL. This graph is oriented opposite from the audiogram with less intense sounds at the bottom and more intense sounds at the top of the graph. Many REM systems will have similar layouts to the one presented below. This study will focus on using the SPL-o-gram and REAR as these are the most common method of display used by clinicians in North America.

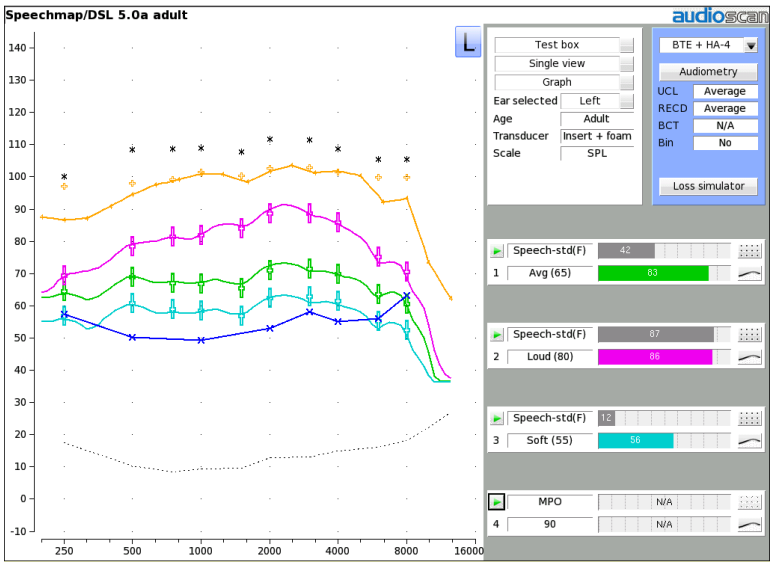

Figure 1.1 SPL-o-gram

1.5 Benefits of Real Ear Measurement

There are multiple advantages for using REMs for hearing aid verification. An advantage for the client is increased performance in noisy environments (Leavitt & Flexer, 2012), and for the audiologist, fewer client-initiated follow-up appointments (Kochkin, 2011) and increased client satisfaction with clinicians (Amlani, Pumford, & Gessling, 2016). Furthermore, 79% of clients prefer the sound quality of hearing aids when they are fitted to a validated prescriptive approach using REM over a manufacturers' first-fit approach (Valente, Oeding, Brockmeyer, Smith, & Kallogjeri, 2017). Despite these advantages, only 40% of clinicians use REMs for verification (Mueller & Picou, 2010). The low number of clinicians using REMs is discouraging when evidence suggests benefits to both the client and audiologist. Two potential sources of these benefits from REMs have been proposed: 1) using REMs to precisely match the hearing aid response to prescriptive targets and 2) the client receiving informational counselling about their hearing aid processing. The literature thus far has focused on the benefit from matching the hearing aid to prescriptive targets and thus, there is minimal literature regarding informational counselling during REMs.

1.5.1 Matching to Prescriptive Targets

Several research studies have determined multiple advantages of using REMs to match to prescriptive fitting method targets. However, it is hard to separate the value of using a validated prescriptive method from the verification process (REMs) itself. Best practice for fitting hearing aids is to use a validated prescriptive approach (e.g., NAL-NL2 or DSL v5), which is a research-based algorithm that provides targets for each frequency dependent on the severity and type of hearing loss and age of the client. It can be used with products from any hearing aid manufacturer and any REM system. The output of the hearing aid must be adjusted to ensure that the targets are

reached. The REM verification process indicates that the hearing aids are providing adequate output for the individual's hearing loss when the output of the hearing aid (REAR) is matched to prescriptive targets.

Both the prescriptive fitting method and the use of REMs are important for fitting and verifying hearing aids for the following reasons. First, there is evidence indicating that when clients' hearing aids are fitted and verified with a prescriptive method and using REMs, they have better performance for phoneme recognition in quiet and sentences in noise (Leavitt & Flexer, 2012; Valente et al., 2017). Second, there is more self-reported benefit from individuals who had a hearing aid fitted using a validated approach versus a non-validated approach (Abrams, Chisolm, McManus, & McArdle, 2012). Third, Kochkin (2011) examined the relationship between verification, validation (individual outcome measures of a client's performance and benefit with hearing aids), and the number of client-initiated visits after the hearing aid fitting. Clients who reported having neither verification nor validation in their hearing aid fitting had the highest number of client-initiated appointments after the fitting while clients who had experienced both verification and validation had the fewest. Finally, Amlani et al. (2016) determined when hearing aids are fitted with a validated prescriptive approach and verified with REMs, participants reported higher self-perceived benefit, value, satisfaction with clinician, and were willing to pay more for the procedure.

1.5.2 Informational Counselling during Real Ear Measurement

Informational counselling is the act of providing relevant information to the client that is necessary for him/her to understand the nature of a disorder (e.g., hearing loss) and the steps recommended for managing it (Margolis, 2004). In respect to audiology, informational counselling is the act of providing information to the client specifically about communication strategies, their

hearing loss, and hearing aids (Makhoba & Joseph, 2016; Saunders & Forsline, 2012). Informational counselling can be seen as a way to improve client's knowledge about their hearing healthcare by providing information about the rehabilitation process (Makhoba & Joseph, 2016; Saunders & Forsline, 2012). It is also commonly used during the hearing aid fitting when orienting the client to the hearing aids for the first time (Saunders & Forsline, 2012). There is no evidence so far regarding the use of informational counselling during REMs and its potential influence on client satisfaction. Through this study, we explored this new area of research by asking first-time hearing aid users about informational counselling presented during REMs.

1.5.2.1 Health Literacy

Zarcadoolas, Pleasant, and Greer (2005) define health literacy as "the wide range of skills and competencies that people develop to seek out, comprehend, evaluate, and use health information and concepts to make informed choices, reduce health risks, and increase quality of life" (p. 196). It is important that individuals have adequate skills with health literacy to understand and make decisions about their health care. In Canada, about 60% of adults do not have adequate health literacy abilities to manage their healthcare needs (Canadian Council on Learning, 2007; Canadian Council on Learning, 2008). In addition, health literacy skills are lower among certain groups, such as older adults, immigrants, and people who are unemployed (Canadian Council on Learning, 2007; Canadian Council on Learning, 2008).

Health literacy affects physical, social, and economic well-being of individuals (Canadian Council on Learning, 2008). If someone does not have adequate health literacy, they may not follow through with tests, referrals, or medications and may miss appointments and avoid clarification questions (Hakim, 2011). Without health literacy skills, clients may make uninformed decisions about healthcare, conditions may go unchecked or worsen, and questions may go

unanswered (Canadian Council on Learning, 2008). Improving health literacy may prevent illness and reduce accidents and death (Canadian Council on Learning, 2008). In addition, having adequate health literacy abilities allows individuals to take an active part in their healthcare decision making (Canadian Council on Learning, 2008; Nutbeam, 2008; Rootman & Gordon-El-Bihbety, 2008). Finally, the ability to understand and communicate healthcare information is important for maintaining a healthy lifestyle, managing needs, and making informed decisions regarding one's own healthcare (Canadian Council on Learning, 2008).

Based on the negative consequences of low health literacy, it is important that there are opportunities to improve health literacy. Generally, it is important that healthcare information is made easily accessible to everyone (Rootman & Gordon-El-Bihbety, 2008). On a larger scale, this can be done by posting information flyers that are easy to read and by setting up various opportunities in the community for people to learn about and develop health literacy skills (e.g., workshops) (Rootman & Gordon-El-Bihbety, 2008) . On a smaller scale, this can be done during the interaction between the healthcare provider and client by using simple language and providing visual information to supplement the verbal information (e.g., pamphlets or drawings) (Carollo, 2015; Mayeaux et al., 1996; Schwartzberg, Cowett, VanGeest, & Wolf, 2007). Other ways clinicians can supplement learning when communicating with clients are to speak slowly, take time to assess client's health literacy skills, repeat key points, include family members or caregivers in the discussion, limit the information given, confirm client's understanding by asking questions or using a teach-back method, and by being respectful, caring, and sensitive (Blackstone, 2015; Carollo, 2015; Gilligan & Weinstein, 2016; Gilligan & Weinstein, 2014; Mayeaux et al., 1996; Osborn & McKee, 2015; Schwartzberg et al., 2007; Williams, Davis, Parker, & Weiss,

2002). Healthcare providers have an important role when it comes to health literacy as every interaction in a medical visit is a potential learning opportunity for clients.

In audiology, it seems that the trend of low health literacy continues as individuals with hearing loss have limited health knowledge and access to healthcare (Osborn & McKee, 2015). Nair and Cienkowski (2010) found that individuals with hearing loss had health literacy skills below the third-grade level. The language used by the audiologist in the counselling sessions was directed at a higher health literacy level, and the written education materials were even more complex. There is a communication gap between the clients' understanding, the counselling, and educational materials and this gap could impact daily living (Nair & Cienkowski, 2010). It is hoped that with effective informational counselling and using some of the strategies listed above, clients will build enough health literacy skills to become active participants in their audiological rehabilitation.

1.5.2.2 Client-Centered Care

Client-centered care means to provide "care that is respectful of and responsive to individual client preferences, needs, and values, and ensuring that client values guide all clinical decisions" (Institute of Medicine, 2001, p. 6). Client-centered care ensures that care is holistic, individualized, respectful, and empowering to the client (Morgan & Yoder, 2012). It is important for healthcare professionals to understand the various aspects of client-centered care as there is not one solution that will work for everyone and each person may require a different rehabilitation path for optimal results.

Research has shown client-centered care to be beneficial for clients. It can increase client satisfaction (Morgan & Yoder, 2012; Zachariae et al., 2003), increase treatment adherence (Hahn, 2009), lead to better health outcomes (Hendriks, Dahlhaus-Booij, & Plass, 2017; Meterko, Wright,

Lin, Lowy, & Cleary, 2010), and it can improve quality of life and self-care, while reducing symptom burden, and shortening hospital stay (Ulin, Malm, & Nygårdh, 2015). Additionally, allowing opportunities for the client to ask questions, providing information tailored to the client, and listening and responding to emotions are important for the relationship between the client and healthcare professional (Zachariae et al., 2003).

The client-clinician relationship has both emotional and informational components (Kelley, Kraft-Todd, Schapira, Kossowsky, & Riess, 2014); and clients feel that this relationship is important for healthcare interactions (Grenness, Hickson, Laplante-Lévesque, & Davidson, 2014). Furthermore, Carollo (2015) found through interviews with healthcare professionals and older female participants, that a good relationship between the clinician and client is the foundation for client-centered care and communication. By informing, involving, and individualizing the care for the client, the client-clinician relationship can be established and maintained (Grenness et al., 2014). Clinicians who actively listen to their clients and assess their needs (e.g., goals for amplification and health literacy) can target their needs and adjust the rehabilitation accordingly. In addition, the National Academies of Sciences, Engineering, and Medicine (2016) recommends that hearing healthcare requires an individual-centered approach in every step, from the diagnosis to management. Hendriks, Dalhaus-Booij, and Plass (2017) found that clients rated their participation in audiology appointments low, which implies client-centered care could be improved. This could be done by incorporating the client's needs, values, and preferences into the hearing healthcare process (Hendriks et al., 2017).

1.5.2.3 The Relationship between Health Literacy, Client-Centered Care, and Informational Counselling

I am working from the belief that with informational counselling, information about how hearing aids work will become more accessible to clients, providing an opportunity for clients to learn about the procedure and become more knowledgeable about their hearing aids. Clients will become more involved in their healthcare as their health literacy improves (Canadian Council on Learning, 2008). This increase in literacy is partially dependent on the clinician providing opportunities for the client to learn. For example, once the client learns the benefits and limitations of amplification, they can provide specific feedback to the audiologist for further fine-tuning and adjustment of their hearing aids. With this knowledge, clients may feel empowered about their hearing aids as their individual preferences and feedback will be targeted by the audiologist. Additionally, when clients have the knowledge to describe their own experiences, it provides clinicians the opportunity to use elements of client-centered care as the audiologist can focus on the client's specific listening experiences for adjustments.

There are several ways for clinicians to incorporate informational counselling into REM procedures. Generally, informational counseling can be integrated into REMs by stating aloud all the steps and actions the clinician is completing, then by explaining the equipment and REM system display, and what to look for throughout the procedure. As the audiologist explains everything, clients will begin to learn the vocabulary for REM and amplification. For example, Smriga (2015) suggests that clinicians can use the SPL-o-gram in hearing aid fitting appointments as a counseling tool to explain to clients how their hearing aids work. Using the SPL-o-gram on the REM system, clinicians can demonstrate that changes to the hearing aids can cause signals to fall in or outside the client's dynamic range, and thus make speech sounds audible when they are

within the dynamic range (Smriga, 2015). Using correct terminology such as “dynamic range” provides clients with a tool for explaining to others how their hearing aids work. Another way to incorporate counselling in REMs is to demonstrate various features of the hearing aids. For example, using live speech signals, the clinician can show the difference in audibility the client has with and without the hearing aids (Bentler, Mueller, & Ricketts, 2016). Also, features like directionality and noise reduction can be demonstrated to the client to give him/her more knowledge of how the hearing aids will work in the environments where the features would be activated. Noise reduction is a helpful feature to demonstrate as the client can see the processing of this feature on the REM system display in real time as the signals are being presented; i.e., the reduction of noise and increase of gain for speech can be easily seen (Bentler et al., 2016). Finally, during counselling, the audiologist should ask the client if there are any questions about the procedure or any features of the equipment that are unclear.

Using some of these strategies during REMs, I believe that clients will learn the vocabulary and will become active participants in the client-clinician relationship. After the hearing aid fitting appointment, there are a few follow-up appointments that rely on client’s feedback and experience with amplification. When clients have more knowledge about their hearing aids, they can provide more feedback about specific environments. With this feedback, audiologists can adjust the hearing aids. It is suggested then that clients will feel empowered because they were able to share their experiences with the audiologist and see their needs being addressed. Informational counselling may provide an opportunity for clients to become active participants in the interaction as they can ask questions about the REM procedure while learning about their hearing aids. Additionally, clients may become active participants in their hearing healthcare journey and in the client-clinician relationship with their audiologist.

1.6 Purpose

This project was an initial step in formally implementing informational counselling in REMs. Further projects in this area of research will use experimental manipulation to determine whether informational counselling has an impact on client outcomes and satisfaction with amplification; before that investigation can happen, it was important to gather the clients' perspective on the best way to deliver the messages. So far, the literature surrounding REMs has primarily focused on clinician's views regarding the use of hearing aid verification. Through focus groups, we directly asked clients to provide feedback on one example of informational counselling. Thus, the purpose of this study was to identify the perspective of first-time hearing aid users with respect to the content and format of informational counselling during REMs. Specifically, participants were asked to comment on any positive aspects and/or negative aspects with respect to the content and format or provide any suggestions for change.

Chapter 2: Methodology

2.1 Research Paradigm

In this study, a constructivist paradigm was adopted. Constructivism is the idea that individuals build their own knowledge and understanding through interactions with other people and create their own unique realities (Creswell, 2013; Mogashoa, 2014). Constructivism assumes relativist ontology and subjectivist epistemology (Denzin & Lincoln, 2005; Guba & Lincoln, 1994). Ontology is the nature of reality (Lee, 2012); relativist meaning there are multiple realities that are constructed and one is not more or less true than the other (Denzin & Lincoln, 2005; Guba & Lincoln, 1994). Everyone will experience different events and activities throughout their lifetime and thus create a unique reality (Creswell, 2013). Epistemology is the theory of knowledge; in constructivism the individuals create mutual understanding through their interaction with peers (Lee, 2012; Mogashoa, 2014). Thus, the research findings are created based on the understanding and knowledge of both the researchers and participants (Denzin & Lincoln, 2005; Guba & Lincoln, 1994). Through focus groups, participants shared their experience and knowledge about REMs and the researchers may have their own reality of the best protocol for counselling. Thus, the results from this study were produced on a reality that is based on the combined values of the researchers and the participants.

2.2 Study Design

The current study follows an interpretive description approach as described by Thorne (2016). Interpretive description is not a formal method but instead it provides investigators a way to conduct research where the question is practical to their respective field without trying to conform to traditional qualitative research methods (Thorne, 2016). In applied health, researchers

often have trouble fitting research questions into a traditional methodology (e.g., grounded theory) and end up using a mixed-method approach (Thorne, 2016), whereas interpretive description provides an opportunity for the research question to be used without many adjustments. Thorne, Kirkham, and O'Flynn-Magee (2004) describe interpretive description as a "smaller scale qualitative investigation of a clinical phenomenon of interest to the discipline for the purpose of capturing themes and patterns within subjective perceptions and generating an interpretive description capable of informing clinical understanding" (p. 5). The research aim of the current project is of interest to the researchers as there are few clinicians using REMs worldwide and incorporating informational counselling could be one way to increase uptake. Researchers who follow the methodology of interpretive description should (1) conduct their study in the most naturalistic context possible, (2) address the knowledge of participants as the fundamental source, (3) use both participant commonalities and individual thoughts, (4) understand that multiple realities exist, and (5) recognize the influencing interaction between the participants and researchers onto the research outcomes (Thorne, 2016). Several of these listed aspects are similar to the constructivism paradigm, which is why this study design and paradigm were used together in this project.

In the current study, focus groups were conducted with first-time hearing aid users to gather their input regarding the use of informational counselling in verification. In the groups, a short demonstration of informational counselling during REMs was presented. Then, through a semi-structured discussion, participants had the opportunity to share their perspectives on what they liked and did not like about what they heard and saw during the demonstration. Following data collection, the data were analyzed using an inductive content analysis.

2.3 Ethics

This study was reviewed and approved by the Behavioural Research Ethics Board of the University of British Columbia prior to recruiting participants.

2.4 Participants

2.4.1 Sampling

Purposeful sampling was used to select participants. Purposeful sampling is when the researcher selects individuals who know information or have experienced the phenomenon under investigation (Patton, 2002). All participants were fitted recently with hearing aids and were familiar with the REM verification process. We had no restrictions based on age, gender, or education level, before which allowed for heterogeneity in the sample. This allowed the sample to be representative of adult hearing aid users.

2.4.2 Inclusion Criteria

To be a part of the project, a participant had to meet all requirements in the inclusion criteria. The requirements were as follows: a fluent English-speaker, aged 19 years old or older, a first-time hearing aid user, hearing aids fitted in the past four years, able to transport self independently to the focus group, and remembered the verification procedure occurring during their own hearing aid fitting based on self report.

2.4.3 Demographics

There were 17 adults (5 males, 12 females) who participated in one of four focus groups. One participant was excluded from the study as the participant missed the demonstration portion of the focus group and was not able to attend another focus group session. Thus, data were used from a total of 16 participants. Most participants were between the ages of 60 to 89 years old.

Participants were diverse across variables, such as age, education, and languages spoken. Additional information regarding participant demographics can be seen in Table 2.1. The demographic information is used to describe the participant sample as a whole.

2.5 Materials

2.5.1 Questionnaire

Participants completed a questionnaire that included questions about demographics, hearing loss, hearing aid use, memory of hearing aid verification, and satisfaction with amplification. The Satisfaction with Amplification in Daily Life (SADL) provided indirect information about the participants' satisfaction of the amplification performance, perceived benefit, and clinician satisfaction. The SADL is easy to administer, time efficient, is widely used, and has been validated. It has strong internal validity, construct validity, and good re-test reliability (Cox & Alexander, 1999; Cox & Alexander, 2001; Hosford-Dunn & Halpern, 2001). Participants were typical of hearing aid users in general, with an average global score of 5.2 on a 7-point scale (where 7 is tremendously satisfied); the normative score for SADL is 4.9 ±0.8. Responses to the demographic questionnaire and the average SADL score of participants across focus groups and total average score across all participants are presented in Table 2.1. An URL link to the current version of the questionnaire can be found in appendix B.

2.5.1 Discussion Guide

A semi-structured discussion guide that contained questions and prompts for the session was developed for the moderator to use when facilitating the focus groups. The discussion guide and additional information about the format of the focus group is provided in appendix D to G.

Table 2.1: Participant Demographics

	FG 1	FG 2	FG 3	FG 4	Total
Age					
<30 years old	1				1
60-69	1	1	1	1	4
70-79		1	2	4	7
80-89	1	2		1	4
Gender					
Male	1	1		2	4
Female	2	3	3	4	12
SADL Average Score	4.8	5.4	5.4	5.2	5.2
# of HAs					
1 HA	1			1	2
2 HA	2	4	3	5	14
HA experience					
<6 weeks				1	1
6 weeks – 11 months	1	3	2	3	9
1 – 10 years	2	1	1	2	6
Reported Daily use					
4 – 8 hours	2	3	2	1	8
8 – 16 hours	1	1	1	5	8
Reported HL degree					
Mild		2	1	1	4
Moderate	3	2	2	5	12

SADL= satisfaction with amplification in daily life FG= focus group HA= hearing aid HL= hearing loss

	FG 1	FG 2	FG 3	FG 4	Total
Living situation					
Alone	2	2	3	2	9
Spouse	1	2		4	7
Education					
High school diploma or equivalent			1		1
Trade-vocational, including apprenticeship				1	1
College or non-university post secondary	2		1		3
University, diploma, degree, or certificate, or higher	1	4	1	5	11
Citizenship					
New immigrant	2	1		2	5
First generation	1	1		1	3
Second generation		1	1	1	3
>Second generation			1	2	3
No response		1	1		2
Languages spoken besides English	Spanish, Portuguese, German	French	Cantonese, Hindi	German, French	
Employment (current and previous)	Student, Musician, Computer Programmer, Secretary	Teacher (2), Pastor, Museum Guide	Manager, City Planner, Travel Guide	Dietician (2), Social Worker, Electronic Lab Technologist, Facilities Manager, Piping Draftsman, Non-Profit Organization Executive Management	

2.5.2 Demonstration of REMs

A live scripted demonstration of REMs including informational counselling was presented to the focus groups with the support of hired individuals acting as the clinician and client. There were two clinician actors across the four sessions. The demonstration showed REMs for speech-stimuli testing matching to the prescriptive targets and did not include any noise reduction or directionality testing. The demonstration was scripted to ensure consistency and accuracy among all focus groups. The script was reviewed and verified by experienced clinicians to ensure it was realistic to what would be said in a clinical appointment. This script was loosely followed by the clinician to allow for more natural delivery. The materials used for the demonstration were a laptop, REM system, probe tube, a hearing aid, otoscope, and a projector screen.

2.5.3 Audio Recorders

Two digital audio recorders were used, as suggested by Douglas (1985), (TASCAM Pocket Studio DP-004 and Olympus DS-2300) to record the focus group discussions. The files were reviewed afterwards and the recorder with most intelligible signal was used to transcribe the discussion and the other was saved as a back up. The clearest recording varied from session to session based on factors such as room set up, volume of talkers, and position of microphones.

2.6 Procedures for Conducting the Study

Participants were recruited through posters in the community, such as at community centers, audiology clinics, and health clinics, and through online posting and email. The poster invited potential participants to contact the researchers for more information about the project. Participants were screened with the inclusion criteria checklist prior to participating in the study.

When an individual decided to participate, a consent form was sent to review before attending the focus group. Participants were placed into focus groups depending on availability.

On the day of the session, participants completed the consent form, demographic questionnaire, and the SADL questionnaire. The focus group began with introductions from the research team, an ice breaker, then the demonstration was shown. Participants had visual prompts of written statements of topics that would be presented later on in the focus group (e.g., "What did you like that was said," "What about the visuals did you not like," and "Other general thoughts"). Following the demonstration, the moderator began the discussion by asking the group about the content and format of the demonstration. During the sessions, the researchers (AR & LJ) were observers to the discussion and completed field notes and memos (format seen in appendix G). These notes were used to compare with the audio recording to ensure that the text transcriptions were accurate. The notes also provided the researchers with an opportunity to develop initial impressions about the data. See appendix D to G for further information about the focus groups.

After each focus group, AR, LJ, and the moderator debriefed about the discussion and their respective notes. Then the audio recordings were transcribed verbatim into text by AR. The participants' names and other identifiers were removed. This provided an opportunity for AR to become familiar with the data and begin to think of preliminary categories. The transcripts were then reviewed by a research assistant, who was not involved in the project, to ensure there were no errors in the transcription of the audio recordings.

2.6.1 Focus Groups

When conducting research, focus groups are useful for topics that have limited or no information available, hypothesis creation that is based on participants' opinions, developing new questionnaires, product or program development, and understanding participant's interpretations

of earlier study results (Krueger & Casey, 2015; Morgan, 1988). Focus groups are similar to group interviews but the interaction between participants about the topic is more meaningful than the interaction between participants and the moderator (Morgan, 1988). The allocated time allowed the participants to express their understanding via their suggestions and thoughts about the topic (Krueger & Casey, 2015; Morgan, 1988).

Four focus groups were conducted. Each group ran for about 1-1.5 hours with 3-6 people per group. To identify trends and patterns among the focus group, multiple groups must be conducted; at least three focus groups is ideal to represent a wide enough range of perspectives from participants (Krueger & Casey, 2015).

The groups were facilitated by a moderator who was not involved in the project to diminish bias during the discussion (Krueger & Casey, 2015). The moderator was experienced with qualitative methods, interviews, and focus groups. The moderator had no prior audiology expertise prior to the study and developed working knowledge in order to respond and/or deflect any audiology-related questions. The moderator's role was to facilitate discussions by opening questions to the group, encouraging comments, and keeping discussions on topic (Krueger & Casey, 2015).

2.6.2 Demonstration

To keep the demonstration realistic, it included otoscopy, probe tube placement, hearing aid insertion, and the matching to prescriptive targets via the REM system. The demonstration consisted of both live action and video components. The clinician demonstrated putting the probe tube and hearing aid in the client's ear, then a pre-recorded video of a Verifit2 REM system display was used to demonstrate the REAR on the SPL-o-gram display. The slides from the video can be found in appendix E. The laptop and Verifit2 REM system were used as props and no adjustments

were made to the hearing aid during the demonstration with these devices. The laptop was used to project the pre-recorded video of the REAR. The pre-recorded video was developed by AR for consistency across groups. Participants were given printed pictures of the SPL-o-gram display (slide 2 and 8 of appendix E) as well as paper to write any notes or questions during the demonstration. The scripted demonstration can be found in the appendix F. Because participants had to remember their own REM experience, they would now have two experiences to draw from when discussing it in the focus groups: their own personal experiences plus the demonstration of REM that was presented in the focus group.

2.7 Data Analysis

In terms of the analysis procedure, the interpretive description methodology does not prescribe one specific technique but instead it provides information to help researchers with the analysis method chosen for the investigation and clinical topic in question (Thorne, 2016). Additionally, Thorne (2016) describes a general analysis process of developing codes and creating patterns from the derived codes. Instead of developing patterns or themes from the codes, this project focused on developing categories of codes that have similar attributes. This modified methodology was appropriate for the clinical purpose of this project as the aim was to gather the input from clients regarding informational counselling.

The coding process used in this study was an open inductive approach similar to Kolltveit et al. (2016) methodology. Open coding refers to a process where the data is coded line-by-line, taking the information apart and examining the similarities and differences between codes (Thorne, 2016). Inductive coding is used when there is limited or no knowledge of the specific topic;

therefore, new theories are developed from the information (Bengtsson, 2016; Elo & Kyngäs, 2008).

To begin the analysis process, two of the researchers (AR and LJ) reviewed the transcripts independently and began to identify meaning units related to the research question in the transcripts. Meaning units were quotations from the transcripts that were identified as significant independent thoughts. Afterwards, the researchers condensed the meaning units. An example of a meaning unit, condensed meaning unit, code, and a category are presented in Table 2.2. The condensed meaning units were written onto index cards and grouped into preliminary codes and categories. Codes and categories with similar meanings and topics were grouped together. Throughout the analysis, new categories were created, and others were modified to better represent the data. The codes were grouped into categories based on similarities among the codes.

Table 2.2: Data Analysis Example

Meaning unit:	**Participant 1:** It's too busy cause after the second line goes on (pause) then you lose what all the lines mean- **Moderator:** -Mmhmm- **P1:** -Like you can't remember what the green line was the where it should be. Um you almost need a colour chart- **M:** -Mmhmm- **P1:** -To look at it
Condensed Meaning Unit:	1. Get too busy with all the lines so lose what lines mean 2. Need colour chart
Code:	1. Visuals unclear and confusing 2. Legend
Category:	1. Visual information- Negative aspects 2. Visual information - Suggested changes

The use of written transcripts and index cards ensured that the researchers were organized with the data and allowed them to track the analysis backwards (Seers, 2012). After multiple reviews, a finalized set of codes, categories and, and higher-level categories were created. The figure below shows the process of organizing the codes into categories and higher-level categories.

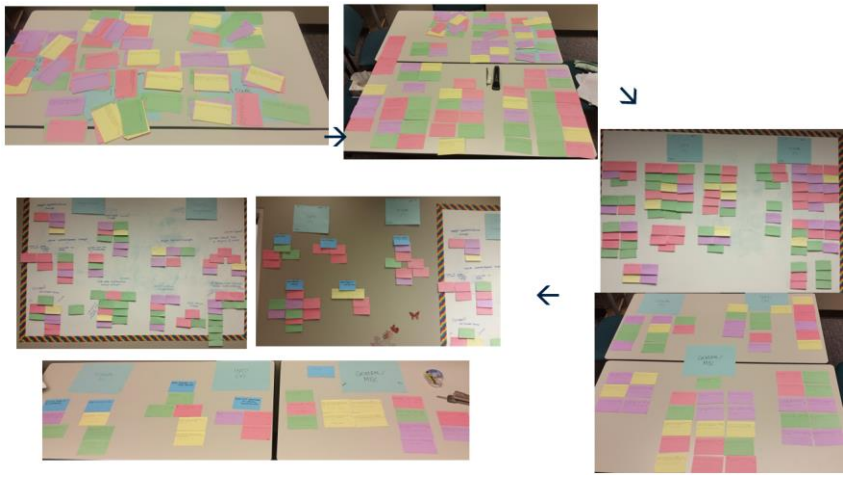

Figure 2.1: Process of Category Development

2.8 Rigour of Project

Given (2008) describes the features that define rigorous qualitative research: transparency, credibility, dependability, and reflexivity. By addressing these features, we attempted to ensure rigour of the project.

To be transparent, researchers should provide a detailed description of the methodology to provide clarity of the research process for readers (Given, 2008). I provide detailed steps for methodology, which produces an audit trail and an opportunity for replicability by other researchers. It also allows the current researchers to easily track the data backwards if necessary.

To achieve credibility, the project design should be appropriate to gather an accurate representation of the phenomenon in question (Given, 2008). The current project used purposive

sampling to ensure the sample of participants represented the population of adults with hearing aids. The researcher ensured that all participants remembered the hearing aid verification procedure from personal experience. Also, peer debriefing with all members of the research committee was used to ensure credibility of the results in terms of accuracy from the focus groups.

Dependability recognizes that results can vary with different researchers and may need to be flexible within the research context (Given, 2008). In our study, we responded to contextual changes by adding additional explanation to participants before the focus groups based on the questions that arose; this explanation is available in the script in appendix D. Additionally, we had planned to conduct all focus groups on the university campus, but in response to concerns about accessibility from potential participants, we conducted half the focus groups in the community.

Finally, AR kept a reflexive journal to mark down any bias and make notes throughout the research project. Journal entries were made after each focus group and analyzing the data.

2.8.1 Reflexivity of Researcher

The researchers in this study acknowledge that each participant and researcher in this study has their own understanding of informational counselling during REMs. As researchers, we acknowledge our bias of wanting to improve REMs for clients with the assumption that informational counselling will meet that goal. In addition, we recognize that when presented with the same data different researchers may have reached different conclusions.

As an audiology student spending the last two years learning about the various evidence-based practices of audiology, I, AR, acknowledge a potential bias. As a future clinician, I want to ensure that clients benefit from amplification. I want to ensure that hearing aids are used regularly, and clients understand all the information presented to them. I wanted participants to volunteer their feedback to determine what examples to use to explain REMs. Including a moderator to lead

the focus group helped to reduce the impact of any bias in the group interactions as I had no role in the group discussion. Being an observer reduced the possibility that my presence may have influenced the participants' responses. After learning the evidence of REMs and how they are important for hearing aid fittings, I hoped that the participants would understand and accept the REM procedure. Furthermore, I want these results to persuade clinicians to use REMs as part of their verification process in hearing aid fittings.

Chapter 3: Results

From the analysis, there were 10 categories and 88 codes developed. The data fell into two broad categories: 1) the *interaction* and 2) the *transaction* of informational counselling. Walsh (2007) described these aspects as the 'sociorelational' (interaction) and a 'business-of-the-day' (transaction) components of a clinical session. Interaction refers to an informal exchange between communication partners, for example building rapport by communicating as friends not as client and clinician (Walsh, 2007). Transaction refers to the discussion between communication partners that involves completing the clinical task, in this case the topics are restricted by the clinical task and are usually controlled by the clinician (Walsh, 2007). These broad categories, along with their subcategories, are shown schematically in Figure 3.1.

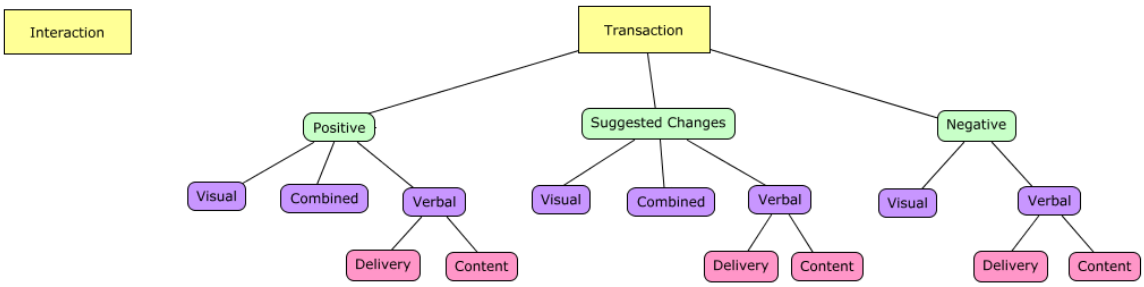

Figure 3.1: Schematic Diagram of Categories

Codes regarding the transaction of informational counselling were further developed into multiple categories, seen in Figure 3.1. The subcategories positive aspects, negative aspects and suggested changes are statements that refer to the positive aspects about the transaction, the negative aspects about the transaction, and suggestions to improve the transaction of information. Then, the subcategories further divide into visual, verbal, and combined which refer to statements that are based on what type of information the statement is referring to; that is, the visual information, the verbal information, or a combined thought of both the visual and verbal

information, such as needing a verbal description of a visual element. Delivery and content categories refer to the verbal information on how the information was relayed to the client and the overall content of the information. The codes in all these categories are displayed in blue and are the last level of boxes in the schematic code map diagrams below. The meanings of the codes are expanded in a table that can be found in appendix I.

The following sections will briefly describe the codes within each category and provide direct quotations from the focus groups to illustrate the codes and categories. The transcription legend is attached in appendix H to present the meaning for various symbols that are used in the quotations from the transcript.

3.1 Interaction of Informational Counselling

Analysis revealed 5 codes regarding the interaction of the informational counselling demonstration in the focus groups. Specifically, ideas were brought up by participants regarding how their experience with their clinician might have been different from their peers' experiences. For example, one participant said *"Depends on who your audiologist is and how much time they want to spend with you when explaining things"* FG4-P2. Another group brought up the power dynamic between client and clinician and how it is sometimes hard to determine who is in charge.

> "*P1: Well I'm there under the clinician's direction so.*
> *P2: I'll take a point up that-that you said… for me it would not be that it would be <u>he</u> or <u>she</u> is under mine. I am here to get the help and I was told that you could help me by friends.*
> *M: So, there's a bit of a, for a lack of a better term, power dynamic that's [not really yeah]*
> *P2: [You could call it yes] but I would not say it's really as you say lack of a better term*" FG3

Participants noted that the clinician in the demonstration was not engaging, the clinician was assuming the client's knowledge about the topic, and the audiologist was not trying to establish rapport. "*It's-sort-of the audiologist is assuming you know what you know*" FG3-P2. Another participant mentioned how their own appointment felt warmer than the one in the demonstration; "*The lady I worked with did when they talked about putting the thing in my ear…there was a rapport established so between telling me the information on the different levels we had we would have a little rapport building and then we would go onto the next steps so the environment of the whole thing was warmer*" FG3-P1.

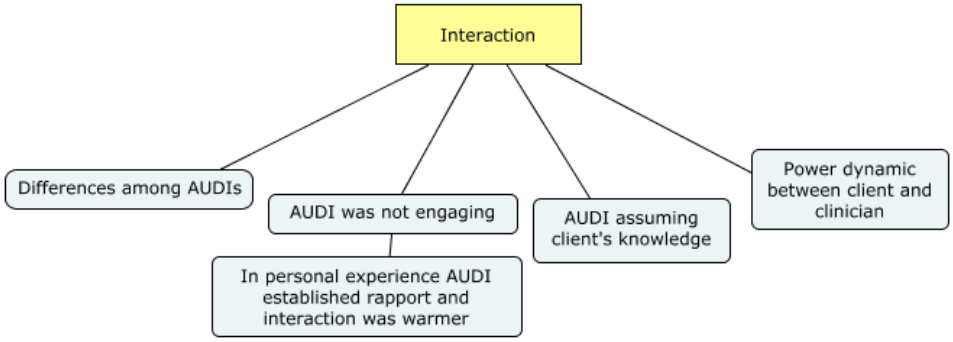

Figure 3.2: Interaction Codes

3.2 Transaction of Informational Counselling

The analysis revealed 83 codes related to transaction that were divided across the subcategories. The codes are presented based on their subcategories of positive aspects, negative aspects, and suggested changes for improvement of the transaction with their corresponding figures and support from the transcripts.

3.2.1 Positive Aspects about the Transaction

There were 15 codes revealed from the data across the visual and verbal information categories. Codes can be seen in Figure 3.3 with a brief description about the visual and verbal information categories following. Again, the meanings of the codes are presented in appendix I.

3.2.1.1 Visual Information- Positive Aspects

Participants commented on specific attributes about the visuals that were perceived to be positive. They stated that the visuals were good, clear and straightforward, and discussed the colour coding. Some explicit statements from participants were "*I think it was pretty clear and to distinguish which one's which by different colours*" FG1-P1 and "*I found the visuals really helpful particularly um the sort of grey range but the explanation of the cross hairs and where they fit in and that part of it I found <u>really</u> clear and-and really um quite straight forward."* FG4-P6

3.2.1.2 Verbal Information- Positive Aspects

In terms of the delivery of information, participants liked how the clinician used the client's name, asked if there were any questions, and used co-operative language. "*And then he talked about um we're going to find out how <u>we</u> are going to find out <u>our</u> um whatever it was rather than <u>your</u>*" FG3-P2. Participants acknowledged that the information was clearly explained and that the terminology was fine. *"(The clinician) was explaining everything which was good*" FG3-P2. Also, participants mentioned that a step-by-step explanation was helpful for them.

> "*Yeah for me I liked how she said uh what she was going to in each step. So first I'm going to insert the tube second, I'm going to do this then third and so on. So, for people that ah it's their first time I think it's pretty useful cause some people might even be scared. Ah it's something new right and the fact that someone is telling is-uh-ah telling you what's happening, so you don't uh-cause-uh- you know why tubes wires you know can be a bit scary so it's okay when someone tells you everything that's happening.*" FG1-P1

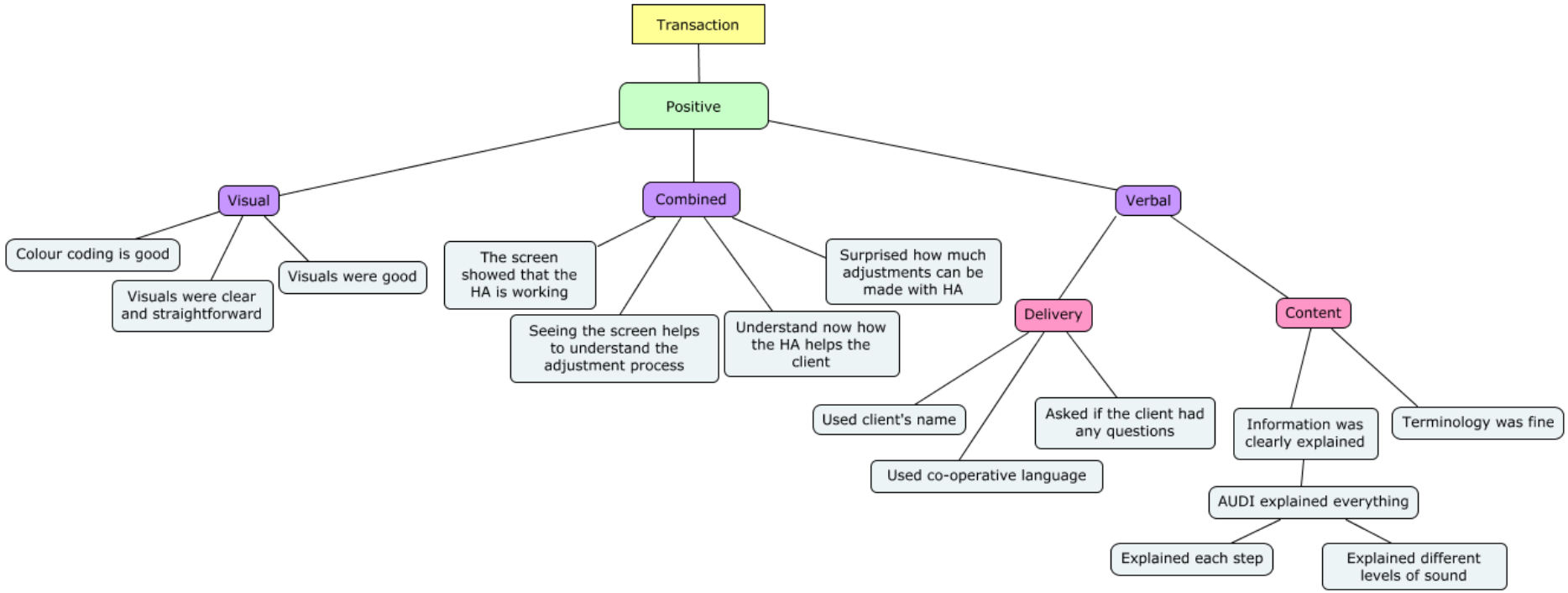

Figure 3.3: Positive Transaction Codes

3.2.1.3 Combined Visual and Verbal Information- Positive Aspects

Participants touched on multiple positive aspects that related to both the visual and verbal information and thus these statements were grouped into their own category. A few participants noted how the screen helped them to understand the REM adjustment process "*Yeah and uh my-my thing is that they do adjustments on these things on a computer and so forth and I'm never quite sure what they're doing, this pictures it for me a little bit … and uh I think it-it's going to help me see what could be helped and not helped in the process"* FG2-P2. Similarly, the screen showed the clients that the hearing aid is working "*The person feels somewhat engaged if they can see the movement and can see that they're actually doing something with thing in your ear and that the appliance that you're spending all this money on is digitally sophisticated it knows what it's doing and it's been programmed to address your whatever*" FG4-P1. Participants also highlighted understanding how the hearing aid is helping them and how much adjustment can be made with the hearing aid. As one participant said "*It struck me, and it also struck me that how much adjustment you can do with these hearing aids uh uh I didn't realize it was that kind of technical adjustment that. Well we got those switches that turn them on, up and down and so forth but this is very fine tuning*" FG-P2.

3.2.2 Negative Aspects about the Transaction

Altogether there were 21 codes identified as negative components of the transaction of informational counselling. Figure 3.4 shows the codes under the visual and information categories; descriptions to follow. See appendix I for explanation of the codes.

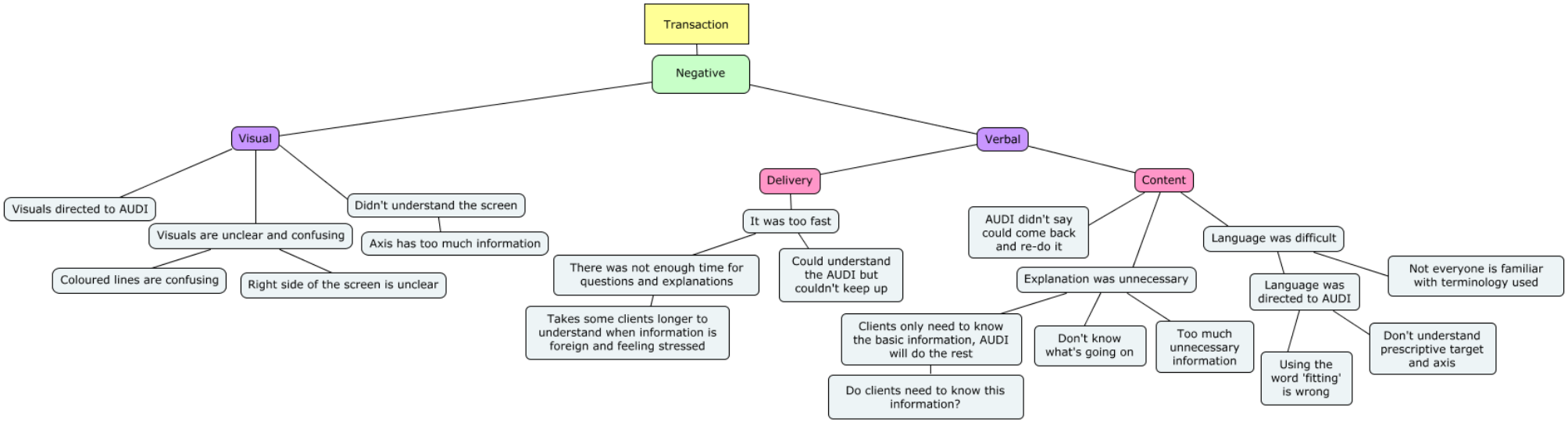

Figure 3.4: Negative Transaction Codes

3.2.2.1 Visual Information- Negative Aspects

Overall, participants said that the visuals were directed to the clinician. Participants thought the visuals were unclear and they did not understand the screen. Participants found the coloured lines confusing, the audiologist-directed legend on the right-side of the screen unclear, and the axis had too much information. Statements from participants include "*Um and then on the right-hand side, there's all this other stuff which um the audiologist didn't speak to I don't know why it's there*" FG3-P3 and "*I did not understand all the lines and the significance even though they were they were coded diff-coloured differently*" FG4-P1.

3.2.2.2 Verbal Information- Negative Aspects

In terms of the delivery of verbal information, participants found it went too fast and it was hard to keep up with the clinician. "*There was too much and it was in too short of time. Um-but I-I realize it was just a demonstration but by the time you sort of formulated a question to ask the clinician gone, had gone on to the next point.*" FG3-P1. One participant highlighted that when the information is new to the client it may take longer for the client to understand. "*My brain is sort of slow when I'm in a stressful situation which something like that would be… Because I-it takes me awhile to understand foreign things and that's a foreign thing*" FG3-P1. Participants also commented on the content of the verbal information stating that the language was difficult, and the explanation was unnecessary. Many participants commented on how the process was overwhelming "*This would have been totally overwhelming and inappropriate for an awful lot of my peers.*" FG4-P1. Others commented on whether clients need to know this information or not "*I guess the overall thing is I mean do we as clients <u>need</u> to know this? And if we don't need to know it then maybe looking at these just confuses us*" FG2-P2. A few participants acknowledged that language was suitable for the clinician but not necessarily the client, as "*The language was fine*

for the purposes of the audiologist" FG4-P1. Finally, an important point that was highlighted by a few participants was the term 'fitting' being used incorrectly.

> "*P2: But I think maybe for me not using the word 'fitting' but um knowing where I have my problems*
> *M: -Right*
> *P2: You see*
> *P3: It's testing more than fitting, isn't it? Was the purpose of that? A test?*
> *M: Oh, the purpose is to um adjust the different volumes and levels of um sound that was being (.) projected by the hearing aid*
> *P2: I think the word fitting is incorrect then sorry*" FG3

3.2.3 Suggested Changes for the Transaction

The analysis revealed 47 codes for suggested changes in terms of the transaction of informational counselling. Participants described many suggestions for the visual component and the verbal information that was conveyed. These respective schematic code map diagrams have been divided between the sections below. See appendix I for explanation of the codes.

3.2.3.1 Visual Information- Suggested Changes

There was a total of 18 codes developed from the analysis suggesting changes about the visuals that were presented. Participants described many interesting ways to modify the display differently so it is more user-friendly for clients.

Participants recommended to have separate screens for each test so that there are only two lines shown: the current REAR and the target line. "*I know what I would like. I would like that it divided into 4 pages on the screen and each page, one is for high tones, and the next one is for low tones, so you can talk-and with the lines of average in it so you could look at the 4 pages on that screen… Where it is so each square would only have 2 lines and an average and where I am*" FG3-P1. Other participants suggested that there should be a client-oriented screen that would have more information and labels compared to a clinician-oriented screen

"*P4: I'm wondering what it would be like if the patient had a patient-oriented screen and the audiologist had an audiologist-oriented screen*
M: Yeah that's a really interesting thought. When you say patient-oriented screen what do you think would be useful to have on it?
P4: Um I guess on the side instead of those bars that are for the audiologist there could be terminology and I don't I don't really know… Or maybe there could be like a preview-
M: -Mmhmm-
P4: -A preview for the patient where there's arrows pointing to the different lines with explanations and (.) and then after they get passed that preview they could go to the audiologist screen" FG2.

For the current screen format, participants had suggestions to improve clients' understanding. One person mentioned that printed materials are better "*Watching it on the screen doesn't always show me what's going on heh heh but the print does*" FG2-P2. Others suggested to make the contrast of change larger, so clients can see the adjustments and even proposed to bring the amplification down at first to show clients what happens then bring it back up "*I can't see a lot of change you know almost would have been better if (demonstration clinician) went negative on it before (demonstration clinician) went positive on it and then we could actually see what's going on… could even backed it down say okay you know I just made this worse now I'm going to put it you know where it needs to be*" FG4-P2. A recommendation that was identified in all groups was to have labels on the display "*If you're not in the business I think the explanation has to be right next to the coloured lines*" FG2-P5 as well as a legend somewhere on the screen "*Something that described what we were looking at and what the actual um sidebars meant etcetera*" FG2-P3. A few other interesting points to consider are if a client is colour-blind and what accessibility modifications are possible "*I would say for someone colour-blind this would be an issue…No I mean I live with someone who's totally colour-blind and there's no way until I told him that he knew these were different colours. So, if some if there were some other way of distinguishing them*

like the length of the dots between or whatever" FG2-P3, and to display familiar sounds on the SPL-o-gram similar to an audiogram "*I liked the one which had the wind and the trees and the lapping of the water and then down a band at the bottom because that was immediately clear to you as to where about these sounds actually are, the visual of it*" FG2-P3.

Participants had suggestions that are client-dependent. Participants mentioned that clients will have their own preferences to see the visuals and clinicians should respect that. It was also suggested to put less emphasis on the visual as it can be hard to remember "*I'd like to add as I get older, I'm not good at remembering all of these things… So, you don't want to put too much emphasis on the visual stuff*" FG4-P4. A few other participants said that clients may not want to understand the graph and thus the clinician does not need to explain it but instead explain the process afterwards and how it relates to them "*I don't even want to look at that tell me. Explain to me what is my problem with my ears my hearing*" FG3-P2.

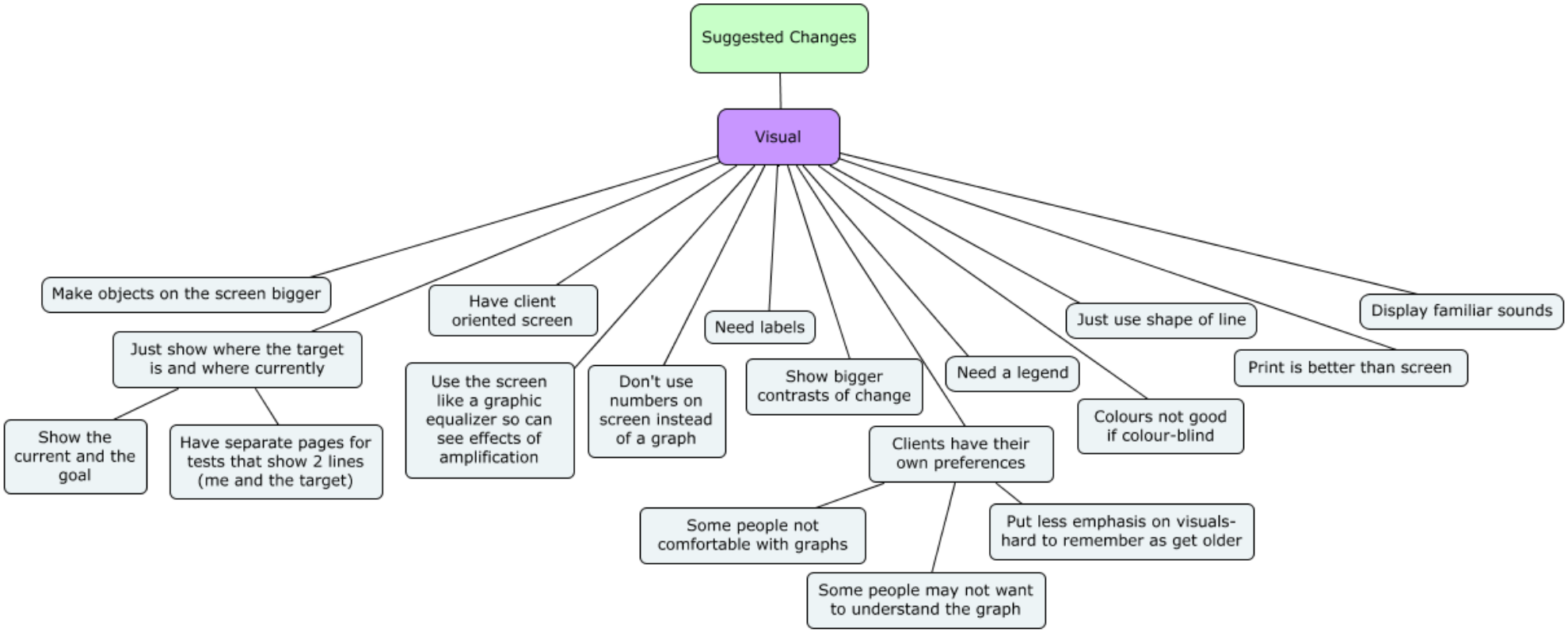

Figure 3.5: Visual Suggested Changes Codes

3.2.3.2 Verbal Information- Suggested Changes

There were 24 codes developed from suggestions about the verbal information from informational counseling. The suggestions for the verbal information included aspects related to the delivery of the information and aspects related to the content of the information. For the delivery, participants wanted the clinician to provide more explanations between the tests "*Could have been more explanation between each one?"* FG4-P2 and "*I think the information should be shown twice like I said. The first time just to see it and then the second and explain and then the second time show it when I have the explanation what it means*" FG3-P1; check in with the client "*Yeah and ask people-and ask if do you know do you see what's going on here… Then if they say no they don't understand it then…Okay explain it in more detail*" FG4-P2; and provide more time for understanding, speaking slowly and repeating important pieces of information and providing more demonstration of the equipment. For example, when describing speech sounds in relation to frequency "*Um I liked it but when I think when (the clinician) was talking about, um you know I'm going to use the wrong um vowels but /t/, /p/, /f/ that business, (the clinician) went quite quickly through that and if (the clinician) could have gone s-slower through that and maybe even repeated it a couple of times then it would have been clearer I-I found (the clinician) went quite quickly over that part*" FG2-P5.

Regarding the content of the information, participants stated that they wanted more explanation about the process, the audiologist to use simpler terminology, and the audiologist to provide an outline of the procedure. Certain clients want to know everything about the procedure and felt there should have been more explanation "*I think it needed a lot more explanation*" FG-P2. As well, some participants commented on how they want to know a lot about their hearing healthcare since they are paying a lot for the services "*When you look at the price of-of a hearing*

aid to start with, you want to know as much as possible about what's going on you know" FG4-P2. Examples of specific terminology to use are described in the table in appendix I. Finally, a few participants suggested that there should be a basic explanation of physics of sound included in the counselling to give clients foundational knowledge to help understand REMs.

Participants mentioned a few ways to present the information in a client-centered way. The first was to make the information meaningful to the client; "*I think it has to be connected to yourself*" FG2-P5. A suggested example of relating it to clients' experiences as described by one of the participants:

> "*Okay I guess then if they went if-if um there was it-if-the audiologist had said 'Okay it sounds like we've got a good match here on the higher tones but not but not so much on the lower tones does that fit with what you're experiencing?' Then maybe getting more feedback from the client about what their real-life experience is and whether that what-what is being produced on the screen is expressing that*" FG3-P3.

Second, leaving the option up to the client in terms of learning more about the procedure. This is important because not everyone wants to know more than the basic information.

> "*P4: How it's how it's being known by the audio-how it's being known through the technology-*
> ***M: -Mmhmm-***
> *P4: -Um like I find that I find it fascinating that they can do that and I-I would like to know more about-about the actual process*
> ***M: Mmhmm***
> *P5: Some people wouldn't care-*
> *P4: -Yeah some people wouldn't-*
> *P5: -I would care-*
> *P4: -Yeah-*
> *P5: -But some people wouldn't*
> *P3: So maybe to have the option-*
> *P5: -Yeah-*

P3: -Of knowing" FG3.

Third, determining the correct balance of information to present to the client. Throughout the groups, participants commented on how there are age and gender differences among clients

> "*Age definitely, definitely definitely. I'm sure if you had a young person who's 35 years old who's having some kind of a problem and right now it would not be a surprise speaking up because everyone is always cha-um-and then I think the audiologist could talk quickly because the young people are quite used to talking quite quickly and you-you could mumble but he would understand what was going on so that yes. And with the um gender I can only talk about my situation um-ma-I'd-I have one friend who even with hearing aids I HAVE TO TALK MUCH MUCH LOUDER so-so I assume that men and women have different I don't know*" FG3-P2;

how clients who are novice to this information will find it hard to understand

> "*Yeah I would say the same. I guess you know I understand the decibel and-and it's all about frequencies right and it's uh the different the different decibels that you hear at different frequencies. You can hear better at the ah-uh-uh-uh some frequencies than others sort of thing you know. But you're right it was you know I read a little about it, so I do know a little bit what you're talking about but if you a complete novice it-it's pretty hard*" FG4-P3;

and how you have to judge how much information to give the client

> *"…I've been a technologist for computer stuff for 40 years and I it's really hard to know what too much and not enough information you know there's a fine re- there's a cut when you're explaining stuff to people who are not technical you know. And*

you have to explain how to do something technical ah like half of my work you know for most of my life. So I think I would you got to judge your audience I think you know I mean pe- like I said some people are well aware of of frequencies and you need then you don't need to emphasize how that works but if people aren't aware of that then you need to go into that…" FG1-P2.

Another point raised by participants was that if clients want specific adjustments to their hearing aid, they have to explain their issues clearly, so the clinician can put the appropriate settings into the hearing aid

"*P3: I thought I still think I'm quite comfortable I still would like them a little finer tune up but maybe this will go along*
M: Mmhmm
P3: I know what to ask for because you always have to explain she can only put in the machine what what I explain
M: Mmhmm
P3: You know it almost very hard to-it's still a learning process" FG1.

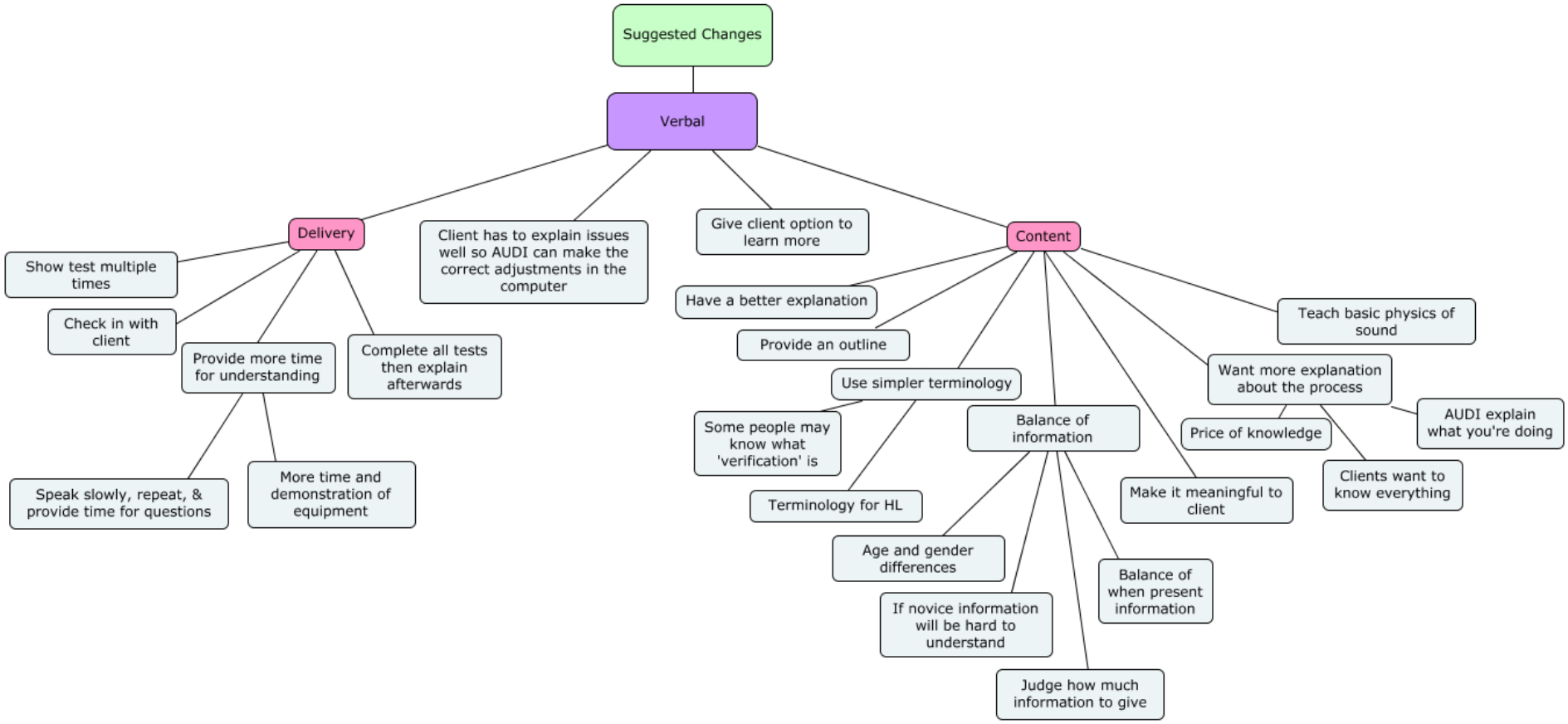

Figure 3.6: Verbal Suggested Changes Codes

3.2.3.3 Combined Visual and Verbal Information- Suggested Changes

There were several codes in the analysis that were relevant to both the visual and verbal components of informational counselling. Thus these 5 codes were combined into this 'combined suggestions' category. General suggestions about presenting the information were original ideas from participants, for example providing clients with an information pamphlet that outlines all the terminology that will be used in the appointment "*I'm wondering if it would be helpful in those initial consultations to have a like uh an information pamphlet for the for the person explaining terms like prescription and like just explaining the terminology and explaining that-like general kind of s-general stuff*" FG2-P4. Another idea was to develop a video of the REM verification procedure and have clients come in early to watch the video before their appointment "*You know when you go in for a minor surgery, sometimes beforehand you watch a little thing on the TV screen and if-if this was shown before you had your appointment. I mean if you came in 10 minutes early or whatever that would be really good. You-you would know what to expect*" FG2-P5.

In addition, participants reported that the images needed a better explanation to understand the REM process. As stated by participants "*It was all necessary information it's just how you explain it that's what it is. I mean it's all I don't think you can show anything much different just how you explain it*" FG4-P3 and

> "*M: What could have made it easier?*
> *P2: Just more explanation (.) of of what (C) was trying to accomplish there I keep you know I keep looking and it goes what's moving here [what's changing you know]*
> *P3: [Heh heh] you're going to wonder what were the lines, what the lines were. You know what are all these lines-*
> *P1: -I still haven't got it figured out*
> *P3: Heh heh*
> *P2: We need a-*

M: -You say you want more explanation. Did you crave that explanation from (C) or do you think that this graph could have been better-
P2: -The graph-the graph could have been better explained" FG4

Throughout the focus groups various participants mentioned specific aspects of the REM display screen that they wanted to know more about. These included: the black 'x's at the top of the screen, the 'x's at the bottom of the screen, why the red line does not move, where the target is, what all the lines mean, what is the average or target that we are trying to achieve and describe the shape of the line.

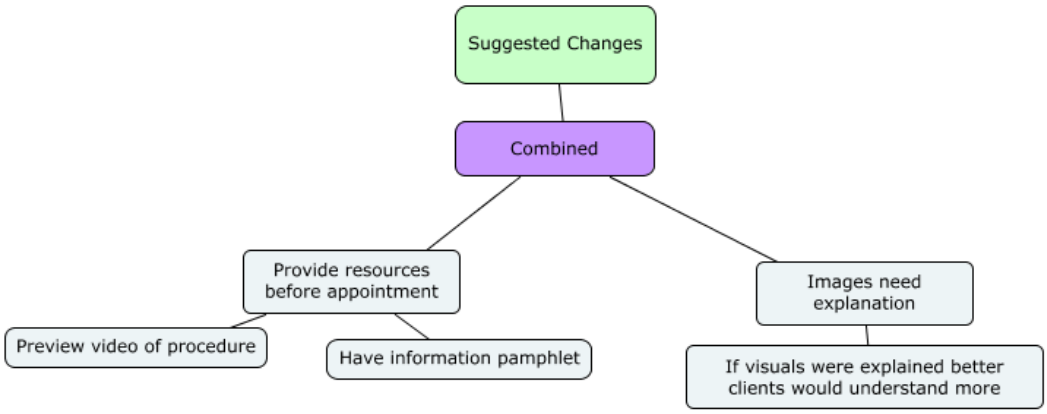

Figure 3.7: Combined Suggested Changes Codes

Chapter 4: Discussion

4.1 Introduction

The purpose of this study was to identify the perspective of first-time hearing aid users with respect to the content and format of informational counselling during REM verification. Participants provided feedback in terms of the content (verbal information) and the format (visual information) of informational counselling as well commenting on other areas of the overall interaction which were not explicitly questioned. This project was an initial step in formally implementing informational counselling during REMs. Further projects in this area of research will use experimental manipulation to determine whether informational counselling has an impact on client outcomes and satisfaction with amplification; before that investigation can happen, it was important to gather the clients' perspective on the best way to deliver the messages. Through focus groups, we directly asked clients to provide their feedback on one example of informational counselling.

From the data gathered, it is apparent that when clients feel they understand the overall verification process, they understand why it is important for their amplification needs. When the process is explained well, clients understand what is happening and seem to have a positive outlook regarding REMs and the associated informational counselling. When clients understand the verification process, they understand how the hearing aid can help them and learn how to manage their specific amplification needs consistent with the principles outlined in health literacy report by the Canadian Council on Learning (2008). Participants commented on how watching the 'visual representation' of the output of the hearing aid on the REM system display helped to conceptualize the amplification process and confirm that the hearing aid is working. For instance, if the REAR is below the client's hearing threshold then the client will not be able to hear it but will be able to

see the response on the REM system screen. Overall, it seems that most clients want to know more about the REM process to understand how their hearing aids are set for them individually. When participants did not understand what was happening during the informational counselling demonstration, they were frustrated and asked many questions regarding the content of the information. In addition, many participants did not understand the visuals that were presented and said it was directed to the clinician, which is valid as REM systems are designed for the hearing health practitioner. From the participants' comments, changes can be made to ensure an encouraging learning environment. Specifically, to address these points, participants said for the clinician to check in with the client, provide an outline of the procedure, speak slowly, give the client the option to learn about the procedure, use simpler terminology, and provide time for questions.

4.2 Revisiting the Relationship between Client-Centered Care, Health Literacy, and Informational Counselling

From the focus groups it is evident that clients have individual preferences in terms of learning about informational counselling and how to facilitate a stimulating learning environment. In the groups there were contradicting statements, as some participants had strong negative feelings about an aspect of informational counseling where others had strong positive feelings about the same aspect. A specific example is the codes 'visuals are clear and straightforward' versus 'visuals are unclear' and 'language is directed to the audiologist' versus 'terminology is fine'. These contradicting ideas suggest that there are differences in client's understanding needs. Perhaps some clients need to know a lot of information where others are comfortable with knowing the basic information of the procedure; thus, clinicians must find a balance of presenting the visual

and verbal information to clients. Another idea that was raised in the focus groups was making the counselling meaningful to the client. This relates back to client-centered care as it is holistic, individualized, respectful, and empowers the client (Morgan & Yoder, 2012). One concern from participants was that not everyone is comfortable with graphs and may not be comfortable with the technical terminology that audiology sometimes encompasses. This concern relates back to how clients may have varying health literacy skills compared to the clinician. As Nair and Cienkowski (2010) found, there was a communication gap between the clinician and client in terms of the information presented by the clinician.

The focus groups raised many factors that should be addressed to meet the needs of the individual client. For example, clients should be given the option to learn about REMs or not, as many clients feel as if they do not need to know this information. One participant related this idea to riding the bus: when riding the bus, you are not concerned about the engine or what turns to take on the route as the bus driver is responsible for that. You are only concerned about getting to the destination. Participants felt the same way with knowing everything in terms of their hearing health care, stating that knowing the basic information is fine as the clinician will take care of the client and the hearing aids. The amount of information to give to clients is hard to determine as everyone is different.

As proposed earlier, informational counselling provides an opportunity to practice client-centered care during REMs. The importance of client-centered care is based on both moral and ethical grounds as it fulfills healthcare professional's obligation to put client's interests above everything else and respect their autonomy (Epstein, Fiscella, Lesser, & Stange, 2010). Additionally, client-centered care depends on three factors: an informed and involved client, a receptive and responsive clinician, and a supportive healthcare environment (Epstein et al., 2010).

Having opportunities for client-centered care is imperative as it allows information to be tailored to the client, the client can ask questions, and the clinician can listen and respond to emotions (Zachariae et al., 2003). Grenness et al. (2014) found that participants want an opportunity to express their preference to the audiologist and see their rehabilitation modified based on their own individual needs.

There is a balance between clients having an active role in the rehabilitation and having the audiologist take lead because of their skill level (Grenness et al., 2014). This balance relates back to the emotional and informational components that are seen in the client-clinician relationship (Kelley et al., 2014). In the interaction (emotional component) of communication, both the client and clinician have equal control of topics in the conversation (Walsh, 2007). With informational counselling, clients may increase their skill levels through the transaction information exchange with the clinician and may become equal communication partners during subsequent transactional exchanges. The supposed mechanism by which this can happen is through informational counselling during REMs, which has the potential to increase client's health literacy skills. Individuals who have adequate health literacy skills can understand and make decisions about their own healthcare (Canadian Council on Learning, 2008; Nutbeam, 2008; Rootman & Gordon-El-Bihbety, 2008). When clients are knowledgeable, they may be an active part of the audiological rehabilitation and they can provide detailed feedback to clinicians. For example, if clients learn the terminology and purpose of REM, they may be able to transfer this information into listening experiences. Then, at a follow up appointment, they might describe in more detail their feedback about specific communication environments. Clients may then feel empowered as they see their preferences and feedback being met by the clinician.

As previously discussed, many clients have inadequate health literacy skills to understand the concepts raised in their audiological appointments (Nair & Cienkowski, 2010). I am suggesting part of solving this issue relates to the idea of clients becoming active members in the client-clinician relationship. In order to be an active member, clients must be able to understand and discuss care need with their hearing health care professional. By providing information that is accessible, clients could potentially understand the audiological materials (Rootman & Gordon-El-Bihbety, 2008) and perhaps they will learn the concepts more easily. For example, workshops in the community are a good way to raise awareness about hearing healthcare and audiological rehabilitation (Rootman & Gordon-El-Bihbety, 2008). In addition, when educating clients in clinics, both oral and written communication as well as images should be used (Carollo, 2015; Mayeaux et al., 1996; Williams et al., 2002) and ensure that the information is tailored to the individual (National Academies of Sciences, Engineering, and Medicine, 2016). Other ways to specifically make the information accessible are to reduce the information and use simpler terminology, use printed material to support the verbal information, speak slowly and clearly, and present a few concepts at a time (Schwartzberg et al., 2007).

I am working from the belief that as clients become more knowledgeable about their hearing aids, they will become more involved in their audiological rehabilitation. To improve clients' health literacy about amplification and general hearing healthcare it is clinicians' responsibility to provide engaging learning environments. By actively listening to clients, providing individual care, and tailoring information to the client's health literacy skills, the client-clinician relationship can be established and maintained (Carollo, 2015; Grenness et al., 2014). This is important for clients as they will feel empowered and accept their role in their rehabilitation process (Carollo, 2015). Hendriks, Dalhaus-Booij, and Plass (2017) found that many clients felt

they had little to no role when interacting with their audiologist. In contrast, when clinicians tailor the appointment to the client's needs, clients have increased satisfaction (Morgan & Yoder, 2012; Zachariae et al., 2003), better healthcare outcomes (Hendriks et al., 2017; Meterko et al., 2010), increased quality of life, and increased self-care (Ulin et al., 2015). In general, the client and clinician should work collaboratively to meet the amplification needs which then will ensure a safe, respectful environment for the relationship and effective management for the client (National Academies of Sciences, Engineering, and Medicine, 2016). Thus, clinicians have an important role as every interaction with clients is a learning opportunity. Information counselling is one suggested way to improve the health literacy skills of clients to have them become active participants in their hearing rehabilitation and in the client-clinician relationship with the audiologist. The relationship between the client and clinician is important as many clients have described it as essential and the basic need of any healthcare interaction (Grenness et al., 2014).

4.3 Recommendations

Below are proposed recommendations for the clinical audiologists, the REM system manufacturers, and for the audiology profession. I developed these recommendations from participants' responses in the focus group.

4.3.1 For Clinical Audiologists

a) *Provide a comfortable and respectful learning environment and focus on the interaction aspect of communication*. When treating the client as an equal communication partner there is an increase in rapport building, cooperation, and development of communication skills from the client (Walsh, 2007). Clinicians should not assume the knowledge of the client and should have discussions about how much information the client would like to

know or what their background knowledge is about technology, amplification, and science in general. Using this approach, clinicians can incorporate the client in the appointment more by having them involved in determining how much information to receive (Epstein et al., 2010). Clinicians should engage with the person and not complete the task from rote. Clinicians should respect clients' preferences independent of the health outcomes (Epstein et al., 2010). When clinicians are attentive to clients, clients report higher satisfaction and a better clinician-client relationship (Zachariae et al., 2003).

b) *Simplify informational counselling to the client's knowledge level*. This is important to note as many people cannot act on health information or tasks due to low health literacy skills (Zarcadoolas et al., 2005). This can be done by not speaking too quickly, repeating important information, using simplified terms that the lay person understands, describing the tools and equipment used and their purpose, and providing an outline of the REMs before starting. Additionally, modifying the information content based on the individual client's health literacy skills is another way to simplify the information specifically to the person. Clinicians can adjust the language by first asking the client a few questions about REMs and then based on the clients' response and reaction, modify the language that would be better suited for the client's understanding.

c) *Check in with the client throughout the appointment*. Asking the client periodically if they have any questions about the procedure or if they would like to take a break. Give clients more time for understanding the information by pausing, speaking slowly, and demonstrating equipment.

d) *Explain every step of the process*. Participants stated that they want to know everything about the REM verification procedure. Others mentioned that they understood the

procedure well because the clinician was explaining every step as they were conducting it.

e) *Apply components of client-centered care in informational counselling*. As participants said, ask the client if they would like to see the images or if they prefer printed materials instead. Ask if they want to know this information and if so, how much they want to know. Another concept that can be easily implemented by clinicians is to provide personal examples that the clients can relate to. This can be completed by asking the clients to comment on the stimulus test by relating it to a listening experience, such as speaking to a friend or hearing a car drive past. By providing real life examples for clients to refer to, they are able to communicate using terminology they are familiar with.

f) *Present and explain visuals clearly*. One way to make the visuals clearer would be to show the REM screen and explain the tests multiple times. For example, a few participants suggested that the clinician should run the first test, then explain the screen, run the test a second time so the client knows now what they are looking at, then confirm with the client before running the test for a third time. Another suggestion recommended by participants was to show larger amounts of change on the SPL-o-gram when completing REM. One participant said if you were to reduce amplification to show the client the REAR and how with the adjustment to the hearing aid the REAR line on the SPL-o-gram will move, it would present it clearly to clients.

g) *Provide additional resources*. Participants mentioned that providing an information pamphlet to give to clients to read while in the waiting room would be helpful to introduce the information. The pamphlet could describe relevant terminology, diagrams, why REM verification is important, and what to expect would give the client an idea of what will

happen during the appointment plus provide a tangible item for the client to refer to either during the appointment or afterwards. Another idea would be to print a copy of the SPL-o-gram after the first REARs are gathered for the different stimulus test and after the REM verification is completed. The clinician can write the labels and explanations on the print-outs for the client to bring home; again, providing a tangible item for the client to refer to once they have left the clinic. Additionally, by creating a demonstration video for clients to watch while in the waiting room or while the clinician is setting up for the REMs could prepare the client for what to expect from the informational counselling in terms of the process and terminology that will be used.

4.3.2 For REM System Manufacturers

a) *Create a client-oriented screen*. The display could encompass a legend, labels, and remove some of the unnecessary information (e.g., the audiologist's controls). Another way to simplify the visuals would be to have only two lines on the screen, where one is the REAR and the other is the target. Each stimulus test could be a different screen so clients are not confused with all the lines. To help with understanding, the initial REAR of the hearing aid could be displayed as well, so in total there would be three lines: where the hearing aid started, where it is currently, and where the ideal hearing aid output is (i.e., the target). Figure 4.1 shows a schematic representation for a simplified version of the screen as proposed by the researchers.

b) *Include a legend and labels onto the display, change the display of the target, provide visual accessibility options, and other options for displaying other items*. In terms of changing the display of the target, participants were confused about what the prescriptive targets and crosses were; several participants suggested to just use a line for the target and

match the REAR to the target line. Further visual accessibility options would be needed if a client were colour blind or had limited vision. For the case of colour blindness, having an option to change the colours or use dots or dashes to represent the different lines would be needed. For limited vision, having a 'zoom in' feature or having an option for increasing the scale of the axis to have the targets larger, etcetera would be helpful. In respect to options for displaying other information, having a button on the display to turn on and off other features would be another way to make it easy for the clinician to counsel clients about pieces of the SPL-o-gram. Some items that could be controlled by this toggle switch would be familiar sounds/ sounds of life, the labels, and the legend.

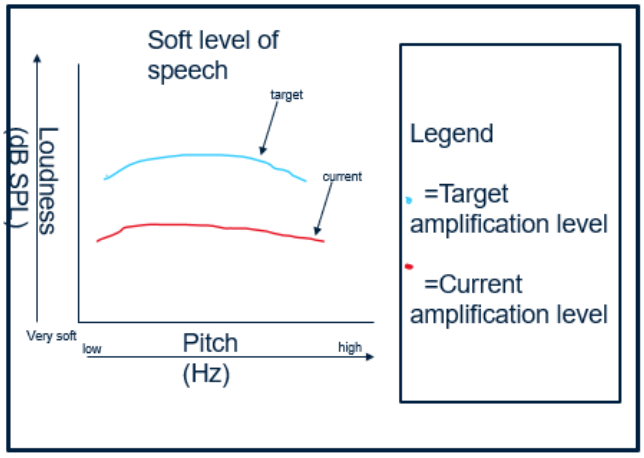

Figure 4.1: Client-friendly SPL-o-gram Example

c) *Create a preview screen for clients*. As the REM systems have been developed for the clinicians and the software is currently supporting clinicians throughout hearing aid verification, some manufacturers might be hesitant to make changes to the REM visual display they have currently. A preview screen could capture all the relevant information suggested that clients want on the screen and not affect the clinician's screen. A suggestion for developing a preview screen is shown in Figure 4.2. The preview screen could be a pop-up window that is displayed before testing is initiated or called up with a

button if clients have questions. One limitation to this is that the preview screen would not include the client's specific thresholds and targets. Some participants mentioned that they want the experience to be as closely related to their hearing levels. Clients might be confused by why the preview screen is different from the SPL-o-gram that displays their personal thresholds and targets. If the client's hearing thresholds and estimated prescriptive targets could be displayed on the preview screen that would address this client-specific issue.

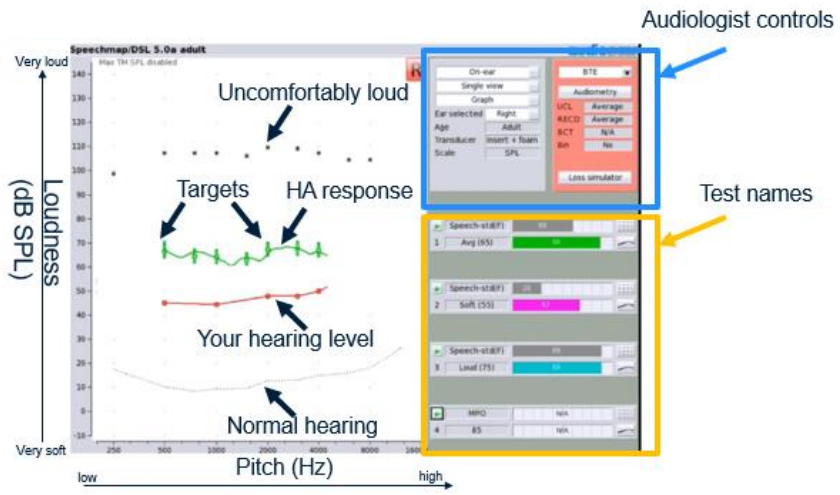

Figure 4.2: SPL-o-gram Preview Screen Example

d) *Have a dual-screen option*. Again keeping the audiologist's screen the same, a dual screen mode, where there is the clinician-oriented screen and a client-oriented screen, could be programmed into the REM systems. This option is similar to presenter view on PowerPoint, where the audience sees the slides and the presenter has the slides and their notes for the presentation.

e) *Provide additional resources*. REM system manufacturing companies could create resources for clients to refer to. As suggested for clinical audiologists, REM system manufacturers could also create an information pamphlet and/or a summary video of the

demonstration. The pamphlet can be sent to clinics for the clinicians to distribute to clients and the video could be implemented into the REM system for the clinician to play as they are setting up for the procedure or can be published online. Having these extra resources prepares the client for the procedure and gives the client tangible information to take with them outside of the appointment.

4.3.3 For Audiology Profession

a) *Explore 'fitting' terminology appropriateness.* The use of the term 'fitting' to describe the process of hearing aid verification was brought up as a source of confusion several times in the focus groups. The confusion was whether 'fitting' means the physical fit of the hearing aid in the client's ear or the fit to prescriptive targets. A few participants expressed their confusion and explained their thoughts regarding this term. It is suggested that this term be evolved into something that is clear when referring to adjusting the hearing aid so it matches the prescription. A few participants feel that the term is being used incorrectly and does not represent what is happening during REM hearing aid verification.

b) *Consider incorporating client-centered care, health literacy, and knowledge of learning styles into education/protocols*. Client-centered care has already been investigated in audiology but perhaps more exploration specifically on how to tailor the information given to clients in informational counselling would be beneficial. As well, many clinicians are aware of the concept of health literacy and how it may influence the client's access to hearing healthcare, but no education resources are provided to audiologists. General learning styles of individuals are explained in other fields (e.g., psychology and

education) but limited discussions are presented in the audiology field. Knowledge of client's specific learning styles could influence the informational counselling format.

4.4 Study Limitations

The current study has several limitations that should be discussed. First, there was a lack of participants in the age range of 30 to 59 years of age. Although there were no participants in this age range, the participant sample was representative of the population of adults with hearing aids, as many people with hearing aids are 60 years of age or older.

Second, the focus group sizes were relatively small compared to what is suggested by the literature. Groups ranged in size of 3 to 6 people where an ideal focus group size is 6 to 8 people (Krueger & Casey, 2015). A common problem in all focus groups is some participants may feel that they did not have an opportunity to state their opinions as others were 'taking the lead' in the discussion or felt that since others agreed with one thought they could not initiate a rebuttal. This feeling could have been exaggerated with the smaller number of people in the group.

Finally, there were two volunteer clinicians that assisted with the REM demonstration in the groups, which may have led to inconsistencies in the demonstration. One clinician assisted with three of the groups, and the other assisted with one group. Our research design helped mitigate this issue by using a script, pre-recorded visuals, and multiple rehearsals with each clinician.

Chapter 5: Conclusion and Future Directions

In this study, focus groups were conducted with first-time hearing aid users, who had memory of REM, to elicit their feedback on informational counselling during hearing aid verification. Participants explained what was beneficial about informational counselling, negative aspects of the informational counselling demonstration, and suggestions to improve the procedure. This is a rich area for research and now that there are some client-developed suggestions, it is possible to move forward with asking research questions about the added value of incorporating informational counselling in REMs. For example, through experimental research, we can analyze if there is a relationship between adding informational counselling into verification procedures and subsequent client outcomes (e.g., satisfaction with hearing aids). In this, it could be possible to tease apart matching to target versus the use of informational counselling and the added value that clients may perceive from seeing the clinician putting effort into matching to target.

Currently it is unknown if informational counselling adds value or not but there are other actions that can be initiated in the meantime. Manufacturers of REM verification systems can take the suggestions presented in the recommendations section and develop software changes to make the equipment more client-friendly. Additionally, resources can be developed for clinicians to include informational counselling in various appointments. For instance, using the feedback from the participants, a modified script of informational counselling can be developed for clinicians to use during REMs. Informational counselling is commonly used in HA fitting appointments when orienting clients to their new hearing aids but could also be used in other areas of audiology and other healthcare fields. The participants' suggestions regarding informational counselling could be applied into any client-clinician relationship, audiological or otherwise, such as a physician explaining to a patient their diagnosis (e.g., diabetes) and the recommended steps for management.

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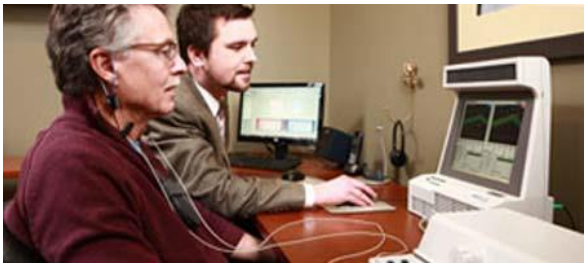
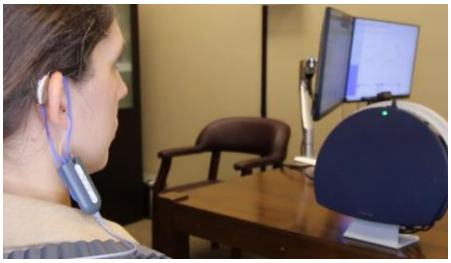
Appendices

Appendix A : Recruitment Poster

The University of British Columbia
School of Audiology and Speech Sciences
443-2177 Wesbrook Mall, Vancouver, BC, V6T 1Z3
T:604-XXX-XXXX F:604-XXX-XXXX
www.audiospeech.ubc.ca
Investigator: Lorienne Jenstad, PhD, Associate Professor
Co-Investigator: Angela Ryall, MSc Audiology Student

Have You Recently Received New Hearing Aids?

We are conducting a study at UBC, as part of a Master of Science thesis (Counselling During Probe Microphone Measures: The Clients' Perspective), using small group discussions to get participants' feedback about education during hearing aid verification.

(Verification = the process of using small microphones to make sure hearing aids are set optimally for an individual)

Help us by contributing your insight to improve education in hearing aid verification and improve client knowledge about hearing aids!

We need volunteers who:

- **Received a hearing aid(s) within the past year (2017/2018)**
- **Are new hearing aid users**
- **Are adults 19 years old and/ or older**

The group discussion will take place at UBC campus. The group discussion will take about 2-3 hours and will be audio-recorded.

Volunteers will receive an honorarium of $20.00 and parking reimbursement!

If you are interested in volunteering or want further information, please contact:

Appendix B : Participant Questionnaire

Part A: Satisfaction with Hearing Aids

SADL Questionnaire to be printed and distributed
http://harlmemphis.org/files/4513/5412/2821/SADL15.pdf

Part B: Demographics

1. Gender: How do you wish to be recognized?
   - ☐ Male
   - ☐ Female
   - ☐ Other, please specify: _____

2. Age:
   - ☐ Less than 30
   - ☐ 30-39
   - ☐ 40-49
   - ☐ 50-59
   - ☐ 60-69
   - ☐ 70-79
   - ☐ 80-89
   - ☐ 90 or more

3. Which of the following best describes your current living arrangement?
   - ☐ I live alone
   - ☐ I live with only my spouse or common law partner
   - ☐ I live with my family (children, parents, sibling) in the same house
   - ☐ I live in a retirement community for independent individuals
   - ☐ I live in an assisted living environment
   - ☐ Other: (please specify) _____

4. Which of the following best describes the highest level of education you have completed?
   - ☐ Less than high school (secondary school)
   - ☐ High school (secondary school) diploma or equivalent
   - ☐ Trade-vocational, including apprenticeship
   - ☐ College, or Non-university post-secondary
   - ☐ University, diploma, degree, or certificate, or higher

5. What was/is your work or occupation? Please be specific and indicate up to three occupations that are most representative of your whole working career. For example: plumber, fishing guide, wood furniture assembler

   _____
   _____
   _____
   _____

6. What generation Canadian are you?
   - ☐ New immigrant
   - ☐ First generation; my parents moved to Canada
   - ☐ Second generation; my grandparents came to Canada
   - ☐ More than a second generation Canadian

7. What is your first language? What other languages do you speak fluently?

8. How many hearing aids do you currently wear?
   - ☐ One hearing aid
   - ☐ Two hearing aids

Part C: Further Comments

Please provide any further comments:

Appendix C : Consent Form

Counselling During Probe Microphone Measures: The Client's Perspective

This project is for a Master of Science thesis.

We are asking you to take part in a research study because you have indicated that you are interested in the topic. The purpose of this consent form is to provide the information to help you decide to participate in the study or not. *Please read the form carefully.* You may ask questions about the purpose of the research, what we would ask you to do, the possible risks and benefits, your rights as a participant and anything else about the research that is not clear. When all your questions have been answered, you can decide if you want to be in the study or not. *This process is called "informed consent."*

PURPOSE AND BENEFITS

This is a research study to gather information from adults with hearing aids about counselling during probe microphone measurements (PMMs). PMMs occur during hearing aid fittings and are a way to ensure the hearing aids are set appropriately for a person. It uses small thin tubes in the ear canal to measure the volume from the hearing aid in the ear canal. The purpose of this study is to determine the best way to present information about this process.

Within a group discussion, there will be a demonstration about PMMs. You will be asked several questions afterwards about your thoughts about the demonstration and how it was explained to you. Some questions may include what helped your learning, as well as what might be done to improve the demonstration.

By participating you may learn more about your hearing aid(s). The information obtained in this study will help audiologists to improve how they present this information to future clients.

PROCEDURES

If you choose to participate in this study, you will be asked to attend a demonstration and group discussion. Overall the session will last about 2 – 3 hours.

You will be asked to answer some questions about your satisfaction with hearing aids and some other questions about yourself. After answering these questions, you will be asked to participate in a discussion with 6-8 other adults who have all recently received new hearing aid(s) too. The group will talk about the presentation. You will all be asked questions about the information and procedures

presented. You will be encouraged to provide your input about what information is/would be helpful to peers and what would not be helpful.

By agreeing to participate, you consent to have your conversation recorded during the discussion.

STUDY RESULTS

The results of this study will be reported in a Master of Science thesis and may also be published in journal articles and books. If you would like to receive information about the results from this study, please check the box at the very end of the consent form.

RISKS, STRESS, OR DISCOMFORT

There are no known physical risks associated with these study procedures. It is possible that you may find the discussion personal; you may be called upon to answer a question, and everyone will be given the opportunity to participate. It is up to you what information you wish to share with the group and you do not have to answer any question if you do not want to. We have addressed concerns about your privacy in the following section of this consent form.

OTHER INFORMATION

Participating in this study is voluntary, you may decline to enter or withdraw from the study at any time without any consequences.

Confidentiality relies on all participants understanding their role in protecting the identities and experience of fellow participants. All participants are asked to limit their discussion of this group to that which will protect the identity of others.

In our analysis, information gathered about and from you is confidential. We will code all study records, including recorded materials. The link between the code and your name will be kept at a secured location, separate from the study information. Only lab employees, all of whom have been trained in privacy and confidentiality, will have access to the link. All interview recordings will be saved on a password protected computer in a locked laboratory.

We will keep the link between the study records and your name as well as a copy of the recorded discussion for five years from the date of participation in the study, and then we will destroy the link and delete all recordings using methods appropriate for destroying electronic data. If we publish the results of this study, we will not use your name.

REIMBURSEMENT

You will receive $20.00 for your participation in this study. In addition, if you require parking, there will be reimbursement for this cost on the day of the group discussion.

SUBJECT'S STATEMENT

The study described above has been explained to me, and I voluntarily consent to participate, as indicated by my signature below. I have had an opportunity to ask questions. I understand that future questions I may have about the research will be answered by the investigator listed above.

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

I understand that true confidentiality is dependent on myself and all participants; I agree to not share information provided by others in this group with anyone else.

_____ _____

Please Print Your Name Date

_____

Please Sign Your Name

Please indicate if you would like the results sent to you by:

☐ Mail

_____

_____

_____

☐ Email

_____

Availability for group discussions

☐ Are you available on Fridays or Saturdays?

☐ Friday

☐ Saturday

☐ If not, what other days of the week are you available?

_____

☐ What time of day works best for you?

☐ Morning (9 am to 12 pm)

☐ Afternoon (1 pm to 4 pm)

☐ Evening (5 pm to 8 pm)

☐ Yes, I would like to receive the final report of this study

Please send it to my _____ listed above:

☐ Mailing address

☐ Email address

Appendix D : Focus Group Discussion Guide

(Adapted from Holliday, 2013; Format suggested by Krueger & Casey, 2000)
remember to clarify questions and use follow up prompt questions when necessary

Opening Questions/ Icebreaker
Purpose: get people talking and feeling comfortable with an easy-to-answer question that does not highlight any power or status differences between participants

Moderator start off then pass it to the participants

- **Tell us your name and your favourite city/place to travel/time of year**
- **Tell us a bit about your experience with your hearing aid fitting?**
    - How did your clinician make sure the hearing aids were fit right for you?

Moderator please say slowly:
"We are aware that everyone has had the procedure already, so you can reflect on your experience and think about how other people may react to the information. Feel free to take notes throughout the demonstration, these can be anything from what you liked or didn't like about what was said and what was shown. Also note anything that wasn't said or shown that would have been helpful. Everybody should have some scrap paper to take notes or write any questions or thoughts you want to bring up later in the discussion. Let's get started"

*****Live demonstration of REMs*****

Introductory Questions
Purpose: introduce the topic of discussion; get people thinking about their connection to the topics. This is an opportunity for participants to express their understanding of the issue

- **What are your initial thoughts based on the demonstration we just saw?**
- Prompt if no one seems to have much to say:
    - Think of someone just getting their first hearing aids, what do you think their initial thoughts would be?

Key Questions (should begin by 1/3 to ½ of total time)
Purpose: two-to-five main questions, these answers are the main interest of the study
Content= what; Format= how

- **What did you like about the information that Sandra said?**
- If discussion is flagging, ask any of these questions below:
    - If your audiologist was to conduct this procedure and say exactly what we heard, what are some things that you think would be good to include?
    - What information do you think was helpful for you to understand the procedure?
    - Now think about someone else, maybe someone going through it for the first time, what are some things you think they should hear from the audiologist?

- **What did you not like about the information that she said?**
- To get people to continue talking ask the first question. If no one has brought up terminology, ask second question:
    - What are some better ways to say it?
    - Was there any terminology or phrases that were hard to grasp? (e.g., verification vs measurement or probe microphone measurement vs real-ear; using the phrase real ear hearing aid measurement or on-ear hearing aid measurement)

- **Forget about what was said, what did you like about what you saw on the screen?**
- Prompts:
    - What aspect of the image made it easy to understand/follow?
    - Now think about someone else, maybe someone going through it for the first time what are somethings you think they should see on the screen? (format wise)

- **What about the images on the screen you didn't like?**
- If not understood use prompt below and if no explanation to why then ask next question below
    - Were the images straightforward or hard to understand?
    - What are some better ways to show this information?
- **Let's think outside the box now, what are some other ways we could visualize the information, so it is easy to understand?**
    - Prompts: E.g., using pictures, real life examples, or simpler diagram

<u>Ending Questions</u>
Purpose: bring closure to the discussion, while allowing reflection and analysis by the participants

- Is there anything that you have been wanting to say but haven't had the chance to yet?

<u>Summary Question</u>
Moderator does brief but thorough oral summary (2 min) of key points and topics raised by the group about the discussion around the key questions.
Purpose: succinctly describes the main points for consensus by the group, to aid in later analysis

- How well does that summary capture what was said?

<u>Insurance Question</u>
Moderator gives brief overview of the purpose of the study, more detailed than in the introduction.
Purpose: ensure the group feels that all critical aspects were covered in the discussion

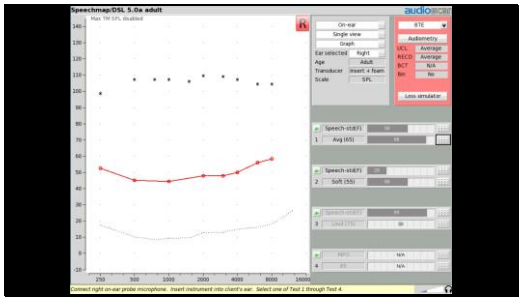
- As a reminder the **purpose** of this study is to get your feedback on the information that was presented in the demo to determine how we can improve the understanding of future clients when they're going through the hearing aid fitting process. Specifically, we were looking for your feedback on the information that was said and the images that were presented and develop new ideas for when explaining this to new clients.
- Is there anything we needed to talk about but didn't in terms of what we saw and heard today?

Appendix E : REM Demonstration PowerPoint Slides

Slide 1

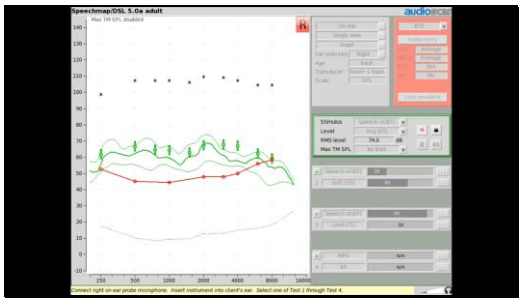
Blank screen to be shown during focus group introductions

Slide 2



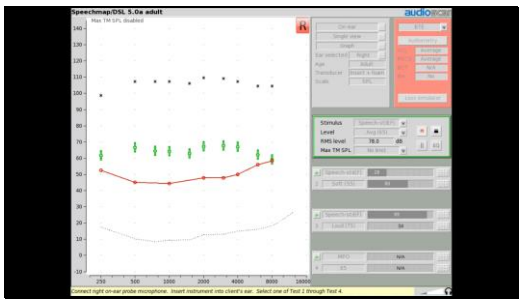
Display of Speechmap at beginning demonstration during otoscopy and probe tube placement

Slide 3



Average conversation stimulus testing-under target

Slide 4

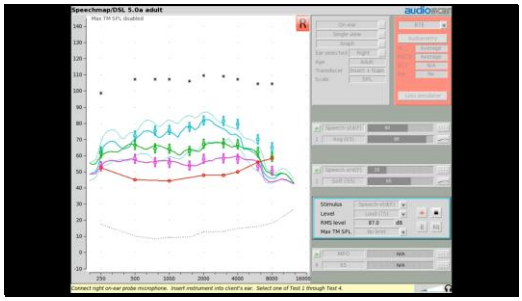


Average conversation stimulus testing- on target

Slide 5

Soft conversation stimulus testing- on target

Slide 6

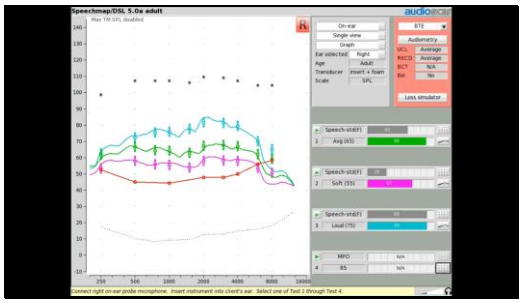


Loud conversation stimulus testing- under target

Slide 7

Loud conversation stimulus testing- on target

Slide 8



MPO stimulus testing– on target

Slide 9

Blank screen to be displayed throughout focus group discussion

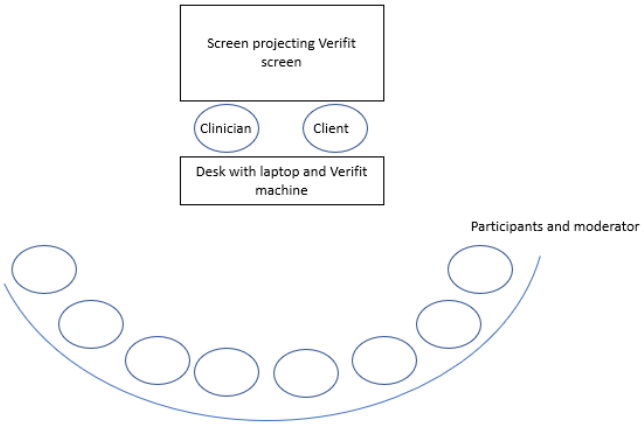
Appendix F : Demonstration Outline & Script

Actor Audiologist & Client

- Audiologist explaining procedure to client
- Inserting probe tube and hearing aid
- Providing informational counselling
- Step-by-step instructions and counselling throughout procedure

Screen: Video of REM Response

- Video from Verifit machine of 'under-target' and 'match-target' responses
- Video and audio – showing the signals being presented and responses displayed in real time.



Step-by-step Outline with Script:

1. Audiologist give the client an outline of what will happen

"Today I'm going to set your hearing aids to a prescription that fits your specific hearing loss. I I'm going to run a few tests and I'll explain everything as we go along. First, I'm going to look inside your ears to ensure they're clean and clear of wax. Then, I'll put this little tube in your ear (*show probe tube*) with your hearing aids. Then I'll have you looking forward at this screen and you'll hear a man tell a story about carrots through these speakers. While the tests are running, we'll have to be quiet and I'll need you to try to stay fairly still. I'm going to run the test at a soft, medium, and loud volumes. We'll see responses on this machine from your hearing aids, and I'll be adjusting your hearing aids during these tests. Let me know if the sounds are too loud and uncomfortable. I'll explain more as we go. Are you ready? Let's get started"

2. Audiologist looks in client's ears with otoscope

3. Audiologist measures probe tube and show client the tube while explaining purpose of probe tube

   "Next, I'm going to put this little tube in your ear. I'm going to measure it, so it fits nicely in your ear canal with the hearing aids. This is connected to a microphone, so it will collect the amplified sounds from the hearing aids and bring them into the machine. The tube can tickle and can feel like it is poking your ear- it can't actually harm you but if it is uncomfortable just let me know and I'll adjust it. *Probe tubes passed around the discussion group.*

4. Audiologist puts the probe tube inside the client's ear

   "I'm inserting the tube now"

5. Audiologist puts hearing aid in the client's ear

6. Audiologist explains SPL-o-gram and procedure then initiates REM testing

   "Okay I'm going to start the testing now, all you have to do is look forward at the scree, sit still and listen to the story. On the screen we'll see the response from your hearing aids. On this axis we have loudness, from very soft at the bottom to very loud at the top, a bit different than the audiogram Across this axis we have pitch, low pitch to high pitch. This red line is your hearing thresholds that were determined with the hearing test. Anything below this line you will have trouble hearing, so we want to make sure all the sounds are above this line. When I press start, we are going to see a bunch of targets (or crosses), one for almost each pitch and a line that'll move with the story. This line is the response from your hearing aids. I'll explain more right after. Let's begin." *Audiologist pushes button to begin recording.*

7. Video plays on screen (average speech- 65 dB SPL= under-target)

8. Audiologist explains response on SPL-o-gram

   "So, this graph shows us the response from your hearing aids. We want this line to reach all the targets as close as possible. This line is the hearing aid response in your ear through that tube. The targets are based on a prescription for your hearing. We can see that we need to make some adjustments for the line to match more closely. These sounds are above your hearing thresholds (this line) so you can hear it, but it is not loud enough for you to get full benefit. I am going to increase the volume at these frequencies." *Audiologist pretend to make changes on computer.* "Now let's try that again and see the difference". *Audiologist pushes button to begin REM.*

9. Video plays on screen (average speech- 65 dB SPL= match-target)

10. Audiologist explains reasoning of on-target and explains next stimulus, soft speech

    "Now that the line is matching or close to matching, we know that the hearing aid is providing you with enough volume in order to for you to get full benefit. Now, I'm going to move onto another one. Now you will hear the story with a quiet voice. This will be soft to you, so it might be difficult to understand. Again, you'll have to sit quietly and listen to the story." *Audiologist initiates speech stimuli.*

11. Video plays on screen (soft speech- 55 dB SPL= match-target)

12. Audiologist checks with client that he/she understands, and moves on to loud speech

    "The targets are already matched as closely as possible so there are no adjustments needed. Are you understanding the process so far? Any questions? … Now I'm going to move onto loud speech, this time the story will be loud, but we do not want it to be uncomfortable; let me know if it is beyond what you can tolerate. Again, we are trying to get the line to match to the targets." *Audiologist presses button to initiate testing.*

13. Video plays on screen (loud speech- 75 dB SPL= under-target)

14. Audiologist pretends to make changes on program

    "I have to make a few changes, I will increase the volume there *(point at specific frequency)* then run the test again." *Audiologist pretends to make changes on computer and begins test.*

15. Video plays on screen (loud speech- 75 dB SPL= match-target)

16. Audiologist checks in again, and prepares for MPO

    "Seems like all the targets were matched again here too. We're almost done, just one more. This one will play loud beeps this time. This is measuring the maximum output/ceiling level of the hearing aids. This means that when a very loud sound happens, you will hear it as a very loud sound, but not painfully loud. The hearing aid will restrict or limit the sounds from going beyond what you can tolerate. The hearing aids won't amplify any sounds louder than these beeps. These beeps will be loud, but it will only be for a few seconds. Tell me to stop the test at any time if it is beyond what you can tolerate. Here we go." *Audiologist presses button to start testing.*

17. Video plays on screen (MPO)

18. Audiologist explains MPO

    "Most of the targets are already matched so we don't have to make any more changes to that. Again, this is to make sure that the hearing aid does not amplify very loud sounds too much for you and we have an adequate range for amplification."

19. Audiologist explain to client that all finished with measurements. Asks client if they have any questions about procedure. Audiologist summarizes why this is important.

    "We are finished with the measurements for today. Again, to summarize, these measurements are to make sure your hearing aids are amplifying sounds appropriately for your hearing. It is important that we make sure it is fit to you as an individual instead of just letting you take the hearing aids right away out the door. If we do not complete these measurements then your hearing aids may not amplify sounds properly for your hearing, for example some sounds may be too loud or quiet for you. With this measurement we can ensure that your hearing aids are set for you specifically and no one else's hearing."

Researcher summary at end of demonstration:
"At this point, the basic fitting is done and completed. Within clinics, you clinician may use other tests with this set up to demonstrate and measure other features that hearing aids have. Today, we are not going to show these other tests today, as our focus is the basic fitting that we just saw."

Appendix G : Field and Memo Notes

(Adapted from Holliday, 2013 & Winsor, 2011)

MEMO

Author:
Quick Title:
Date:

Purpose of Memo:

Memo Text:

This is where thoughts and opinions emerge and can be interpretive or inferential.

Can use memos to note issues, dilemmas, or challenges during discussions as well as what strategies and questions have been effective, what hasn't been working, what needs more follow-up, etc.

Also use memoing for summarizing what seemed important or preliminary codes or categories and how that may affect future data collection. This is a good place to identify and document why given decisions are made regarding category identification.

_____
(Author's initials_YYYY-MM-DD_Time_ Setting)

FIELD LOG

P.___ of Field Log entry:
Date:
Time:

Observer name:

Location:

Group #:
# of individuals in session (do not use names):

Field notes are used for general description
Paraphrased from *Morse & Field (1995)*

- *Description of environment: including clothes, technology, personal belongings, sensory details*
- *Context: the immediate environment but also the history necessary for someone else to understand the interactions you observe.*
- *Non-verbal behavior: tone of voice, posture, facial expressions, eye movements, emphasis in speech, body language, gesturing*
- *Language used: key words, focus, topics of primary interest to participants, topics of interest to the study questions, exact phrases, explanation of jargon or vernacular (i.e., language that you don't understand and for which you need to get an explanation.)*
- *Researcher's impressions (i.e., clear discomfort of participants as they interact or when you ask a question, excitement or relief, your own discomfort, confusion or excitement)*
- *Analysis (i.e., tentative hunches, emerging patterns, links between observation episodes, things that need to be followed up, ideas for future observation sessions.)*
- *Consider drawing maps, flow charts, sketches*

_____
(Author's initials_YYYY-MM-DD_Time_ Setting)

Appendix H : Transcript Legend

Symbol	Explanation or Meaning
FG#	Focus group
P#	Participant
M	Moderator
{description}	Specifies context or researcher's description
Underline	Signals vocal emphasis
LOUD	Marks speech that is obviously louder than surrounding speech
-	No space between the words (within or between speakers)
(possible)	Indicate words that are possibly what was heard, or replacement of names/confidential information, or to indicate a pause
Heh heh	Voiced laughter
Laught(h)er	Indicates laughter within speech
(.)	Pause within speech
[talking]	Speakers talking at the same time
x	Unsure of word
/k/	Sound of letter/phoneme

Note: Table is adapted from Holliday (2013, pp. 135), Puchta & Potter (2004, pp. 164-5), and Silverman (1993, pp. 118).

Appendix I : Meaning of Codes

Note: '→' indicates that the code is nested under another code in the maps. Please refer to code maps if needed.

Interaction Codes

Code	Meaning
Difference among audiologists	There will be differences in clients' experiences as it will depend on who your audiologist is (e.g., how much they spend time with you and explain information to you).
Power dynamic between client and clinician	There seems to be a power relationship between the client and the clinician and some mixed opinions on who is in 'charge'. Some participant said the audiologist is under the client's direction where others said that they are under the audiologist's direction.
Audiologist assuming clients' knowledge	The audiologist is assuming what the client knows already about the REM procedure and is deciding how much information to relay based on that.
Audiologist was not engaging	The audiologist was not trying to elicit any information from the client. The audiologist was speaking from rote and was not friendly.
→In personal experience audiologist established rapport and interaction was warmer	In participant's personal experience there was rapport building in between each test and the environment was a lot warmer.

Positive Transaction Codes

Code	Meaning
Visual	
Visuals were good	Participants liked the visuals and thought the screen was great to see. Visuals were good in the sense that it presented enough information. Participants liked that the graph showed the different levels and colours.
Visuals were clear and straightforward	The images presented were straightforward. The visuals and cross-hairs (or targets) were really clear and straightforward.
Colour coding is good	The colours are nice. The colour coding is good as it is clear to distinguish which one's are which by the colours.

Code	Meaning
Combined	
The screen showed that the hearing aid is working	The graph showed motion of the reaction of the hearing aid and you could see the mechanics of the adjustments to your hearing loss. The visuals showed improvement with the cross-hairs (or targets) and showed that the hearing aid is going to work for the clients. Clients felt engaged if they can see the movement and that the hearing aid is doing what it is programed to do.
Seeing the screen helps to understand the adjustment process	Clients know that the audiologist is making adjustments on the computer but sometimes not exactly sure what they're doing so seeing the screen helps to picture/understand the process.
Understand how the hearing aid helps the client	This demonstration clarified how the audiologist fixes the lack of hearing with the hearing aid. Understand that testing the hearing aid so it is programmed appropriately for the client.
Surprised how much adjustments can be made with the hearing aid	Participants surprised and now realizing how much adjustments you can do with the hearing aids. Did not realize how fine tuning it was until now.
Verbal	
Used client's name	Participants liked that the audiologist used the client's name a lot.
Used co-operative language	Liked that the audiologist used 'we' and 'our' instead of 'you' which indicated that they were working together to achieve the goal.
Asked if the client had any questions	The audiologist asked the client at the end if they had any questions.
Information was clearly explained	Participants found that the explanation was clear and that they were okay with the information that was presented in the demonstration.
→Audiologist explained everything	The audiologist was explaining everything during the demonstration.
→Explained each step	Participants liked how the audiologist said what they were going to do in each step.
→Explained different levels of sound	Participants liked that the audiologist explained that there were different levels of sound (e.g., this one is soft, medium, and loud).
Terminology was fine	Participants thought the terminology was fine and did not think there was many long words that were challenging.

Negative Transaction Codes

Code	Meaning
Visual	
Visuals directed to the audiologist	Participants felt that the visuals were probably designed for the audiologist rather than for clients. Also, that the audiologist needs the screen not the client.
Visuals are unclear and confusing	Participants found that the graph was totally unclear. Some individuals said they do not want to see the screen as it makes them more confused. Others commented that the screen gets too busy with all the lines, so you lose what each line means.
→Coloured lines are confusing	The coloured lines do not mean anything. Participants wondered what the lines were for and did not understand their significance even though they were colour-coded.
→Right side of the screen is unclear	Right side of the screen has all this other information that the audiologist did not address. Participants found that the images were not straightforward because they did not follow the right-side panel of the screen.
Didn't understand the screen	The screen is nothing because the participants do not understand it.
→Axis has too much information	The axes have too much information for the participants.
Verbal	
It was too fast	Overall it felt too rushed, hurried, and it was too fast.
→There was not enough time for questions and explanations	The demonstration seemed too short to explain everything. There should have been more time. By the time participants formulated a question to ask, the audiologist had moved on to the next point.
→Takes some clients longer to understand when information is foreign and feeling stressed	Some participants feel that their brain is slower in stressful situations and that it takes them awhile to understand foreign concepts. A hearing aid fitting appointment can be stressful for clients as this is a big change in their life.
→Could understand the audiologist but couldn't keep up	Some participants said they could understand the audiologist, but they could not keep up with the pace.
Audiologist didn't say could come back and re-do it	There is a back and forth process of adjustments that is not reflected in the demonstration but on the other hand the demonstration showed exactly what happened when you get hearing aids. The audiologist did not say you can come back as many times and re do it again or adjust it, which is true, and it should have been said. You can go back to the audiologist as many times as you want.
Explanation was unnecessary	The explanation about all this is not necessary.

Code	Meaning
→Clients only need to know the basic information; the audiologist will do the rest	Participants felt that they just need to know that the audiologist is putting the hearing aid to the level that is best for them. They only need to know the basic information; the professional will take care of the hearing aid by programming it for me.
→Do clients need to know this information?	Overall participants felt do we, as clients, need to know this or need to see this? Participants felt that they do not need this but need the audiologist to tell them. Participants do not care since they are not studying this information. In some of their personal experiences, clients watched the process and no details were expected nor wanted from them.
→Too much unnecessary information	Participants felt that the details and visuals were not always necessary and that there was too much unnecessary information. Some participants said it was an information dump, too much information in a short period of time. Others said that a lot of information can be quite overwhelming. Some participants mentioned that they felt overwhelmed in that time period and felt that it was useless and inappropriate for seniors.
→Don't know what's going on	Participants did not know what was going on and had a struggled to figure out what was going on. They had a lot of questions that were unanswered throughout the process.
Language was difficult	The language was difficult for participant's understanding.
→Language was directed to audiologist	Language was fine for the audiologist but not necessarily fine for the client. Individuals that are in the industry are aware what the terminology means.
→Using the word 'fitting' is wrong	The word fitting is incorrect in this setting. Participants think the word 'fitting' is related to the physical fit of the hearing aid in the ear and once they realized that the fitting meant adjusting the hearing aid to the appropriate volume levels, they said that the word is being used incorrectly.
→Don't understand prescriptive target and axis	The use of the word 'prescriptive target' and the axes are confusing. Some participants wonder if it is necessary to use the word 'prescriptive target' because clients do not know what clinicians are taking about since clients don't understand that word.
→Not everyone is familiar with terminology used	Depending on your knowledge background, some individuals may not be familiar with some of the terminology that was used (e.g., frequency and equalization).

Visual Transaction Suggested Changes Codes

Code	Meaning
Make objects on the screen bigger	Make objects like the targets bigger because they are important for tracking the change of the hearing aid response.
Just show where the target is and where currently	On the screen just show the target that want to reach and where the current hearing aid response is.
→Show the current and the goal	The visuals do not have to be very complex if you show the target and bring up the response. See where the hearing aid response is currently and where it should be/ where going to put it based on the programming needs of the client.
→Have separate pages for tests that show 2 lines (me and the target)	Show one screen at a time for each stimuli test and show the target and the client's response. On each screen it could be titled to explain which stimulus test it is for (e.g., high volume or low volume) and then only have two lines, the average and where the client's hearing aid output is currently.
Have client-oriented screen that has labels	Have a preview screen with arrows that explain the different lines and then go to the audiologist-oriented screen. Another idea is to create a patient-screen that has more terminology explained compared to the audiologist-screen. Both of these screens would be used at the same time, so each person would see the screen that is developed for them.
Use the screen like a graphic equalizer so can see the effects of amplification	Show the screen like entering a graphic equalizer then you can see the increase in amplification and the effect on the screen.
Don't use numbers on screen instead of a graph	When exploring other ideas to display the information on the screen, participants mentioned that just the use of numbers alone, with no graph, would be just as unclear.
Need labels	The visuals should have labels that explain what each item is. The axis should be labelled which one is decibel and which is frequency. All graphs should be labelled and if you are not an expert in the industry you will have that doubt in your mind of what the axes are. Other labels could be placed beside the coloured lines.
Show bigger contrasts of change	Participants want more movements on the screen, so it is easier to track the information and begin to understand it. Provide bigger contrasts of change because currently it is too small and cannot see a lot of changes since the output is already near the baseline. It would be better if the clinician were to reduce the amplification of the hearing aid, so the response is reduced on the screen, so the client understands how the adjustments work then go back up.

Code	Meaning
Clients have their own preferences	Clients will have their own preferences of seeing the visuals or not. Clinicians should determine beforehand if the client wants to see the graphs or not.
→Some people are not comfortable with graphs	Some people may not be comfortable or adept at reading graphs. Some participants raised the idea that 'how many people are comfortable with graphs?'
→Some people may not want to understand the graph	Some participants felt that they do not want/need to understand the graph nor see it. They want the clinician to explain the problem with hearing. Some prefer no charts in front of them and receive the explanation verbally after testing by referring back to it.
→Put less emphasis on visuals as it's hard to remember as get older	Participants feel that as they get older, they are not as good with remembering these images, so it is not good for the clinicians to put a lot of emphasis on the visuals.
Need a legend	There should be a legend that describes what clients are looking at and what the side bar (on the right-hand side) means. Clients need to know what the lines mean so they can look at the legend and match the information. A clear colour chart would account for everything. The legend could explain what the targets and provide an explanation for all the lines that are presented in the SPL-o-gram (e.g., the yellow line has no label on the right-hand side of the screen).
Colours not good if colour blind	Colours are an issue if someone is colour blind so there should be another way to distinguish between the lines. For example, change the length of the line or use dots instead.
Just use shape of line instead of targets	Instead of using the targets, keep it simple by just using a line as it represents the same information.
Print is better than the screen	Some participants prefer printed materials rather than looking at the computer screen.
Display familiar sounds on the screen	By displaying familiar sounds onto the screen, it makes the information similar to the audiogram. Some clients may have understood their hearing loss clearly using these sounds which visually shows what sounds they are able to hear and what sounds will be more difficult. The same concept could be applied to this SPL-o-gram to improve understanding.

Verbal Transaction Suggested Changes Codes

Code	Meaning
Show the test multiple times	Run the first test, then explain the results right away, then run through the test a second time, the clients will have a better idea of the screen now from the explanation. Do the test first and show the client then run the test a second time and explain it. Providing more time and repetition will help the clients to understand the testing.
Check in with the client	Check in with the client and see if they know what is going on and if they do not then explain in more detail. Checking in with the client after a few of the tests to see if they want to take a break testing and provide time for questions. Clinician should check for client's understanding regularly.
Provide more time for understanding	Overall, audiologists should make sure there is enough time for clients to understand the material.
→Speak slowly, repeat, and provide time for questions	Audiologists should speak slowly, repeat important information, and provide time for clients to ask questions. For example, if the audiologist is going to explain speech sounds and compare them to frequency, the audiologist should explain this concept slowly and repeat it a couple time, so it is clear.
→More time and demonstration of equipment	Should have taken time to explain and demonstrate equipment that was being used. For example, explain what the tube is for rather than waiting for people to ask what it is for.
Complete all tests then explain afterwards	Some clients said it is fine for the audiologist to complete all the testing first then explain everything afterwards when it is complete.
Client must explain issues well enough, so the audiologist can make the correct adjustments in the computer	The client must explain their issues clearly, so the audiologist can make the appropriate adjustments. The audiologist can only address specific features that the client says.
Give client the option to learn more about the process	The audiologist should be giving the client the option of learning the information. It is a personal thing if clients want to learn or if they do not care about the information and they will tell the audiologist what they prefer. Providing the option of knowing the information will be helpful for client since some of them will not care about the information and do not want to waste time on it.
Have a better explanation	Participants said that the explanation should be proper and overall should be better.
Provide an outline	Participants felt that they needed the audiologist to give an outline of the procedure at the beginning. The audiologist should say how many tests there will be and if there will be an opportunity to take breaks or not.
Use simpler terminology	The specific words that were used were not understood by many participants as they are not the professional. Participants mentioned that there were too many terms that were used that they never

Code	Meaning
	heard of before. It is a technical field, but the audiologist should bring the terminology down to the client's level. Overall, the amount of information should be cut down a bit because there is too much technical information and many participants do not understand it. Examples of ways to modify the language: 1. Instead of saying amplification, say turning up the hearing aid, boosting the hearing aid at a certain frequency, or bring quiets up so you can hear. 2. When explaining decibels use a synonym (e.g., loudness). 3. Describe how 'fitting' is related to the prescription not the physical fit of the hearing aid. 4. When referring to the axes, just describe the meaning of them but the clinician does not have to necessarily say 'x-axis' and '-y-axis'. 5. Would be clearer if the audiologist says they are going to turn up the hearing aid and ask if is okay or ask for a sign from the client to confirm the adjustment is alright.
→Some people may know what 'verification' is	Some individuals might understand what the term 'verification' means but if certain clients do not then the audiologist should explain it or use another term.
→Terminology for hearing loss	Some clients may feel uncomfortable when clinicians use the term 'hearing loss' when referring to their hearing thresholds. Consider asking clients what terminology they prefer to use or modify language so more positive when talking about hearing thresholds.
Balance of information	Audiologist must balance the information based on the client and their own personal factors that will influence their understanding.
→Age and gender differences	Depending on the age and gender of the client it might take them longer to understand the information. Some younger clients might be more interested in the information compared to older adults. Accounting for this factor is important.
→If novice the information will be hard to understand	If the client is new to the information, it might be harder for them to understand it right away. Some participants mentioned that they did research before their appointment, so they knew what to expect but if you have not it will be harder.
→Have to judge how much information to give	Some of the information may not be necessary to explain to clients, some people are technical and would like to know a lot of information where others may not be and would like less information presented. Other participants wonder how accommodating the verification process is for those who

Code	Meaning
	may not have any prior knowledge about frequency. If clients are aware of the information that is presented, then the audiologist does not have to go in depth but if they do not then the clinician does. Overall, the audiologist has to judge their audience when explain because there is a fine line of explaining too much and not enough information.
→Balance of when to present the information	As the clinician, you have to judge whether the information should be explained all in one appointment or in various appointments. Some participants mentioned that the amount of information is overwhelming, but they would like to know all the information when getting the hearing aid. Some participants preferred to receive the information in different appointment, so they had time to process the information and ask questions at another time.
Make it meaningful to the client	Make the process meaningful to the client by relating the information to real life experiences and experiences that are connected to themselves. The audiologist can get feedback from the clients about their real-life experiences and can see if the screen is expressing their concerns. For example, by asking clients to imagine they are in a train station, would the sounds they just heard be comfortable to listen to, or to give feedback based on what they have previously experienced being at the train station and currently.
Clients want more explanation about the process	Participants felt that there was a lack of explanation from the audiologist and that more explanation would be helpful.
→Price of knowledge	Participants felt that they are spending a lot of money on hearing aids, so they should know as much as possible about them. They want to know what the hearing aid is doing.
→Clients want to know everything	Clients want to know everything about the process. Examples of items that participants want explained: 1. Explain what tube for. Some participants were not sure how the audiologist knew what the client was hearing and was not sure if it had something to do with the tube. Others were not sure what the tube did, they were not sure if it measured the length of the hearing aid or ear canal or if it was measuring the sound of the hearing aid from inside or outside of the ear. The audiologist should have said from the beginning what the tube did. 2. The audiologist should have explained the target that they are trying to reach. Participants were confused because there was a line that suggested what the average would be but did not understand

Code	Meaning
	why that line was not the target across the range. They thought the average conversational speech stimuli response line was the target. 3. Explain what is normal and what is not normal. 4. Explain how the SPL-o-gram is related to audiogram and critical area of speech. 5. The audiologist should have explained why they were not trying to reach the 8000 Hz target. Participants were not sure if it was because it was a demonstration or if it would have happened also in a real appointment. 6. An explanation of the high pitch level (MPO) was wanted but the audiologist did not explain. 7. Explanation of how the SPL-o-gram is the reverse of the audiogram. 8. Clients want more adjustments with their hearing aids but unsure of their hearing aid limits. More explanation with hearing aid limitations and expectations is warranted.
→Audiologist should explain what you're doing	The audiologist should be explaining what they are doing as they are doing it.
Teach basic physics of sound	There should be some basic physics of sound component included in the demonstration.

Combined Transaction Suggested Changes Codes

Code	Meaning
Provide resources before appointment	Audiologists should provide additional resources to clients before the appointment, so clients can have some preliminary information to help them understand the procedure.
→Preview video of procedure	Clinics could develop a demonstration video to show clients about the procedure. The audiologist could tell the client to come ten minutes early and watch a video of what to expect during the appointment. A similar idea is used for minor surgery, sometimes patients watch a video that shows what to expect in the surgery.
→Have an information pamphlet	Participants suggested an information pamphlet to be given out to clients while waiting for their appointment. The pamphlet could include terminology and other general information about the appointment that will be helpful for the client to know.
Images need an explanation	Images would be easier if there were more explanation for it. Some participants said that the images are okay, they just want them explained. A few of the participants said they did not remember the images and wondered if there was enough explanation for it. Another participant mentioned that the audiologist cannot show another graph, so they should explain it better. Other participants said that either the audiologist shows none of the images or explains everything that they will show.
→If visuals were explained better clients would understand more	Participants felt that there were aspects of the images that were not explained well and if they were explained better, they would understand more of the verification process. Specific items that participants want explained: 1. The black x at the top. Some participants thought this was normal hearing. 2. The dots at the bottom. Participants said would be nice to know what they are for. 3. Why doesn't the red line move. 4. Participants wanted all the lines explained. 5. Explain what the target is that trying to reach. Participants were confused to why was the audiologist not meeting the 'average' and were confused to what the target was. 6. Explain the shape of the line. Participants wondered why the shape of the line was not straight. They were confused to why the line started low then went up as it went across the screen then back down. They thought that the hearing aid targets should be at the same spot for each frequency.