Self-determination theory and hearing rehabilitation: The role of motivation in help-seeking, hearing aid adoption and hearing aid fitting outcomes

Jason Ridgway

BA, DipAud, MSc (Otolaryngology: Hearing Aids, by thesis)

A thesis submitted for the degree of Doctor of Philosophy at The University of Queensland in 2016

School of Health and Rehabilitation Sciences
Abstract

Adults with hearing impairment do not always seek help for their hearing or adopt hearing aids and some people who adopt hearing aids do not use or gain benefit from them. Psychosocial factors that influence help-seeking, hearing aid adoption and outcomes illustrate the importance of addressing client experiences and motivation. Although models of health behaviour have been recommended to understand client behaviour, motivation has not been explored in detail. To investigate motivation in hearing rehabilitation, the research in this thesis applied self-determination theory (SDT) as the guiding theoretical framework.

The research comprised three quantitative studies and one qualitative study, which together followed an explanatory sequential mixed methods design. The thesis research aims were to (1) identify motivational characteristics of first time hearing help-seekers and determine relationships between these characteristics and the decision whether or not to adopt hearing aids; (2) identify whether or not motivational characteristics influence hearing aid fitting outcomes, and if so, in what ways; (3) determine associations between personal characteristics and motivation in first time hearing help-seekers; (4) identify first time hearing help-seekers’ perceptions of their interactions with practitioners; and (5) explore practitioner influence on relationships between motivation, help-seeking and hearing aid adoption. The first three aims were addressed by each of the quantitative studies. The fourth and fifth aims were addressed in multiple studies.

For the quantitative studies, a total of 253 participants completed a series of questionnaires adapted from SDT. In the first study, associations between autonomous and controlled motivation, personal and audiometric variables and hearing aid adoption were explored with multivariate regression analysis. Three factors were positively associated with increased hearing aid adoption: autonomous motivation, perceived hearing difficulty and poorer hearing. Controlled motivation was not associated with hearing aid adoption.

The second study reported outcomes for 216 of the 253 participants with respect to autonomy support. Multivariate regression models were formed that examined associations between autonomous and controlled motivation, personal and audiometric variables, autonomy support and hearing aid fitting outcomes. Autonomy support was not associated with increased hearing aid adoption, but was associated with three outcomes: increased perceived competence for hearing aids, reduced activity limitations and
increased hearing aid satisfaction. Autonomous motivation was positively associated with one outcome, hearing aid satisfaction.

The patterns of effect of autonomous and controlled motivation on hearing aid adoption and hearing aid fitting outcomes prompted the third quantitative study, which sought to examine personal characteristics associated with motivation. Multivariate regression indicated that, in the 253 participants, those who were younger, wanted hearing aids more and reported greater hearing difficulty also reported higher autonomous motivation. Participants with higher controlled motivation were more often referred by others and wanted hearing aids more than those reporting lower controlled motivation.

Together, the three quantitative studies revealed a variety of motivational processes that underlie behaviours and actions of participants. Practitioners may benefit from evaluating motivation in order to better understand how help-seekers engage with hearing services and to identify how hearing aid adoption is internalised. Using autonomy support as a guiding principle, practitioners may provide hearing aid adopters with skills to master challenges associated with hearing aid adoption. The lack of association between autonomy support and hearing aid adoption raised questions about the practitioner’s role in hearing aid adoption.

To explore these relationships in greater detail among first time hearing help seekers, 13 participants not previously engaged in this research project and who either adopted or did not adopt hearing aids were interviewed about their motivations for seeking help and experiences in the clinic. Transcripts were analysed using thematic analysis. The most important motivational processes for seeking help were (1) Communication experiences, which encompassed conversation difficulties, impact on family, participation and participants’ emotional response, and (2) My story, which comprised preconceptions about hearing aids, perceived difficulties, self-image, encouragement from family and promotion of service. There was evidence also that practitioners supported participants’ hearing aid adoption decisions reflected in the theme Clinical experiences, which included general comments about the service, discussions about the audiogram, supportive and non-directive practitioners, choice and cost. When SDT principles were applied to the interview data, participants’ comments were seen to fall along the internalisation continuum and reflect need satisfaction in terms of autonomy, competence and relatedness. Autonomy support was less evident when practitioners minimised or dismissed self-reported communication difficulties, when rehabilitation options did not include communication
strategies, and when family members were not involved in hearing aid adoption decisions.

In summary, this research provides evidence to support application of SDT in hearing rehabilitation involving hearing aids. A variety of motives were evident in people seeking services, and autonomy was important throughout rehabilitation. Autonomy supportive practitioners have the potential to reduce activity limitations, facilitate competence with hearing aids and improve hearing aid satisfaction for adults with hearing impairment seeking help for the first time.
Declaration by author

This thesis is composed of my original work, and contains no material previously published or written by another person except where due reference has been made in the text. I have clearly stated the contribution by others to jointly-authored works that I have included in my thesis.

I have clearly stated the contribution of others to my thesis as a whole, including statistical assistance, survey design, data analysis, significant technical procedures, professional editorial advice, and any other original research work used or reported in my thesis. The content of my thesis is the result of work I have carried out since the commencement of my research higher degree candidature and does not include a substantial part of work that has been submitted to qualify for the award of any other degree or diploma in any university or other tertiary institution. I have clearly stated which parts of my thesis, if any, have been submitted to qualify for another award.

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Publications during candidature

Peer reviewed papers contained in this thesis


Conference presentations


Publications included in this thesis

This thesis includes three articles published in peer-reviewed journals, and two articles being prepared for submission as journal articles. The authors of each article and their relative contributions are tabulated below.


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Contributions by others to the thesis

Jason Ridgway was primarily responsible for the conception and design of the project, review of the literature, recruitment of participants, analysis and interpretation of research data, and writing the work.

Professor Louise Hickson (School of Health and Rehabilitation Sciences) and Dr Christopher Lind (School of Health Sciences, Flinders University, Adelaide) contributed to the conception and design of the project and reviewed the analysis and interpretation of research data and written work. Dr Asad Khan (School of Health and Rehabilitation Sciences) provided statistical guidance for the analyses described in Chapters 3, 4 and 5.

Jason Ridgway also thanks and acknowledges the reviewers who provided anonymous peer review feedback during the journal article submission process.
Statement of parts of the thesis submitted to qualify for the award of another degree

None.
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To my dear family and friends.

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To my grandfathers Bob and George, who returned from WWII with hearing loss, and my dad John, whose many years working in noise caused industrial deafness. Your experiences with hearing impairment are one of the reasons for my choosing a career as an audiologist, and I am forever grateful for having you in my life.

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And for Alison and Emily. Thank you for putting up with my hours in front of the computer; thank you for providing help, love and support when my words haven’t come as easily as I’d like them to; thank you for helping staple and fold 15000 pieces of paper into 3000 envelopes. Emily – a special thank you for your energy-channeling powers. Everything is worthwhile with you both in my life, and I very much look forward to spending more time with you now! xx
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<tr>
<td>4FAHL</td>
<td>4-Frequency Average Hearing Loss</td>
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<tr>
<td>APA</td>
<td>American Psychological Association</td>
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<tr>
<td>AUC</td>
<td>Area Under Curve</td>
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<tr>
<td>CI</td>
<td>Confidence Interval</td>
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<tr>
<td>CPHI</td>
<td>Communication Profile for the Hearing Impaired</td>
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<td>dB</td>
<td>Decibel</td>
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<td>dB HL</td>
<td>Decibel Hearing Level</td>
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<td>HCCQ</td>
<td>Health Care Climate Questionnaire</td>
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<td>HHIE</td>
<td>Hearing Handicap Inventory for the Elderly</td>
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<tr>
<td>ICF</td>
<td>International Classification of Functioning, Disability and Health</td>
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<td>IOI-HA</td>
<td>International Outcomes Inventory for Hearing Aids</td>
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<td>kHz</td>
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<td>KMO</td>
<td>Kaiser-Meyer-Olkin</td>
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<td>OR</td>
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<td>ROC</td>
<td>Receiver Operating Characteristic</td>
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<td>SD</td>
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<td>SDT</td>
<td>Self-Determination Theory</td>
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<td>Treatment Self-Regulation Questionnaire</td>
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<td>URICA</td>
<td>University of Rhode Island Change Assessment</td>
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<td>VIF</td>
<td>Variance Inflation Factor</td>
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<td>WANT</td>
<td>Wishes and Needs Tool</td>
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Chapter 1: An introduction to motivation and hearing rehabilitation

When in the mind of man appetites and aversions, hopes and fears, concerning one and the same thing, arise alternately; and diverse good and evil consequences of the doing or omitting the thing propounded come successively into our thoughts; so that sometimes we have an appetite to it, sometimes an aversion from it; sometimes hope to be able to do it, sometimes despair, or fear to attempt it; the whole sum of desires, aversions, hopes and fears, continued ‘til the thing be either done, or thought impossible, is that we call deliberation.

In deliberation, the last appetite, or aversion, immediately adhering to the action, or to the omission thereof, is that we call the will; the act, not the faculty, of willing.

It is manifest that, not only actions that have their beginning from covetousness, ambition, lust, or other appetites to the thing propounded, but also those that have their beginning from aversion, or fear of those consequences that follow the omission, are voluntary actions.

Thomas Hobbes (1588 – 1679). Leviathan, 1651 (Ch. 6, p. 39)

Written over 350 years ago, Hobbes described human motivation in *Leviathan* when he proclaimed that people think before they act. Although this quote ignores the unconscious biological and mechanistic processes that underlie human function, peoples’ actions are consciously and inextricably linked with their motives and deliberations across all domains of life (Ryan & Deci, 2000b). People are motivated to act for a range of reasons. Frequently, people are motivated from within, such as when they genuinely enjoy an activity (Seligman & Csikszentmihalyi, 2000; Ryan & Deci, 2000b), or when they value the sense of satisfaction that completion of an activity brings (Weiner, 1985; Deci & Ryan, 2000b). Alternatively, they may be driven by a sense of obligation (Sheldon et al., 2004), or of conviction or ideology (McCullough & Willoughby, 2009; Jost & Amodio, 2012). Motivation may also stem from external factors such as pressure from others (Pelletier, Séguin-Lévesque, & Legault, 2002), and from rewards and bribes (Deci, Koestner, & Ryan, 1999).
People may also act from fears they have about how they are perceived by others (Crocker & Knight, 2005), or may be disengaged and not act at all (Klag, Creed, & O’Callaghan, 2010).

In health care, these motivational processes are central to the actions clients take when engaging with health services and making treatment decisions (Ryan, Patrick, Deci, & Williams, 2008). For health practitioners, client motivation represents a key component of health care that contributes to the initiation and maintenance of behaviours associated with personal well-being and quality of life (Ryan & Deci, 2000b; Ng et al., 2012).

This thesis presents research that investigates patterns of motivation adults report in seeking help for their hearing for the first time. The overall purpose is to better understand how motivation contributes to help-seeking behaviour, decision-making such as hearing aid adoption and rehabilitation outcomes, and how contextual factors influence help-seekers’ motivation. This first chapter provides background for the research reported in this thesis, and describes the theoretical foundations on which the research is based. The specific aims of the thesis are presented, and the thesis methodology is explained. A synopsis of each thesis chapter is described.

1.1 The significance of hearing impairment

Hearing impairment is a common health condition that affects the adult population. In 2015, it was estimated that 328 million adults worldwide, or 4.8% of the population, have disabling hearing loss, defined as hearing loss greater than 40 dB in the better-hearing ear\(^1\). Cruikshanks et al. (1998) reported approximately 20% of people aged between 48 and 59 years experienced hearing impairment, which increased to 43.8% of 60-69 year olds, 66% of 70-79 year olds, and 90% of people aged over 80. In Australia, Chia et al. (2007) reported that 36.3% of 60-69 year olds and 64.6% of 70-79 year olds had some degree of hearing impairment. The most common type of hearing impairment is sensorineural. Sensorineural hearing impairment is a deterioration of the function of the inner ear or auditory nerve that is characterised by a progressive and gradual decline in hearing thresholds (Lee, Matthews, Dubno, & Mills, 2005). Sound distortion can also accompany hearing impairment (Plomp, 1986), caused by physical changes to the peripheral auditory system and auditory cortex. Abnormal loudness growth (Moore & Glasberg, 2004), decay of frequency resolution and sensitivity (Pickles, 2012) and reduced temporal resolution (Drullman, Festen, & Plomp, 1994) can all occur. The cumulative effects of these changes include decreased speech perception or understanding in noise.

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\(^1\) Disabling hearing loss is defined by the World Health Organisation here: [http://www.who.int/mediacentre/factsheets/fs300/en/](http://www.who.int/mediacentre/factsheets/fs300/en/)
(Plomp, 1986; Takahashi & Bacon, 1992; Wong et al., 2009). The World Health Organisation estimates that 1 in 3 people aged over 65 years live with hearing impairment².

In 2001, the World Health Organisation released the International Classification of Functioning, Disability and Health (ICF) framework (World Health Organisation, 2001). The ICF is a multidimensional, hierarchical system of classifying health function and disability, which distinguishes between the anatomy and physiology of a person (*body structure and function*) and the daily activities and aspects of social participation impacted by the health condition. Health function and disability are conceptualised as dynamically interacting with environmental and personal contexts. Relationships among an individual’s *impairment* (problems with body function or structure), *activity limitations* (difficulties undertaking activities), and *participation restrictions* (problems with involvement in life situations) help clinicians and researchers to describe health conditions and to articulate the ways various components of a condition are associated with one another. A series of studies by Granberg and colleagues (2014a; 2014b; 2014c) used the ICF to profile hearing impairment, for the purpose of translating the ICF classification system into clinical practice. Granberg et al. (2014c) reported the impact of hearing impairment on activity and participation in over half of the ICF’s categories, illustrating the scale of significance of hearing impairment to peoples’ lives. Study respondents most frequently identified factors associated with communication, interactions with others, confidence and emotional effects (Granberg et al., 2014c).

An advantage of applying the ICF to hearing impairment is that it enables distinction between anatomical and functional aspects of hearing impairment, and the contextual factors (i.e., personal and environmental, or “non-audiological” factors) affected by hearing impairment. Meyer, Hickson, Lovelock, Lampert and Khan (2014) and Hickson, Meyer, Lovelock, Lampert and Khan (2014) studied relationships between a large number of contextual factors and aspects of hearing rehabilitation such as help-seeking, hearing aid adoption and successful rehabilitation. Audiological factors such as degree of hearing impairment and age at onset of hearing impairment, and non-audiological factors such as attitudes to hearing aids, family support, self-reported hearing difficulties, expectations and age, were included in the Meyer et al. (2014) and Hickson et al. (2014) analyses. These studies revealed two of the three factors associated with help-seeking and hearing aid adoption, and four of the five factors associated with hearing aid success, were non-audiological. The predominance of contextual factors that influence human behaviour

² Source: http://www.who.int/mediacentre/factsheets/fs300/en/
throughout hearing rehabilitation identified by Meyer et al. (2014) and Hickson et al. (2014) justifies further investigation. Therefore, the influence on the lives of people with hearing impairment is the territory of the research in this thesis.

People with hearing impairment may experience activity limitations such as communication difficulties, difficulty understanding television and difficulty listening to radio (Hickson & Scarinci, 2007). Communication difficulties in group conversations and in noisy listening environments can be especially challenging for people with hearing impairment (Hickson & Scarinci, 2007). A reduced ability to communicate with others can diminish social interaction and restrict participation in everyday activities (Arlinger, 2003; Hickson et al., 2008), which can negatively affect relationships with others (Scarinci, Worrall, & Hickson, 2012) as well as psychological health (Kramer, Kapteyn, Kuik, & Deeg, 2002). Adverse emotional effects of hearing impairment include feelings of frustration (Scarinci et al., 2012), loneliness (Kramer et al., 2002), depressive symptoms (Kramer et al., 2002) and anxiety (Hogan, Phillips, Brumby, Williams, & Mercer-Grant, 2015; Mehta et al., 2003), which can result in poorer quality of life (Dalton et al., 2003; Chia et al., 2007).

Despite the adverse and wide-ranging consequences of hearing impairment, adults may defer help-seeking for some years (Davis, Smith, Stephens, & Gianopoulos, 2007; Kochkin, 2009). In a large-scale survey of 34,362 individuals across Great Britain, Davis et al. (2007) reported that adults may wait up to 10 years before referral for hearing assessment. Kochkin (2009) reported that adults with hearing aids waited an average of 6.7 years (median 3 years) from first noticing hearing impairment to the time they adopted hearing aids. At the time they were surveyed, adults who had not adopted hearing aids had perceived their hearing impairment an average of 12.4 years (median 8 years).

Given the significance of hearing impairment to health function and psychosocial well-being in adults, there may be broader long-term societal consequences of delayed help-seeking. The demographic profile of the Australian population indicates that the proportion of adults aged over 65 increased from 11.8% to 14.7% between 1994 and 20143. This figure is projected to reach 20%, or 6.8 million people, by 20404. If the proportion of adults with hearing impairment increases, there may be a corresponding increase in the number of adults who experience negative psychosocial consequences of hearing impairment, which may extrapolate to the number of adults who do not seek help. Understanding why adults with hearing impairment do not access hearing rehabilitation services is therefore important, given their potential to minimise the psychosocial consequences of permanent acquired hearing impairment.

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1.2 Interventions associated with hearing impairment

Adults with hearing impairment do not routinely access hearing rehabilitation services. In the Blue Mountains Hearing Study conducted in Australia during 1997-1999 and 2002-2004, 39% of adults with measured hearing impairment had not sought help (Schneider et al., 2010). In the UK, Davis, Smith, Ferguson, Stephens and Gianopoulos (2007) reported that of the 26% of 55-74 year olds with self-reported or measured hearing impairment, only 3% had received intervention. Based on preliminary MarkeTrak IX data, Abrams and Kihm (2015) cautiously flagged an increase in rate of hearing aid ownership from 24.8% in 2008 to 30.2% in 2014 among those who had perceived hearing difficulty. Despite this increase, the percentage of those who have sought help has remained low. For those adults with hearing impairment who do seek help, rehabilitation interventions such as hearing aids, assistive listening technology, and individual and group programs may be available to support them (see reviews in Laplante-Lévesque, Hickson, & Worrall, 2010, and Hickson, Laplante-Lévesque, & Wong, 2013). For each form of intervention there has been evidence of benefit (Takahashi et al., 2007; Johnson, Danhauer, Ellis, & Jilla, 2016; Chisolm, Noe, McArdle, & Abrams, 2007b; Hawkins, 2005; Sweetow & Palmer, 2005; Jennings, 2009) and improved quality of life (Chisolm et al., 2007a; Cox, Johnson, & Xu, 2016; Chisolm et al., 2007b; Hickson, Worrall, & Scarinci, 2006; Kramer, Allessie, Dondorp, Zekveld, & Kapteyn, 2005; Preminger & Yoo, 2010). Among these interventions, hearing aid fitting has been the most commonly recommended by audiologists (Grenness, Hickson, Laplante-Lévesque, Meyer, & Davidson, 2015). Despite technological advances and real-world benefits that can arise from adopting hearing aids (Vuorialho, Petri Karinen, & Sorri, 2006), clients have not always adopted them (Meyer & Hickson, 2012; Grenness et al., 2015), or may have changed their minds about intervention (Laplante-Lévesque, Brickman, & Worrall, 2012a). Illustrating this point, Kochkin (2009) found 40% of people with moderate to severe hearing impairment, and 10% of adults with mild hearing impairment, owned hearing aids. In Australia, one third of adults with measured hearing impairment reported owning a hearing aid (Chia et al., 2007). Although these epidemiological studies placed importance on increasing hearing aid ownership among adults with hearing impairment, not all help-seekers with hearing impairment have elected to adopt hearing aids if a range of intervention options was available (Laplante-Lévesque, Hickson, & Worrall, 2011). Laplante-Lévesque and colleagues (2011) presented a sample of first-time hearing help-seekers with intervention options that included hearing aids, communication programs or no intervention, and reported 24% chose communication programs and 22%
opted to do nothing. Although hearing aids have been shown to be an important part of hearing rehabilitation for many help-seekers (Takahashi et al., 2007; Hickson, Clutterbuck, & Khan, 2010; Hickson et al., 2014), the research in this thesis views hearing aid adoption as only one form of rehabilitation intervention among several that can potentially benefit hearing help-seekers.

Psychosocial factors influence the rehabilitation decisions adults make. In a study that explored why adults seek help and adopt hearing aids, Meyer et al. (2014) found the major contributing factors were (1) positive attitudes to hearing aids, (2) support from significant others, and (3) greater degree of hearing impairment. Of clients who adopt hearing aids, studies consistently reveal a proportion will stop wearing them (e.g., Hartley, Rochtchina, Newall, Golding, & Mitchell, 2010). Knudsen, Öberg, Nielsen, Naylor and Kramer (2010) also reported findings from a number of previous studies that explored links between a range of different variables and hearing aid use and satisfaction, and showed mixed results. Hickson et al. (2014) reported five factors associated with successful hearing aid use, specifically: (1) greater support from significant others; (2) greater self-reported hearing difficulties prior to adopting hearing aids; (3) positive attitudes to hearing aids; (4) perceived self-efficacy for hearing aids; and (5) more gain from hearing aids, measured with real ear insertion gain. Given the impact of psychosocial factors on the entire hearing rehabilitation process, it is critical to understand how these factors influence help-seeking, rehabilitation decision-making and outcomes. With a renewed focus on person-centredness in audiology research (Hickson, 2012), recent work has sought to better understand the ways clients initiate and maintain health behaviours in the clinic, to help address questions relating to how these behaviours influence clinical decision-making and rehabilitation outcomes.

1.3 Health behaviour in the audiology clinic

Health behaviour is inexorably linked with clients’ motivation (Ryan et al., 2008). To explore client behaviour in hearing health care, researchers have studied the applicability of theoretical models of health behaviour such as the health belief model (Rosenstock, 1966), the transtheoretical model (Prochaska, DiClemente, & Norcross, 1992) and the theory of planned behaviour (Ajzen, 1985) to audiological rehabilitation (Laplante-Lévesque, Hickson, & Worrall, 2013; Saunders, Frederick, Silverman, & Papesh, 2013; Hickson et al., 2014; Meister, Grugel, & Meis, 2014; Ferguson, Maidment, Russell, Gregory, & Nicholson, 2016; Saunders, Frederick, Silverman, Neilsen, & Laplante-Lévesque, 2016). The focus of such theories is to summarise the constructs and
techniques for understanding behaviour, and to provide a framework for conceptualising the ways these constructs and techniques influence behaviour (Michie, Johnson, Francis, Hardeman, & Eccles, 2008).

The health belief model and theory of planned behaviour emphasise ways to explain and predict behaviour (Janz & Becker, 1984; Ajzen, 1985), while the transtheoretical model describes the processes for modifying health behaviour (Prochaska et al., 1992). The health belief model (Rosenstock, 1966) argues engagement with health behaviour is triggered by personal beliefs about health problems, perceived pros and cons of taking action, and self-efficacy. This model contends that health behaviours are triggered by perceived need to act (i.e., cue to action). Saunders et al. (2013) and Hickson et al. (2014) both provided evidence that specific health belief model constructs helped explain health behaviour and attitudes in hearing rehabilitation. For example, Hickson et al. (2014) reported help-seekers who perceived greater difficulty before getting hearing aids (i.e., perceived severity), held positive attitudes (i.e., perceived fewer barriers) and reported greater self-efficacy for hearing aids were more likely to achieve success with hearing aids.

The theory of planned behaviour examines attitudes towards a behaviour, the social influences on behaviour (i.e., subjective norm) and self-efficacy (i.e., behavioural control). Meister et al. (2014) used the theory of planned behaviour to study intention to use hearing aids in groups of (1) non-help-seekers, (2) help-seekers, (3) help-seekers trialling hearing aids, and (4) hearing aid adopters. The authors linked greater internalisation with increased likelihood of hearing aid adoption. External pressure from others influenced intention in groups 1 and 2 moreso than participants in groups 3 and 4. These findings suggest an internalisation process for hearing aid adoption could be predicted with the theory of planned behaviour.

The transtheoretical model (Prochaska et al., 1992) evaluates readiness to act on a health behaviour, and describes stages of change that guide readiness to undertake or change particular health behaviours. Using this model, Laplante-Lévesque et al. (2013) found first-time hearing help-seekers who reported a more advanced stage of change initially (i.e., the action stage of change), were more likely to adopt hearing aids or complete a communication program, and to report positive outcomes, than adults who reported a less advanced stage of change. Accordingly, both the health belief and transtheoretical models are potentially applicable for understanding and predicting health
behaviour in hearing rehabilitation.

Researchers and practitioners alike have embraced such theories because they recognise the role of health behaviour models to inform, develop and evaluate rehabilitation interventions (Niewenhuijsen, Zemper, Miner, & Epstein, 2006; Coulson, Ferguson, Henshaw, & Heffernan, 2016). A large body of empirical evidence has provided support for prominent theories of health behaviour (Marshall & Biddle, 2001; Bridle et al., 2005; Carpenter, 2010; Armitage & Conner, 2001). However, health behaviour models often do not account for the conditions that help contextualise client behaviours and explain what moves clients to act (Niewenhuijsen et al., 2006; Ryan et al., 2008). The health belief model contextualizes health behaviour with its cue to action construct, although does not differentiate between internal or external factors that motivate action. Furthermore, the model does not explore external, non-health-related factors that may explain why a person holds a particular belief (Janz & Becker, 1984). Likewise, the theory of planned behaviour contextualizes behaviour by recognising the importance of personal and demographic factors influential to health beliefs, intentions and actions (normative beliefs and subjective norms), but does not stipulate the origins of individual behaviour (Ajzen, 2011). Although the transtheoretical model describes a range of cognitive, behavioural and affective strategies that provide context for health behaviour change, it overlooks social or economic factors that might drive behaviour. All three models do not account for irrational or illogical decision-making. Consequently, researchers have called for further exploration of the relationships between the underlying determinants of help-seeking behaviour and rehabilitation decisions such as hearing aid adoption, and what helps maintain behaviours such as hearing aid use over time (Laplante-Lévesque et al., 2013; Saunders et al., 2013; Hickson et al., 2014; Coulson et al., 2016).

Recently, several studies have focused on client-practitioner interactions to better understand rehabilitation planning and decision-making during initial audiology consultations (e.g., Grenness et al., 2015; Ekberg, Grenness, & Hickson, 2014). Grenness et al. (2015) reported that of 62 initial consultations with 26 different audiologists, clients were recommended hearing aids 83% of the time, yet adopted hearing aids only 56% of the time. These results could be interpreted as revealing practitioners to have limited influence over clients’ decision-making processes, because clients did not adopt hearing aids despite being recommended them. In such cases, clients might be exhibiting internalised motivation by making decisions about hearing aid adoption independent of practitioner recommendations. It might also be possible that clients have not internalised
the advice given to them by the practitioner. Both Grenness et al. (2015) and Ekberg et al. 
(2014) reported clients’ psychosocial concerns were not often addressed, which suggested 
practitioners might not fully explore the underlying causes of client behaviour. Clients given 
the opportunity to discuss the social and emotional impact of their hearing impairment 
during consultation might provide practitioners insight into what motivates their decisions. 
Further work to clarify the practitioner’s role throughout the rehabilitation process may 
improve understanding of the motivational factors that most influence help-seeking, 
decision-making and outcomes in hearing rehabilitation that involves hearing aids.

1.4 The nature of motivation

The term motivation may be defined as being moved to act (Ryan & Deci, 2000a). 
Motivation is what compels all aspects of activity, direction and purpose (Kleinginna & 
Kleinginna, 1981; Graham & Weiner, 2012). Researchers in the field of psychology define 
motivation in broad terms because of its perpetual connection across biological, cognitive, 
social, cultural and developmental mechanisms that characterise human behaviour (Ryan 
& Deci, 2000b; Franken, 2006; Deckers, 2016). As such, a wide variety of perspectives 
and theories are woven through historical research of human motivation and behaviour, 
including instinctual and biological drive theories (e.g., James, 1890; Dodson, 1917); 
needs hierarchy (e.g., Maslow, 1943); behaviourism (e.g., Skinner, 1953); and cognitive 
theories (e.g., Rosenstock, 1966; Deci, 1971; Bandura, 1977; Prochaska et al., 1992). 
These theoretical perspectives are described in more detail in Chapter 2.

Observations of human behaviour reveal that, by and large, people are curious and 
eager to learn (Knowles, 1975; Ryan & Deci, 2000a), are willing to give effort and 
commitment to mastering new skills (Bandura, 1977; Schwarzer, 2014), and are self-
motivated and inherently predisposed to personal growth (Maslow, 1970; Seligman & 
Csikszentmihalyi, 2000; Ryan & Deci, 2000b). However, these positive characteristics of 
human behaviour are not universally present. Irrespective of sociocultural backgrounds 
and experiences, there are examples of reckless and antisocial behavior (Pape, 2005), of 
apathy and passivity (Marin, 1990; Robert et al., 2009), and of alienation and isolation 
(Twenge, Catanese, & Baumeister, 2003) that diminish human function. The wide variety 
of observable behaviours reflects the complex nature of the mechanisms that drive human 
behaviour (Bandura, 1989; Ford, 1992; Deci & Ryan, 2008a). More than inherent personal 
and biological characteristics, a person’s psychosocial characteristics and circumstances 
are central to personal development, growth and well-being (Ryan & Deci, 2000b).
To more readily understand the relationships between psychosocial characteristics and how they influence human behavior, a broad, multi-faceted viewpoint of motivation is necessary (Ryan & Deci, 2000b; Deci & Ryan, 2008b). Whereas the health belief model, theory of planned behaviour and transtheoretical models treat motivation as a singular construct that drives health behaviour, the self-determination theory of motivation (SDT; Deci & Ryan, 1985) defines and categorises various forms of motivation, and describes the contributions of internal and external motivation to personal and social development (Ryan & Connell, 1989; Ryan & Deci, 2000b; Deci & Ryan, 2008b). For this purpose, SDT was selected to research the role of motivation in hearing rehabilitation in this thesis.

In our overview of SDT in Chapter 2, various forms of motivation are classified along an internalisation continuum, and are described according to the relative autonomy experienced with health behaviours. Internalised, or autonomous, motivation is most commonly associated with greater enjoyment, persistence and performance of an activity (Ryan et al., 2008; Ng et al., 2012). By contrast, less internalised, or controlled, motivation is unrelated or may undermine health-related outcomes (Ng et al., 2012). Unlike other health behaviour models, SDT also emphasises how peoples’ sociocultural circumstances and experiences guide their preferences and engagement with activities, and influence well-being and outcomes (Ryan & Deci, 2000b; Deci & Ryan, 2008a). From a theoretical standpoint, SDT takes an organismic, dialectical approach, which regards people as active, and interactive, beings, with inherent predisposition for development and growth towards internalisation (Deci & Ryan, 2000).

SDT regards three innate psychological needs to be essential to optimal personal growth and development (Ryan & Deci, 2000b). These needs are: (1) autonomy, where actions and choices are self-endorsed (de Charms, 1968; Deci & Ryan, 1985; Ryan & La Guardia, 2000); (2) competence, or feeling confident and capable of undertaking an action (White, 1959; Ryan & La Guardia, 2000); and (3) relatedness, or the need to belong and feel connected with others (Baumeister & Leary, 1995; Ryan & La Guardia, 2000). SDT argues that personal growth and development is influenced by factors within a person’s sociocultural environment that facilitate or thwart autonomy, competence and relatedness (Deci & Ryan, 2000). In SDT literature, facilitating autonomy, competence and relatedness is described as autonomy support (Deci & Ryan, 2000; Ryan et al., 2008). To understand motives and predict behaviours, SDT researchers have explored the extent to which autonomy support is fulfilled (Deci & Ryan, 2008a). Studies across cultures (Ryan, La Guardia, Solky-Butzel, Chirkov, & Kim, 2005), in education (Chirkov & Ryan, 2001), in workplace settings (Baard, Deci, & Ryan, 2004), in interpersonal relationships (Deci, La
Guardia, Moller, Scheiner, & Ryan, 2006) and in health care (Ng et al., 2012) have all reported that autonomy support facilitates internalised motivation, which in turn predicts personal growth, development and well-being.

By differentiating forms of motivation and exploring psychosocial conditions, SDT has the potential to provide insight into the external and internal forces that motivate help-seeking and decision making in hearing rehabilitation, to better understand the ways that hearing help-seekers’ circumstances, experiences and supports help facilitate or undermine well-being and outcomes.

1.5 Thesis Aims

The overall aim of this thesis is to explore, from the perspective of SDT, how motivation contributes to help-seeking, hearing aid adoption and hearing aid fitting outcomes in hearing help-seekers, and how contextual factors influence motivation throughout hearing rehabilitation that involves hearing aids. Five specific research aims were identified:

1. To identify motivational characteristics of first time hearing help-seekers and determine relationships between these characteristics and the decision whether or not to adopt hearing aids;
2. To identify whether or not motivational characteristics influence hearing aid fitting outcomes, and if so, in what ways;
3. To determine if motivation can be characterised by personal attributes of first time hearing help-seekers;
4. To identify first time hearing help-seekers’ perceptions of their interactions with practitioners; and
5. To explore practitioner influence on the relationships between motivation, help-seeking and the decision whether or not to adopt hearing aids.

By researching motivation of hearing help-seekers, it is hoped to predict and explain some of the reasons why adults engage with hearing services generally and in the adoption of hearing aids specifically, and uncover the motivational processes and contextual factors that contribute to decisions such as hearing aid adoption or non-adoption and successful hearing aid fitting outcomes. The outcomes of this thesis aim to inform researchers and clinicians about the motivation of clients, to understand the reasons why they seek help, and to tailor rehabilitation interventions that encourage
autonomy support to facilitate internalised decision-making and successful rehabilitation. More broadly, results from this thesis will hopefully address questions about why so few adults with hearing impairment seek help, and, if they do seek help, why they decide to adopt or not adopt hearing aids as a consequence. These results might also help answer why some adults who adopt hearing aids do not use or benefit from them.

1.6 Thesis methodology and overview of Chapters

A review of literature has indicated that SDT has not been employed as a model of understanding human behaviour in hearing rehabilitation research before. This thesis builds on the behaviour change research of Laplante-Lévesque et al. (2013), Saunders et al. (2013), Hickson et al. (2014), Meister et al. (2014), Saunders et al. (2016) and Ferguson et al. (2016) by addressing unanswered questions about: (a) the motivational factors and practitioner characteristics that influence help-seeking behaviour, (b) how motivation influences rehabilitation decisions such as hearing aid adoption, and (c) whether motivation influences success with hearing aids.

An explanation of the theory and its potential relevance to hearing rehabilitation is found in Chapter 2. This chapter outlines psychological theories of motivation in health care and describes the potential use of SDT in hearing rehabilitation involving hearing aids. Terminology and theoretical concepts of SDT are described. A literature review in rehabilitative audiology exploring motivational factors linked with hearing rehabilitation is also provided. Chapter 2 has been published in the Journal of the Academy of Rehabilitative Audiology.


A mixed methods (quantitative and qualitative) approach was taken for this research, using a sequential explanatory design (Creswell & Plano Clark, 2011). Mixed methods research combines both quantitative and qualitative approaches to deepen understanding of the research questions (Johnson, Onwuegbuzie, & Turner, 2007). The two forms of data are collected sequentially, which allows the overall results to be integrated and then interpreted from multiple viewpoints (Creswell & Plano Clark, 2011). Research Aims 1, 2 and 3 were addressed with quantitative data collection. Questionnaires were adapted from SDT research and completed by a cohort of adult hearing help-seekers. Research Aims 4 and 5 were addressed with both quantitative and
qualitative data collection. Semi-structured interviews of help-seekers were undertaken in the qualitative study. One advantage of using mixed methods was that, together, both quantitative and qualitative research can help more fully address questions that either method alone may not do (Creswell & Plano Clark, 2011). Integration of quantitative and qualitative information might explain the potential application of SDT in hearing health care as it tests and validates theoretical associations found in the quantitative studies and translated them into real world practice. The body of research in audiology exploring perceptions, experiences and preferences of hearing help-seekers has used both quantitative and qualitative methods to help explain behaviour (see Knudsen et al., 2010; Meyer & Hickson, 2012; Knudsen et al., 2012; Laplante-Lévesque et al., 2012b; Meyer et al., 2014; Hickson et al., 2014; Saunders et al., 2013; Grenness, Hickson, Laplante-Lévesque, & Davidson, 2014; and Preminger, Oxenbøll, Barnett, Jensen, & Laplante-Lévesque, 2015, for examples). However, there are few qualitative studies in SDT health research. The Ng et al. (2012) meta-analysis of health-related research in SDT analysed a total of 184 quantitative studies, whereas a literature search identified only five qualitative health studies in SDT (Bhattacharya, 2012; Custers, Westerhof, Kuin, Gerritsen, & Riksen-Walraven, 2012; Ferrand, Nasarre, Hautier, & Bonnefoy, 2012; Quinlivan et al., 2013; Kinnafick, Thøgersen-Ntoumani, & Duda, 2014). Therefore, using a mixed methods research design represents a novel approach in the SDT field. An overview of the thesis research project is presented in Figure 1.1.
Chapter 3 presents the materials, methods and research findings of the first study, which addresses the first research aim. A sample of 253 adults who sought help for their hearing provided motivation and demographic data using self-report questionnaires (see...
Appendices B and C). This was then compared to their decision to adopt or not adopt hearing aids. This Chapter was published in the *International Journal of Audiology*.


Chapter 4 explores the outcomes of hearing help-seekers and their perceptions of interactions with the audiologist, to address the second research aim and contribute to the fourth and fifth aims. In this second study, a subset of 216 of the original sample of adult hearing help-seekers were surveyed on their outcomes, approximately four months after the first study’s data were collected. Participants also completed a questionnaire relating to their experiences with the practitioner at this time (see Appendix D). Questionnaire results were compared to the decision to adopt or not adopt hearing aids for both hearing aid adopters and non-adopters. For those who adopted hearing aids, questionnaire results were also compared to hearing aid fitting outcomes. This Chapter was published in the *International Journal of Audiology*.


The third study presented in Chapter 5 is an overview of factors that were found to be associated with motivation, and addresses the third research aim. Whereas the studies described in Chapters 3 and 4 explored relationships between motivation and experiences with the practitioner, and the hearing aid adoption decision and fitting outcomes, Chapter 5 investigates relationships between motivation and the sociodemographic and audiological data collected for Chapters 3 and 4. This Chapter provides contextual information about factors that might influence motivation, and at the time of writing has been accepted for publication in the *Journal of the American Academy of Audiology*.

Chapter 6 reports on the fourth study, and addresses the fourth and fifth research aims. This chapter also contributes to Aims 1, 2 and 3. In this qualitative study, semi-structured interviews of a cohort of 13 adult first-time hearing help-seekers were undertaken. This study reports on participant perspectives about their motivations for seeking help, and about their clinical experiences, to explore how motivational factors and the clinical environment influenced a person’s decisions. There was a focus on how motivational factors influenced help-seeking, and the role of practitioner autonomy support in the decision to adopt or not adopt hearing aids.

Chapter 7 summarises the overall research findings, and integrates the qualitative and quantitative findings from a SDT perspective. The limitations of the research are discussed, and future research directions and implications for clinical practice are proposed.

Note that Chapters 2, 3, 4 and 5 are written as published articles for peer reviewed journals. There may be some repetition in these chapters because each chapter is written to allow independent reading without the need for prior knowledge of other chapters. There may be differences in spelling among chapters depending on whether or not the journal used English or American spelling conventions. To ensure consistency and flow throughout the thesis, formatting follows the American Psychological Association (APA) Publication Manual (Edition 6). Common terminology and acronyms used throughout the thesis are listed at the beginning of the thesis. References are listed at the conclusion of each chapter. Ethical clearances for all research described in this thesis are found in Appendix A. The questionnaires, interview protocol and other materials are also included as Appendices.

Motivation is at the heart of what prompts all action and intention to act (Ryan & Deci, 2000b). To better understand why people seek help for their hearing, adopt hearing aids or achieve successful rehabilitation outcomes, this thesis considers motivation to be of critical importance.
1.7 References


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Chapter 2 - Self-determination theory: Motivation and hearing aid adoption

This chapter is largely based on the following paper:


This chapter is not exactly as published in 2013. Additional material has been included that discusses relevant literature published after this review was originally written. Several wording changes have also been made, to clarify terminology and to improve consistency through the thesis. These changes have been explained in the chapter where applicable.
2.1 Abstract

Frequently, people seeking help for their hearing are asked to make a decision about whether or not they wish to adopt hearing aids. Both audiological and non-audiological factors often form the basis of this decision, but it has been difficult to predict which of these factors and to what extent they might influence individual decisions. Client motivation is thought to drive personal decision-making in hearing rehabilitation, yet this area of research in audiology has received limited attention. This paper introduces a theory of motivation; self-determination theory (SDT), which it is argued can be applied to hearing rehabilitation to help understand how rehabilitation decisions such as hearing aid adoption are made. Specifically, the key components of SDT are described, past audiological literature is contextualized within the SDT framework, and SDT is explored as a useful theoretical tool for analyzing the role of motivation in hearing rehabilitation. To better understand how motivation may affect the decision to adopt or not adopt hearing aids, future research directions and practical applications are discussed.

2.2 Introduction

Not every adult with hearing impairment seeks help for his or her hearing (Duijvestijn et al., 2003; Hartley, Rochtchina, Newall, Golding, & Mitchell, 2010; Hickson & Worrall, 2003; van den Brink, Wit, Kempen, & van Heuvelen, 1996). Among those people who do seek help for their hearing (help-seekers), many do not adopt hearing aids (Garstecki & Erler, 1998; Helvik, Wennberg, Jacobsen, & Hallberg, 2008; Humes, Wilson, & Humes, 2003). It is therefore of interest to find out why help-seekers decide to adopt or not adopt hearing aids when presented with this option. This information would be beneficial not only for individual clients who face important personal decisions, but also for practitioners and third party funders who have an interest in ensuring clients receive suitable assistance for their hearing.

The decision of a help-seeker to agree to get hearing aids is often denoted as uptake in audiological literature (e.g., Knudsen, Öberg, Nielsen, Naylor, & Kramer, 2010), and is referred to in this paper as hearing aid adoption. Hearing aid adoption ideally involves a collaborative decision-making process (Laplante-Lévesque, Hickson, & Worrall,
that sets the course of future rehabilitation for the help-seeker, and is a process influenced by a combination of factors. Audiological factors such as the severity of hearing impairment and speech recognition scores, and non-audiological factors such as self-reported hearing problems, affordability of hearing aids, client age, and the support of significant others, might all influence hearing aid adoption (see Knudsen et al., 2010, and Meyer & Hickson, 2012, for reviews of the literature). However, despite taking these factors into consideration, predicting individual client decisions has proven difficult. To illustrate this point, studies by Meister, Walger, Brehmer, von Wedel, and von Wedel (2008) and Laplante-Lévesque, Hickson, and Worrall (2011) both found that about one-quarter of research participants had eventually embarked on a form of hearing rehabilitation that was different from their initial stated intention.

Exploring what motivates help-seekers to attend the clinic, and then once in the clinic what factors affect this behavior, might improve understanding of hearing aid adoption. In other domains of health care, motivation is regarded as crucial to understanding what directs client behavior towards or away from a specific treatment (Ryan, Patrick, Deci, & Williams, 2008). Psychological theories of motivation (Bandura, 1977; Deci & Ryan, 1985; Prochaska & Di Clemente, 1986) have been incorporated into various health treatment approaches to address reasons behind client motivation (Ryan, Lynch, Vansteenkiste, & Deci, 2011).

Indeed, client motivation is recognized as a key factor influencing the decision to adopt or not adopt hearing aids (e.g., Kochkin, 2007; Clarke, Maatman, & Gailey, 2012). Hickson (2006) pointed out that past audiological research had investigated motivation only superficially, with the result that few conclusions could be drawn about the relationships between motivation and aspects of hearing rehabilitation. Research that explores how health behavior models can predict and explain behavior and be integrated into clinical practice has therefore been called for (e.g., Saunders et al., 2012; Coulson, Ferguson, Henshaw, & Heffernan, 2016). Consequently, several researchers have applied theoretical models of health behavior to explore the influence of behavioral factors on hearing rehabilitation decision-making and outcomes (e.g., Laplante-Lévesque, Hickson, & Worrall, 2012; Saunders, Chisolm, & Wallhagen, 2012; Laplante-Lévesque, Hickson, & Worrall, 2013; Saunders, Frederick, Silverman, & Papesh, 2013; Hickson, Meyer, Lovelock, Lampert, & Khan, 2014; Meister, Grugel, & Meis, 2014; Ferguson, Maidment, Russell, Gregory, & Nicholson, 2016; Saunders, Frederick, Silverman, Neilsen,
These studies acknowledge motivation to be important for understanding hearing health behavior. However, the models of health behavior used in this research do not differentiate types of motivation that contribute to varied experiences, decisions such as hearing aid adoption and outcomes, nor do they explore the processes involved in how motivation for initiating and sustaining hearing health behavior is acquired. Further research to classify the variety of reasons why people are moved to act might help explain and predict how different types of motivation influence hearing rehabilitation decisions such as hearing aid adoption. Furthermore, research to explore the conditions that facilitate or undermine motivation for hearing health behavior might highlight motivational factors related to the decision whether or not to adopt hearing aids and rehabilitation outcomes in clients.

This paper reports on the potential application of self-determination theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000), which is a theory of motivation that might usefully describe the attitudinal and behavioral processes that influence help-seekers’ decisions. SDT has not been researched in adult hearing rehabilitation before, and has been selected for further investigation because its framework might help practitioners ascertain clients’ motivation for considering hearing aid adoption, as well as help practitioners recognize the conditions that will influence motivation. SDT is the only theoretical model that classifies different types of motivation and explores the conditions through which a person internalizes health behaviors (Ryan & Deci, 2000; Ryan et al., 2008).

This article aims to describe the essential components of SDT and to provide a context for understanding motivation in hearing rehabilitation by reviewing past audiological literature from an SDT perspective. Practical application of the theory to hearing rehabilitation also is discussed. This review contends that classifying client motivation using SDT might help establish what relationships (if any) exist between motivation and hearing aid adoption decisions of help-seekers. Counselling techniques aligned with SDT also are described. Finally, future research directions are offered to suggest how SDT might be used to better understand help-seekers’ motivations prior to hearing aid fitting, and to explore the effects such a rehabilitation approach might have on hearing aid adoption. The historical perspectives of motivation provided in the following section offer a broad context from which motivation is considered in this paper.
2.3 Motivation: A brief history

What compels people to behave in different ways? Human behavior is the result of a complex system of innate biological and evolutionary processes, and is influenced by the person’s social, cultural, behavioral and situational life experiences. In his pioneering text, psychologist William James (1890) described behavior as instinctual and mechanistic, driven by biological processes. However, early theorists such as Dodson (1917; 1932) observed human behavior to adapt with environmental influences as people modified behavior to avoid pain or seek reward. From the premise that behavior is influenced both by instinctual drives and outside influences, Hull (1943) and Maslow (1943) sought to explain human learning and motivation as a function of environment, interacting with individuals’ hierarchies of drives and needs. These approaches to motivation influenced the behaviorist school of thought, of which Skinner (1953) is the most prominent proponent. Skinner (1953) argued all human behavior could be explained as purposeful responses to external influences: that is, behavior was conditioned and reinforced by previous experiences, and learning was based on imitation, repetition, rewards, and punishment.

Whereas these early theories of motivation demonstrated it is possible to generalize how people might behave under certain conditions, the theories did not account for less predictable behavior such as creativity, irrationality, or spontaneity (Chomsky, 1959). This realization spawned a range of approaches to motivation that acknowledged the importance of cognition, alongside the biological and reflexive processes, as drivers of behavior. Cognitive theories of motivation in psychology have sought to identify and understand (1) how external and internal conditions might result in a particular behavior (e.g., Atkinson, 1964; Deci, 1971; Festinger, 1957), (2) how people learn (e.g., Bandura, 1977; White, 1959), and (3) how people make decisions (e.g., Brehm & Cole, 1966; Heider, 1958; Hiroto & Seligman, 1975). Many of these early theories helped form the basis of contemporary theories of motivation applied in organizational psychology (e.g., Steers, Mowday, & Shapiro, 2004), positive psychology (e.g., Seligman & Csikszentmihalyi, 2000), education (e.g., Paris & Paris, 2001) and health (e.g., Rachman, 1997). Researchers in neuropsychology also have sought to explain motivation as related to executive brain functions, such as decision-making and impulse control (e.g., Chan, Shum, Touloupoulou, & Chen, 2008; Posner & Peterson, 1990). It is clear from this variety of perspectives that underlying human drives and instincts implicitly contribute to motivation, but that environmental factors result in substantial individual variation in human
behavior. For this reason, most cognitive theories of motivation primarily focus on the social and cultural influences that potentially affect the initiation and maintenance of purposeful behavior when practical intervention strategies are developed (Ryan & Deci, 2000).

The potential benefits of applying cognitive approaches to motivation extend to health care as practitioners seek to provide services to clients whose behavior might contribute significantly to the success or failure of treatment (Ryan et al., 2008; Schroeder, 2007). A range of behavior theories might be applied in health care for this purpose, such as the health belief model (Rosenstock, 1966), the theory of planned behavior (Ajzen, 1985), social cognitive theory (Bandura, 1977), or the transtheoretical model of intentional behavior change (Prochaska & Di Clemente, 1986). Although individual theories offer specific constructs that guide the treatment approach (Nigg, Allegrante, & Ory, 2002; Michie et al., 2008), evidence-based research does not favor one model over another (Nieuwenhuijsen, Zemper, Miner, & Epstein, 2006). In addition, not all theories explore the influence of environmental contexts on specific motivational processes (Nieuwenhuijsen et al., 2006; Ryan et al., 2008). One prominent theory, the transtheoretical model, classifies client attitude into stages of increasing readiness to accept and undergo treatment, and provides practitioners with a framework to assist clients with behavior change. Five discrete stages of change are described: pre-contemplation (lack of awareness of a problem); contemplation (realization that there is a problem and giving consideration to the effect treatment might have); preparation (an intention to act upon the problem); action (participation in treatment and rehabilitation); and maintenance (acceptance of treatment and continuation of behavior). Prochaska (2008) described chronological progression through stages that may take 6 months or more from the precontemplation to action stages. The maintenance stage occurs when the new behaviour has been in place for greater than 6 months. Relapse to previous behaviour may occur at any time during this process. The pragmatic approach offered by this model has seen the transtheoretical model used across many health fields, and a recent body of work in hearing rehabilitation encourages clinical application of its principles (Babeu, Kricos, & Lesner, 2004; Clark et al., 2012; Laplante-Lévesque et al., 2012; Laplante-Lévesque et al., 2013; Ekberg, Grenness, & Hickson, 2016; Saunders et al., 2016).

Studies that used the transtheoretical model have provided evidence that the action stage of change is associated with increased hearing aid adoption (Ekberg et al., 2016) and successful rehabilitation outcome (Laplante-Lévesque et al., 2013). Meister et al.
(2014) explored intention to use hearing aids with the theory of planned behavior, which seeks to predict behavioral intention by measuring attitudes, subjective norm (i.e., social pressure to act), and behavioral control (i.e., a person's sense of control over their ability to act). Their results suggested all three theoretical constructs of the theory of planned behavior influenced intention to use hearing aids. The health belief model identifies factors influencing health behavior according to perceived severity, perceived susceptibility, perceived benefit, perceived barriers, and perceived self-efficacy. Factors that prompt health behavior change are referred to as cues to action. Using the health belief model, Meyer et al. (2014) reported significant factors associated with hearing help-seeking and hearing aid adoption were attitudes to hearing aids (e.g., perceived benefit, perceived severity of communication difficulties) and support from significant others (cues to action). Likewise, Hickson et al. (2014) found success with hearing aids was linked with positive support from others (cues to action), greater perceived self-efficacy, greater perceived severity and positive attitudes (perceived benefit).

Together, these findings support application of the transtheoretical model, theory of planned behavior and health belief model to explain and predict client behavior in hearing rehabilitation. However, questions remain about what personal circumstances, experiences and conditions influence hearing health behavior, and also about what types of motivating factors might prompt internalization and behavior change. SDT endeavors to provide an answer to these questions by examining the conditions that affect motivation and the processes through which a person internalizes and maintains behavior conducive to health and well-being. As explained in the following section, the SDT framework describes how the type of motivation, and the conditions that affect motivation, might have a bearing on client attitude towards treatment.

### 2.4 Self-Determination Theory overview

SDT is a broad-ranging psychological theory of motivation that has been applied across many fields including education, sport, and health (see Deci & Ryan, 2008, for an overview). This theory differentiates among types of motivation (i.e., intrinsic and extrinsic types of motivation, and amotivation) by classifying the different ways that people regulate their own behavior. Classifying behavioral regulation in this way can represent the extent to which a person's behavior is externally or internally driven, and the various types of motivation can be represented along a continuum of internalization. According to SDT,
There are three innate psychological needs that are necessary for personal well-being and healthy behavior – autonomy, competence and relatedness (Deci & Ryan, 2000). SDT health research shows that the conditions that facilitate or undermine these three needs will influence internalization of behavior (Ng et al., 2012). Autonomy, competence and relatedness are described in Section 2.4.2. Figure 2.1 illustrates the SDT model of motivation.
Figure 2.1: The self-determination continuum, showing motivation type, internalization, behavioral regulation process and psychological need. Adapted from Ryan & Deci (2000).
2.4.1 Motivation Type: Intrinsic, Extrinsic and Amotivation

Motivation that stems from an inherent enjoyment of an activity is commonly termed intrinsic. Intrinsically motivated people give an activity their full attention and involvement, and derive satisfaction from the activity itself. On the other hand, people might be motivated towards an activity for reasons external to them, such as to please others, avoid a threat, or seek a reward. SDT refers to this as extrinsic motivation. SDT proposes that people are more likely to persist with and be successful in an activity if they have internalized the need to take action and are intrinsically motivated (Deci & Ryan, 1991; Ryan et al., 2008; Ng et al., 2012). Partially internalized types of motivation, for example, acting from a sense of guilt, may result in short term adherence to a behavior, but such behavior may not be sustained (Ng et al., 2012). By contrast, amotivation, or lack of motivation, occurs if an activity is not valued, where there is self-perceived incompetence, or if there is no intention of completing an activity.

Notwithstanding the distinctions among intrinsic and extrinsic types of motivation and amotivation, SDT considers motivation to be both dynamic and responsive to the broad range of personal activities and experiences of daily life. Many of these daily activities might be governed by particular expected behaviors or principles, or by externally driven constraints that might not be inherently enjoyable or satisfying. People might be motivated to wash the dishes, for instance, not because the activity is inherently enjoyable, but because they recognize the importance of a clean kitchen for themselves and the rest of the household. By contrast, motivation to wash the dishes might only be present because someone else insists they be done.

According to SDT, the variety of ways that people might respond to any activity can be scaled according to the sense of control felt towards decisions and action. This is often designated perceived locus of causality or behavioral regulation in SDT literature (Ryan & Connell, 1989; Ryan and Deci, 2000; Sheldon et al., 2015), but in this and subsequent chapters is referred to as types, or forms, of motivation. SDT delineates types of motivation along a self-determination continuum (see Figure 1), which illustrates the relationship between different motivation types and the degree of internalization perceived towards decision-making (Ryan & Connell, 1989; Sheldon et al., 2015). Progressing from least to most internalized, these motivation types are external (e.g., acting to avoid punishment or gain reward), introjected (e.g., an internal sense of guilt or obligation), identified (e.g., acting with recognition of the activity’s value), and integrated (e.g.,
alignment with personal beliefs). The SDT literature describes internalization according to a person’s relative autonomy (e.g., Ryan et al., 2011), such that more internalized types of motivation are autonomous, and less internalized types of motivation are controlled.

As an example, people who take medication because they recognize its value to personal health (identified motivation) are extrinsically motivated, as are people who feel obliged to take medication because they wish to please their doctor (introjected motivation). Both examples imply that action is taken for reasons external to the individual, rather than an inherent perception of the benefit of the activity. However, they pose distinctly different motivational orientations that reflect differences in the degree of internalization of the need to take medication.

Given that less internalized types of motivation, such as external or introjected motivation, might warrant behavior change intervention in health settings (Ryan et al., 2008), it is of interest to explore the three psychological needs that influence the internalization process. Each of these needs is described in the following section.

2.4.2 Conditions that Affect Motivation: Autonomy, Competence and Relatedness

The three needs that potentially affect the internalization process are: (1) the need for autonomy, or a sense of control and affirmation of personal choices and actions (deCharms, 1968; Deci & Ryan, 1985; Ryan et al., 2011); (2) the need for competence, or the capacity to master things (Bandura, 1977; Locke, 1968; Markland, Ryan, Tobin, & Rollnick, 2005; White, 1959); and (3) the need for relatedness, or a sense of belonging and community (Baumeister & Leary, 1995; Markland & Tobin, 2010). Fulfilment of these three needs enables internalization (Deci & Ryan, 2000; Ryan et al., 2008), and SDT research in health has shown that treatment outcomes are improved when the needs for autonomy, competence, and relatedness are met, whereas they might be undermined when there are barriers to meeting them (Ryan et al., 2008; Ng et al., 2012). In the clinic, facilitating these needs is known as autonomy support (Williams, Frankel, Campbell, & Deci, 2000; Markland et al., 2005). The next section sets out research that illustrates how autonomy, competence and relatedness are associated with internalization.
2.4.2.1 Autonomy

Autonomy is experienced when people perceive their behavior to be compatible with their beliefs. SDT predicts that actions or decisions made autonomously will help enable intrinsic motivation, and in health care environments, will result in greater likelihood of successful long-term adherence to treatment. In a review of counselling, psychotherapy, and behavior change theories and practice, Ryan et al. (2011) concluded that support for client autonomy is a universal theme through different clinical approaches, which reinforces the importance of fulfilling this need. A meta-analysis of 184 health-related studies in SDT revealed internalized, or autonomous, types of motivation increased engagement with health behavior (Ng et al., 2012). Ng et al. (2012) also reported support for autonomy helped to sustain behavior conducive to successful health outcomes and improved well-being. For example, Williams et al. (2009) evaluated longitudinal data from 2973 diabetes clients by administering questionnaires that measured a range of factors such as autonomy support, motivation for recommended treatment (in this study, self-managed medication adherence), and quality of life. Two years after receiving services, client data relating to medication adherence was cross-checked against initial questionnaire responses. The authors found that autonomy support was positively associated with self-managed medication adherence, which in turn was associated with greater perceived competence, quality of life, and physiological outcomes. The benefits of autonomy support also have been reported in a variety of health studies (see the Ng et al., 2012, meta-analysis), including physical activity intervention uptake research (Chatzisarantis, Hagger, Kamarova, & Kawabata, 2012), and dental health (Münster Halvari, Halvari, Björnebakk, & Deci, 2012). These findings highlight the importance of autonomous decision-making in health.

2.4.2.2 Competence

As with autonomy, developing a sense of competence helps facilitate internalization. In SDT, conditions that encourage a personal sense of accomplishment from mastering a new task (White, 1959), and the confidence that comes with self-efficacy (Bandura, 1977), bring about competence and help enrich intrinsic motivation (Deci, 1972; Deci & Ryan, 2000). By contrast, failure at a task might result in disengagement and require the need for support, reassurance, or rationalisation (White, 1959).
One clinical strategy that fosters competence is collaborative goal-setting (e.g., Siegert & Taylor, 2004). Goal-setting is recognized as central to health rehabilitation (Levack, Dean, Siegert, & McPherson, 2006), and is a clinical process that helps provide structure to the rehabilitation program and builds client confidence to achieve specific outcomes. Both the content of goals and the processes used to achieve those goals are considered by SDT to be important to understanding how people regulate their behavior (Deci & Ryan, 2000). When goals are unrealistic and a client’s rehabilitation expectations do not converge with practitioner expectations (being either too high or too low), treatment might not be optimized (Constantino, Arnkoff, Glass, Ametrano, & Smith, 2011). In such scenarios, providing information about the benefits and disadvantages of future rehabilitation and personal reflection on expectations and beliefs might be useful strategies to build competence (Markland et al., 2005). Interactions between the client and practitioner that foster competence suggest that a strong client-practitioner relationship is necessary for successful rehabilitation and developing intrinsic motivation. The importance of client-practitioner relatedness is therefore recognized by SDT as a third condition that might influence motivation type.

2.4.2.3 Relatedness

Relatedness signifies a person’s need to belong and to relate to others (see Baumeister & Leary, 1995, for a review), and is important for achieving internalized types of motivation (Ryan & La Guardia, 2000). In a study that investigated relationships between relatedness and well-being among nursing home residents, Kasser and Ryan (1999) found that a greater quality or depth of relatedness between residents and their social supports significantly predicted positive well-being and life satisfaction.

Although social relatedness is regarded as important to personal well-being and intrinsic motivation, SDT also considers the client-practitioner relationship to be of value. Williams et al. (2000), in a comparison of relationship-centred versus physician-centred primary care physicians, found clients of relationship-centred physicians had higher satisfaction and better adherence to treatment than the physician-centred cohort.

From these findings it seems clear that the internalization process necessary to achieve and maintain positive health outcomes is made easier when the needs for autonomy, competence, and relatedness are fulfilled (Deci & Ryan, 2000). A substantial
body of health research supports the use of the SDT framework to facilitate behavior change (Ng et al., 2012). Applying the theory to audiological practice might help practitioners better understand the type of motivation and the conditions that govern client decisions such as hearing aid adoption or non-adoption. In the following section, the types of motivation and the conditions that affect motivation type are examined in audiological literature, and findings are interpreted from an SDT perspective.

2.5 SDT and Hearing Rehabilitation Overview

Audiological research that focuses specifically on motivation is not extensive. Although SDT has been considered in a review of social-emotional challenges faced by children with mild to moderate hearing impairment in the classroom (Dalton, 2011), to date there does not appear to be any research that uses the SDT model to investigate the influence of motivation on hearing aid adoption in an adult population. However, interpreting past audiological literature from a SDT perspective supports the potential use of the SDT framework. Table 2.1, which provides examples of a range of stereotypical attitudes towards hearing aid adoption, illustrates how motivation type might be classified using SDT in hearing rehabilitation. These examples are organized according to the extent of internalized behavior and characterize different forms of motivation at specific points along the self-determination continuum.
Table 2.1: Examples of a range of comments made towards hearing aid adoption, using the SDT classification of motivation type, organised according to the extent of internalization

<table>
<thead>
<tr>
<th>Motivation Type</th>
<th>Internalization</th>
<th>Observation</th>
<th>Illustrative Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic</td>
<td>Highly Internal</td>
<td>Inherent enjoyment and satisfaction</td>
<td>“I really enjoy the idea of wearing hearing aids and want to wear them all the time, day and night.”</td>
</tr>
<tr>
<td>Integrated</td>
<td>Internal</td>
<td>Alignment with personal beliefs</td>
<td>“I expect I will hear better with hearing aids in, and once they’re in, I will probably forget they’re there.”</td>
</tr>
<tr>
<td>Identified</td>
<td>Somewhat Internal</td>
<td>Value recognition</td>
<td>“It is important to wear hearing aids because I will hear television better, and hearing television is important to me.”</td>
</tr>
<tr>
<td>Introjected</td>
<td>Somewhat External</td>
<td>Felt sense of guilt or obligation</td>
<td>“My family is making me get hearing aids so I suppose I should get them for their sake.”</td>
</tr>
<tr>
<td>External</td>
<td>External</td>
<td>Avoidance of punishment / gain reward</td>
<td>“If I don’t get hearing aids my family will be angry with me.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“I’m getting the hearing aids for free so I may as well have them.”</td>
</tr>
<tr>
<td>Amotivation</td>
<td>Impersonal</td>
<td>Unintentional / unvalued / uncontrolled</td>
<td>“You can fit me with hearing aids if you want, but I’m not interested in them; they won’t be of any use to me.”</td>
</tr>
</tbody>
</table>
In this section, motivation type is examined within audiological literature. Although motivation is important for both engagement with and maintenance of behavior, particular consideration is given to literature that explores the influence of motivation type on hearing aid adoption. This is followed by an exploration of literature that identifies how autonomy, competence, and relatedness might affect hearing aid adoption.

2.5.1 Hearing Rehabilitation and Motivation Type: Extrinsic, Intrinsic, and Amotivation

Clients seeking help for their hearing for the first time might give a wide variety of personal reasons for adopting or not adopting hearing aids (e.g., Kochkin, 2007; Meyer & Hickson, 2012; Meyer et al., 2014). Internalized motivation has been associated with increased hearing help-seeking and hearing aid adoption (e.g., Laplante-Lévesque et al., 2013; Saunders et al., 2013; Meyer et al., 2014; Ekberg et al., 2016). However, not everyone who seeks help or considers hearing aid adoption may be motivated for internalized reasons. Although the influence of motivation type on hearing aid adoption has not been investigated, it is recognized that the type of motivation might affect specific aspects of hearing rehabilitation. For example, Wong, Hickson and McPherson (2009), in their study that investigated consumer satisfaction with hearing aids, described factors known to influence satisfaction as intrinsic (e.g., self-motivation, positive attitudes to rehabilitation), and extrinsic (e.g., hearing aid type, hearing aid sound quality), although they did not explore these factors from a motivational perspective as part of their research. Recent studies by Meyer et al. (2014), Meister et al. (2014) and Saunders et al. (2016) have reported on internal and external factors that influenced hearing health behavior such as hearing aid adoption, although these factors were not characterized as contrasting types of motivation.

Despite internal and external types of motivation receiving limited attention in audiological research, other variables that might reflect motivation type have been explored. One such variable is the source of motivation to attend hearing rehabilitation sessions. Self-motivation to attend might imply internalizing a need and hence intrinsic motivation towards hearing rehabilitation, as the decision to seek help was personally endorsed. Motivation from others to attend might suggest less internalization, and consequently extrinsic forms of motivation towards help-seeking behavior. According to SDT’s prediction that internal forms of motivation are linked with successful treatment, it
follows that the source of motivation could predict hearing rehabilitation success. In their study that investigated factors associated with hearing aid fitting outcome in 52 adults seeking help for their hearing for the first time, Hickson, Timm, Worrall and Bishop (1999) found no significant relationship between motivation source (self-motivated versus motivated by others) and hearing aid use, although self-motivated subjects did report greater satisfaction with hearing aids three to nine months following fitting. Wilson and Stevens (2003), in a study of 140 first time hearing help-seekers, of which 47 reported self-motivation to attend and 93 reported being motivated by others, did not find a relationship between motivation source and hearing aid use or satisfaction. Relationships between motivation source and hearing aid adoption were not tested. Together, these findings suggest there is no clear evidence that motivation source might not sufficiently measure motivation type. In addition, the studies in this area reported on hearing aid outcomes rather than hearing aid adoption per se, which is the focus of this paper.

A second variable that might be associated with motivation type is self-reported hearing problems. Self-reported hearing problems, which have strong positive associations with hearing aid adoption (Knudsen et al., 2010; Meyer & Hickson, 2012; Palmer, Solodar, Hurley, Byrne, & Williams, 2009; Meyer et al., 2014; Saunders et al., 2016), imply that a person has acknowledged and internalized his/her hearing problem via the act of self-reporting. If hearing problems are self-reported, a person’s decision to adopt hearing aids might be intrinsically motivated. In a related study, Humes et al. (2003), investigated differences among three groups of participants matched for age, severity of hearing loss, and gender. The groups were: (1) 26 participants who did not adopt hearing aids initially; (2) 24 participants who adopted hearing aids but subsequently returned them; and (3) 26 participants who adopted hearing aids and continued to use them. They administered a series of measures including the Hearing Handicap Inventory for the Elderly (HHIE; Ventry & Weinstein, 1982) and the Communication Profile for the Hearing Impaired (CPHI; Demorest & Erdman, 1987), and reported that people who did not adopt hearing aids were less self-accepting of hearing impairment than those who did adopt hearing aids. Although the sample size was small, this relationship might signify lesser internalization of need in those who do not adopt hearing aids compared with those who do.

Perceptions of hearing difficulties associated with increased help-seeking and hearing aid adoption indicate internalized behavior. However, there appears to be limited research evidence about the ways that internal and external forms of motivation might
influence hearing help-seeking and hearing aid adoption. Given the importance of internalization to engagement with hearing rehabilitation, exploring the conditions that facilitate or thwart internalization is of considerable interest. The following section identifies how autonomy, competence, and relatedness might affect aspects of hearing rehabilitation such as hearing aid adoption. In particular, literature that promotes clinical strategies to help facilitate these three needs is described.

2.5.2 Hearing Rehabilitation and Autonomy, Competence, and Relatedness

According to SDT, internal forms of motivation are facilitated when support for autonomy, competence, and relatedness is provided, whereas it might be undermined if these conditions are not supported. This section explores the evidence of the effects of autonomy, competence, and relatedness on hearing rehabilitation, and in particular hearing aid adoption. Each of these three conditions is discussed in turn.

2.5.2.1 Autonomy

Autonomy has not been specifically investigated in audiological research. However, recent work that explored client-centredness in initial audiology consultations (e.g. Grenness et al., 2014) highlights similarities between a client-centred and autonomy supportive counselling approach. Autonomy support helps facilitate autonomy by encouraging client perspectives, supporting choice, providing a rationale for engaging in health behavior and minimising pressure (Williams et al., 2000; Markland et al., 2005). Grenness et al. (2014) described themes of client-centredness, which included developing a therapeutic alliance, sharing decision-making and enabling autonomous choice. Shared decision-making (Laplante-Lévesque et al., 2010) infers that a client’s sense of autonomy in rehabilitation decisions is important in effective decision-making, because it promotes active client involvement in the rehabilitation process, and it encourages client choice. According to SDT, shared decision-making would be considered one strategy that encourages autonomy support and facilitates internal forms of motivation (Ryan & Connell, 1989).

In their 2011 and 2012 papers, Laplante-Lévesque et al. explored factors thought to predict help-seekers’ rehabilitation decisions, choice of rehabilitation option, and outcome
within a shared decision-making paradigm. A sample of 153 first time help-seekers was presented with three intervention options using a decision aid: hearing aids, communication programs, and no intervention. Participants were administered a range of questionnaires at the start of the study and outcomes were measured three months following rehabilitation. Among other factors, the authors found greater self-reported hearing disability predicted the increased likelihood of adopting hearing aids. This corroborates the reviews of Knudsen et al. (2010) and Meyer and Hickson (2012). In a study that used the stage-of-change measure the University of Rhode Island Change Assessment (URICA; McConnaughy, Prochaska, & Velicer, 1983), Laplante-Lévesque et al. (2012) found higher contemplation scores (i.e., greater realization of a problem) predicted increased adoption of both hearing aids and communication programs compared with no intervention being adopted. Lower pre-contemplation scores (i.e., lower lack of awareness) and/or higher action scores (i.e., greater participation in rehabilitation) predicted successful rehabilitation outcome. Laplante-Lévesque et al. (2013) reported participants in a more advanced stage of change were more likely to take up an intervention and to report successful outcomes.

Together, these findings illustrate that internalization might affect rehabilitation decisions such as hearing aid adoption, and provides empirical support for using stages of change in hearing rehabilitation, originally advocated by Babeu et al. (2004). However, as the transtheoretical model does not incorporate an analysis of conditions such as autonomy support that influence motivation type, it remains uncertain to what extent autonomy support facilitates the internalization process in hearing rehabilitation. Further research to quantify the relationships between autonomy support and hearing aid adoption, and to develop practical measures of autonomy support in hearing rehabilitation, would be of interest.

2.5.2.2 Competence

Along with autonomy support, the audiology literature acknowledges the need for client-perceived competence. In their review of theoretical models of health behavior thought to be applicable to audiological practice, Noh, Gagné and Kaspar (1994) reported that people with low self-efficacy might be less likely to adopt hearing aids if they believe they are less capable of succeeding. Hickson et al. (2014) found that perceived self-efficacy for advanced handling of hearing aids was positively associated with success with
hearing aids. Although the presence of hearing impairment itself might contribute to low self-efficacy (Kramer, Kapteyn, Kuik, & Deeg, 2002), high communication self-efficacy during rehabilitation decision-making has been found to reduce the likelihood of hearing aid adoption (Cox, Alexander, & Gray, 2005; Laplante-Lévesque et al., 2012). This finding suggests that people who perceive competence towards everyday communication might be more likely to employ strategies other than using hearing aids to manage life with hearing impairment. Different aspects of self-efficacy might therefore influence hearing aid adoption in different ways.

Competence also is promoted through a second body of literature investigating the use of goal-setting. Goal-setting provides structure to the rehabilitation process (Jennings, 2009; McKenna, 1987), and fosters competence through its collaborative self-report process. This enables clients to recognize individual activity limitations and participation restrictions (Cox, 2003), which might be important to internalizing need. Additionally, goal-setting is often integrated into the initial interview and counselling process, which can help build client-practitioner rapport (Dillon, James, & Ginis, 1997). It also might assist with managing expectations and stigma towards hearing impairment and hearing aids, which are two factors that are often seen as barriers to successful rehabilitation (Saunders, Lewis, & Forsline, 2009; Wallhagen, 2010). Deci and Ryan (2000) argued that the content of goals could be internally or externally motivated, which might influence personal well-being and clinical outcomes. Internally motivated goals are concordant with personal beliefs, and are therefore autonomous (Deci & Ryan, 2000). Therefore, the internal processes that clients employ to attain goals, which are important to SDT, might not necessarily be captured through traditional goal-setting approaches in hearing rehabilitation, but rather through the counselling process itself.

2.5.2.3 Relatedness

Addressing the social and emotional isolation that hearing impairment can bring is especially important in hearing rehabilitation, and though hearing aids themselves might help improve quality of life (Mulrow et al., 1990), relatedness to others also is crucial. For example, in a study that investigated relationship satisfaction of 66 couples where one partner was hearing impaired, Anderson and Noble (2005) found that higher relationship satisfaction was evident when people did not attribute causes of communication breakdown to the character of their partner with hearing impairment. By contrast, low
relationship satisfaction was associated with partners who attributed communication breakdown more personally. Spousal support also is a central theme in accepting hearing impairment. In a qualitative study that explored quality of life and well-being of spouses of hearing impaired people, Scarinci, Worrall and Hickson (2008) found that the partners’ acceptance of his/her spouse’s hearing impairment reduced the impact of hearing impairment in their everyday lives. This relationship reinforces the importance of relatedness to internalization.

The importance of relatedness to hearing rehabilitation also is seen in studies that examined help-seeking behavior. For example, Duijvestijn et al. (2003), in a study that investigated factors that affected help-seeking behavior of 1419 hearing impaired people aged 55 years or older, reported that pressure from others to attend clinical services led to increased help-seeking. In addition, van den Brink et al. (1996) found that people who did not seek help for their hearing also had support from significant others for this decision. In their study of attitude and help-seeking for hearing impairment, van den Brink et al. (1996) reported that participants with negative attitudes to hearing aids who did not seek help were supported in their views by significant others, which could influence intrinsic motivation. By contrast, Duijvestijn et al. (2003), who questioned hearing impaired participants of a driving course about hearing help-seeking, revealed that pressure from significant others increased help-seeking, which implies extrinsic motivation. The contrast in ways that significant others relate to hearing impaired adults in the Duijvestijn et al. (2003) and van den Brink et al. (1996) studies suggests that relatedness may impact internalization for hearing help-seeking. Meyer et al. (2014) reported that support from significant others contributed to increased help-seeking and hearing aid adoption, and Meister et al. (2014) found that expectations of or pressure from significant others was associated with increased hearing aid adoption.

Based on these findings, relatedness to significant others appears to be an important influence on client motivation in hearing rehabilitation decisions. In addition, SDT also recognizes the value of relatedness between the client and practitioner to help enable internalized forms of motivation. Research has found clients to be mostly satisfied or very satisfied with their practitioners (Hickson, Clutterbuck, & Khan, 2010; Uriarte, Denzin, Dunstan, Sellars, & Hickson, 2005). Although hearing help-seekers value client-centred care during rehabilitation (Laplante-Lévesque et al., 2010; Grenness, Hickson, Laplante-Lévesque, Meyer, & Davidson, 2014), clients’ psychosocial concerns may not always be acknowledged (Ekberg, Grenness, & Hickson, 2014), and clients are rarely involved in
rehabilitation decision-making (Grenness et al., 2015). Further research to explain how
the client-practitioner relationship might influence hearing aid adoption is warranted.

From the literature explored in this section, there appears to be recognition that
internalization, influences the decision to adopt hearing aids. As SDT differentiates the
type of motivation along a continuum of internalization (see Figure 2.1), further research to
classify hearing help-seekers’ motivation might therefore contribute to a broader
understanding of the specific effects of internalization on rehabilitation decisions such as
hearing aid adoption, as well as other aspects of hearing rehabilitation such as hearing aid
fitting outcomes. The conditions that affect motivation – autonomy, competence, and
relatedness – also might influence rehabilitation decisions such as hearing aid adoption
and rehabilitation outcomes. Further research that explores how different types of
motivation and autonomy support influence hearing help-seeking, the decision whether or
not to adopt hearing aids and rehabilitation outcomes is therefore warranted. In the
following section, two clinical applications of SDT to quantify the effects of autonomy,
competence, and relatedness are suggested: measuring motivation type, and using
motivational interviewing.

2.6 Clinical Applications

2.6.1 Measuring Motivation

Although self-report measures are commonplace in hearing rehabilitation (Noble,
2006), there appears to be no audiological tool that specifically measures motivation. Used
with the transtheoretical model, tools such as the University of Rhode Island Change
Assessment (URICA; McConnaughy et al., 1983) can help predict relationships between
internalization, hearing aid adoption, and rehabilitation outcome (Laplante-Lévesque et al.,
2012; Laplante-Lévesque et al., 2013; Ekberg et al., 2016), but are not designed to
measure autonomy, competence, or relatedness, which SDT considers necessary to for
internalized behavior. Laplante-Lévesque et al. (2012) suggested the 24-item URICA
might be too long a questionnaire for practical use. Clark et al. (2012), in an article that
explored motivational engagement for hearing help, discussed clinical tools designed to
assist practitioners to engage clients with rehabilitation decisions. These tools, developed
by the Ida Institute, (Ida Institute, 2011; 2013), promote a client-centred approach to
internalization and behavior change and can offer practitioners insight into the
internalization process and how it might be used to determine suitable intervention for a client.

In order to subjectively measure the types of motivation and autonomy support, SDT health research has used three questionnaires: (1) the Treatment Self-Regulation Questionnaire (TSRQ; Ryan & Connell, 1989; Williams, Grow, Freedman, Ryan, & Deci, 1996); (2) the Perceived Competence Scale (PCS; Williams, Freedman, & Deci, 1998); and (3) the Health Care Climate Questionnaire (HCCQ; Williams et al., 1996).

The Treatment Self-Regulation Questionnaire (TSRQ) is a 19-item questionnaire that measures internal and external types of motivation by questioning the reasons for help-seeking. TSRQ items are classified as internal (e.g., “I am thinking about getting treatment because I like the challenge of pursuing something new and interesting”; “I am thinking about getting treatment because I personally believe that doing so is the best thing for me.”), or external (e.g., “I am thinking about getting treatment because I think other people would be upset with me if I didn’t”; “I am thinking about getting treatment because I’d feel guilty if I didn’t do something about it.”). Responses are recorded on a 7-point Likert-style response scale that ranges from 1 Strongly Disagree to 7 Strongly Agree, and internal and external subscale scores are obtained by averaging the responses to each item. Classification of internal and external types of motivation enables measuring the extent to which the reason for seeking help has been internalized.

The Perceived Competence Scale (PCS) is a 4-item tool that examines a person’s perceptions of competence to perform a task (e.g., “I feel confident in my ability to manage my treatment needs.”). The PCS uses a 7-point Likert-style response scale ranging from 1 Not At All True to 7 Very True, and responses to each item are averaged to determine the competence score. Measuring perceived competence helps identify the effect of this variable on motivation type, and can be used to recognize and address any barriers to competence that might impede internalization.

The Health Care Climate Questionnaire (HCCQ) is a 15-item questionnaire that uses a 7-point Likert-style response scale ranging from 1 Strongly Disagree to 7 Strongly Agree. It measures client perceptions of the client-practitioner relationship (relatedness), as well as how autonomy-supportive the practitioner was for the duration of treatment, by including items such as “I feel that my practitioner has provided me choices and options” and “My practitioner listens to how I would like to do things.” Scores for each item are averaged to obtain an overall HCCQ score. Measuring autonomy support can help
represent the effect of the client-practitioner relationship on motivation.

Taken together, the TSRQ, PCS, and HCCQ provide self-report data that help classify internal and external types of motivation, perceptions of competence, and autonomy support in the clinic. In addition, they are designed such that they can be applied across domains in fields as diverse as smoking cessation (Williams et al., 2011), diabetes management (Williams et al., 2009), exercise (Edmunds, Ntoumanis, & Duda, 2007), and addiction control (Zeldman, Ryan, & Fiscella, 2004). In each instance, the questions have been tailored to the particular field while maintaining the integrity of the questionnaire. Levesque et al. (2007), for example, applied the TSRQ across three different health fields (smoking, diet, and exercise) and found it was a reliable and valid measure of different types of motivation for all three fields. As such, there is potential benefit for their use in hearing rehabilitation to increase understanding of the factors that influence motivation.

In spite of this potential benefit, it might be unrealistic to expect practitioners to administer separate questionnaires for motivation, competence and autonomy support, given clinical time constraints. It could be argued that administering a small number of direct questions about client motivation, such as: “On a scale of 1 to 10 how ready are you to obtain hearing aids?”, or “On a scale of 1 to 10 how confident are you in your ability to use and get benefit from hearing aids?”, might offer greater appeal to practitioners than using separate questionnaires to measure the conditions that influence motivation. However, there is potential value in exploring the relationships between reasons for attendance and motivation type, and the predictive nature of such relationships to hearing aid adoption. An investigation of relationships among autonomy support, hearing aid adoption, perceived competence and rehabilitation outcomes would also be of interest. Further work to validate and refine the TSRQ, PCS and HCCQ for practical clinical use in hearing rehabilitation would be of benefit. Research to test the efficacy of these questionnaires for understanding the motivational processes associated with hearing aid adoption and other elements of rehabilitation would be warranted. Along with self-report measures such as the TSRQ, PCS and HCCQ, the interactions that take place between client and practitioner during consultation are also relevant to rehabilitation decision-making. The following section describes a counselling strategy employed for this purpose.
2.6.2 Motivational Interviewing

The second potential clinical application of SDT is motivational interviewing (Miller, 1983). Motivational interviewing is a counselling approach that provides the means to effectively engage clients in rehabilitation (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). It was first promoted by Miller (1983) as a strategy to aid health behavior change for addiction, and has subsequently been introduced to a range of health fields including hearing rehabilitation (Beck, Harvey, & Schum, 2007). Miller and Rollnick (2002) identified four areas important to successful motivational interviewing: expression of empathy; development of discrepancy (to highlight the pros and cons of client behavior and to progress clients’ understanding of differences between current and “ideal” behavior); rolling with resistance (acknowledging rather than countering a client’s negative perceptions); and support for self-efficacy (the belief a client has for success). Researchers who used SDT recognized that these motivational interviewing techniques were closely aligned with the attributes of practitioners who provide autonomy support. Autonomy supportive practitioners are those who recognize and suggest a rationale for behavior; acknowledge the importance of a person’s freedom of choice for behavior; and identify and accept the presence of internal conflict (Deci, Eghrari, Patrick, & Leone, 1994; Williams et al., 2000; Vansteenkiste, Williams, & Resnicow, 2012). In their discussion paper, Markland et al. (2005) proposed integrating SDT and motivational interviewing to provide a more formal structured approach to motivational interviewing and to clarify the dynamic aspects of SDT. More recently, motivational interviewing has been emphasized as complementary to a range of behavior change approaches (Miller & Rose, 2009), and measurable benefits of motivational interviewing have emerged (Moyers, Martin, Houck, Christopher, & Tonigan, 2009). Exploring the use of motivational interviewing in the hearing rehabilitation setting might help establish specific aspects of the client-practitioner relationship that most affect hearing aid adoption.

2.7 Future Directions

This review has highlighted the importance of motivation to clinical practice in hearing rehabilitation, and has introduced SDT as a means to gain an appreciation of the ways motivation might affect hearing aid adoption. Whereas hearing aid adoption has been given primary focus in this review, other components of hearing rehabilitation, such as fitting outcome, also might be affected by motivation. Some people who adopt hearing
aids might end up not wearing them if they are not motivated, or if they exhibit externally regulated styles of behavior. Autonomy supportive practitioners might facilitate internalization, which in turn might lead to increased engagement with hearing services and improved rehabilitation outcomes. Therefore, this paper argues that it is critical for practitioners to identify the type of motivation, and the ways that people internalize and integrate hearing health behavior, at the time a person agrees to adopt hearing aids, in order to address potential barriers to successful rehabilitation. Recognizing that autonomy, competence, and relatedness can influence motivation type might help practitioners better understand client decisions to adopt or not adopt hearing aids, and facilitate sustained behavior conducive to well-being and improved quality of life.

Motivation of people seeking hearing services is an area that has not been widely researched. Motivation is thought to drive personal clinical decision-making, yet it is often difficult to predict which factors might influence individual decisions such as hearing aid adoption. Research that tests the efficacy of SDT in hearing rehabilitation might help predict the role of motivation in hearing aid adoption. There also is an opportunity to quantify the benefits of motivational interviewing to hearing rehabilitation when using the SDT framework.

2.8 Conclusion

Whether to adopt hearing aids is a decision often faced by people seeking help for their hearing, and motivation is likely to play a key role in this decision. Practitioners might better understand hearing aid adoption by classifying motivation along a continuum of internalization, and by recognizing the conditions that affect motivation. Through the use of autonomy supportive counselling approaches, practitioners might engender internalized forms of motivation in clients by facilitating autonomy, competence and relatedness. The use of SDT might therefore encourage a better understanding of the role motivation plays in hearing aid adoption, which in turn might reduce instances of inappropriately providing hearing aids, as well as empowering practitioners to tailor rehabilitation to more effectively meet the needs of individual clients.
2.9 References


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Chapter 3 - Autonomous motivation is associated with hearing aid adoption

3.1 Abstract

Objective
To use the self-determination theory of motivation to investigate whether different forms of motivation were associated with adults’ decisions whether or not to adopt hearing aids.

Design
A quantitative approach was used in this cohort study. Participants completed the treatment self-regulation questionnaire (TSRQ), which measured autonomous and controlled motivation for hearing aid adoption. Sociodemographic data and audiometric information were also obtained.

Study sample
Participants were 253 adults who had sought information about their hearing but had not consulted with a hearing professional. Participants were categorised as hearing aid adopters if they had been fitted with hearing aids 4-6 months after completing the TSRQ, and as non-adopters if they had not.

Results
Multivariate logistic regression was used to examine associations between autonomous and controlled motivation, sociodemographic and audiometric variables and hearing aid adoption (n = 160). Three factors were significantly associated with increased hearing aid adoption when the influence of other variables was accounted for: autonomous motivation, perceived hearing difficulty and poorer hearing. Controlled motivation was not found to influence hearing aid adoption.

Conclusion
These empirical findings that link autonomous motivation to decisions of hearing help-seekers have implications for the ways practitioners may evaluate motivation and could inform discussions with clients about hearing aid adoption.
3.2 Introduction

The majority of adults with measurable hearing impairment do not seek help for their hearing (Hartley, Rochtchina, Newall, Golding, & Mitchell, 2010). Among people who do seek help, a choice often faced is whether or not to adopt hearing aids, and a variety of audiological and non-audiological factors contribute to the choice made (see reviews by Knudsen, Öberg, Nielsen, Naylor, & Kramer, 2010; Meyer & Hickson, 2012). Amongst non-audiological factors, client motivation has emerged as an important factor associated with decisions about hearing aid adoption (Laplante-Lévesque, Hickson, & Worrall, 2013).

Motivation is an internal process that initiates, controls and sustains activity. With this broad definition in mind, motivation researchers have sought to understand the circumstances and characteristics that affect a person’s motivation. Historical studies of motivation have explored instincts (James, 1890), drives and needs (Maslow, 1943), external reinforcement (Skinner, 1953), cognition (Bandura, 1977), and neuropsychology (Berridge, 2004). This range of perspectives highlights the importance of both internal mechanisms and environmental factors to motivation. Most theories of motivation concerned with human behaviour take the cognitive perspective, which is underpinned by the notion that motivation stems from people’s active and ongoing interpretation of their immediate environmental and sociocultural experiences (Deci & Ryan, 2000). As these experiences vary considerably, most cognitive theories of motivation emphasise the effects experiences may have on the initiation and maintenance of purposeful behaviour (Ryan & Deci, 2008). This is especially important to researchers seeking to focus on the practical application of these theories in health, educational, or vocational settings (Deci & Ryan, 2000).

In health care, motivation is regarded as central to client engagement in treatment, and is a significant contributor to the success or failure of treatment across many health domains (Ryan, Patrick, Deci, & Williams, 2008). To understand, develop and test an intervention’s ability to increase engagement in clients identified as unmotivated in clinical settings, models of health care such as the health belief model (Rosenstock, 1966), the transtheoretical model (Prochaska, Di Clemente & Norcross, 1992), or social cognitive theory (Bandura, 1977) have often been used (Nieuwenhuijsen, Zemper, Miner, & Epstein, 2006). Such models commonly characterise behaviour change as a process arising from internalisation, whereby client attitude is transformed from a lack of awareness of, or
resistance to, the need for treatment, through to an adoption of need and a subsequent action to address this need (Prochaska et al., 1992). Although the majority of health behaviour change models structure the steps involved to achieve internalisation, and focus on the clinical approaches used to achieve this (Nigg, Allegrante, & Ory, 2002), they do not routinely distinguish between internal and external motivating factors, nor do they identify antecedents of motivational characteristics (Nieuwenhuijsen et al., 2006). The self-determination theory of motivation (SDT; Deci & Ryan, 1985) is a theory that classifies different dimensions of motivation (i.e. internal and external forms of motivation) along a continuum of internalisation (Ryan & Connell, 1989), and emphasises the processes through which a person internalises health behaviours (Ryan et al., 2008).

The internalisation continuum referred to in SDT is a systematic representation of the relative autonomy felt towards a behaviour change action. At one end of the continuum is more internalised, or autonomous, motivation. These forms of motivation are also referred to as integrated motivation, a motivation that stems from integration of action with personal beliefs, or identified motivation, which relates to identifying the value of an action (Deci & Ryan, 2000). The other end of the continuum represents less internalised, or controlled, motivation. These forms of motivation are also referred to as introjected motivation, which is motivation that originates from an internal sense of guilt or obligation, or external motivation, which stems from external pressure (Deci & Ryan, 2000). Amotivation, which is characterised by lack of willingness to participate, is the least internalised form of motivation. Self-determination theory also argues that successful internalisation of new health-related attitudes requires conditions that encourage autonomy (affirmation of personal decisions and beliefs), competence (confidence and ability to master an activity), and relatedness (a sense of connectedness and trust). Further discussion about SDT, the internalisation continuum and its potential applicability to hearing rehabilitation is found in Chapter 2 (Ridgway, Hickson, & Lind, 2013).

The past decade has seen audiological literature shift from describing motivation as reason for referral (self-motivated to attend, or motivated by others; Wilson & Stevens, 2003) or problem awareness (recognition there is a problem and seeking a solution; Kochkin, 2007), to describing motivation as an internalisation process within the behaviour change construct (Saunders, Chisolm, & Wallhagen, 2012; Laplante-Lévesque et al., 2013). Using the transtheoretical model, Laplante-Lévesque et al. (2013) proposed that adults’ orientation to the action stage of change was a predictor of hearing aid adoption or
communication program uptake. Although this latter research supports the clinical application of behaviour change models to understand internalisation, little is yet known about different aspects of motivation in a population of hearing help-seekers, or the role of autonomy in hearing aid adoption decisions. An examination of various features of motivation in a sample of hearing help-seekers would therefore be of considerable value, to better understand (1) the characteristics of motivation in this population, and (2) the relationship of motivation to clinical engagement via hearing aid adoption.

Health research that has applied SDT to investigate relationships between SDT constructs and specific health variables has typically taken a quantitative approach using self-report measures (Ng et al., 2012). One self-report measure that assesses different forms of motivation and the role of autonomy in decision-making is the treatment self-regulation questionnaire (TSRQ; Williams, Grow, Freedman, Ryan, & Deci, 1996). The self-regulation questionnaire was originally designed for use with children in education research (Ryan & Connell, 1989), and was modified for health research in a study that explored autonomous and controlled motivational predictors for participation in a weight loss management program (Williams et al., 1996). The TSRQ has since been adapted for studies that investigated medication adherence (Williams, Rodin, Ryan, Grolnick, & Deci, 1998b), tobacco abstinence (Williams et al., 2011), dental brushing and flossing (Münster Halvari, Halvari, Bjørnbekk, & Deci, 2012), and a range of other health behaviours (Ng et al., 2012). Therefore, evidence from other areas of health care suggests that an adapted TSRQ may help to identify patterns of motivation among hearing help-seekers. This may then enable relationships between different forms of motivation and decisions such as hearing aid adoption to be explored. If motivation is found to predict hearing aid adoption, differentiating autonomous and controlled forms of motivation may be useful in a clinical context to help guide discussions about possible hearing aid adoption with clients.

With this in mind, the aim of this study was to investigate the association between motivational factors and the decision to adopt hearing aids or not. The TSRQ was used to analyse patterns of motivation in a sample of adults seeking help for their hearing for the first time. Associations between sociodemographic and audiometric factors and hearing aid adoption were also explored.
3.3 Method

3.3.1 Participants

Participants were recruited from amongst people who had sought information about their hearing but had not yet attended a first consultation with a hearing professional. Prior to participant recruitment, permission was received from four hearing service providers for their assistance with recruitment. The principal researcher provided unaddressed research packs to the clinics, who then approached potential participants if: (1) they attended promotional activities such as a hearing screening or information session about hearing services run by a hearing service provider; (2) they made contact with a hearing service provider for an appointment directly; and/or (3) they made contact with a hearing service provider for an appointment, after submitting an application to the Australian Government Hearing Services Program\(^5\) via their doctor. A total of 3347 people were mailed, emailed or given the study questionnaires, a consent form for participation and an audiogram release authorisation. Instructions were given to administration staff of the hearing services providers to address and mail research packs to potential participants. There was a stamped, self-addressed envelope for respondents to mail their permissions and questionnaires directly to the researchers. The principal researcher maintained regular contact with the clinics to ensure staff correctly understood the recruitment process. All potential participants were 18 years of age or older, had sufficient English to respond to the research material and did not live in residential aged care facilities. There were no additional inclusion or exclusion criteria. A total of 291 responses were received, for an 8.7% response rate (see Figure 3.1 for an overview of the study procedure). An 8.7% response rate is low when compared with Öberg, Marcusson, Nägga and Wressle (2012), who reported a 53% to their hearing health survey of people over the age of 85, and Williams et al. (2006), whose SDT study of tobacco cessation yielded an initial response rate of 62%. Potential implications of the low response rate in this study are discussed in Chapter 7. Thirty-eight responses from people with previous hearing aid experience were excluded from the study, leaving a sample size of 253. Ninety-one percent of participants were recruited from one large hearing service provider with clinics across all states and territories of Australia, and the remaining 9% of participants were recruited from a number of smaller service providers located in various states and in rural and metropolitan areas.

The sociodemographic and audiometric characteristics of participants are shown in Table 3.1.
Figure 3.1: Flow diagram showing an overview of the study procedure. Numbers in parentheses represent the numbers of potential or actual participants at the various stages of the study.
Table 3.1: Sociodemographic and audiometric characteristics of participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Full sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Characteristic</strong></td>
<td><strong>(N = 253\textsuperscript{a})</strong></td>
</tr>
<tr>
<td>Age in years, mean (SD) (n = 241)</td>
<td>69.9 (10.5)</td>
</tr>
<tr>
<td>Source of referral, n (%) (n = 246)</td>
<td></td>
</tr>
<tr>
<td>Self</td>
<td>148 (60.2)</td>
</tr>
<tr>
<td>Spouse or family member</td>
<td>56 (22.8)</td>
</tr>
<tr>
<td>General practitioner</td>
<td>20 (8.1)</td>
</tr>
<tr>
<td>Other</td>
<td>22 (8.9)</td>
</tr>
<tr>
<td>Four-frequency average hearing loss in better ear measured at 0.5, 1, 2 and 4 kHz (dB), mean (SD)</td>
<td>31.2 (12.7)</td>
</tr>
<tr>
<td>(n = 183)</td>
<td></td>
</tr>
<tr>
<td>≤ 25 dB HL, n (%)</td>
<td>58 (31.7)</td>
</tr>
<tr>
<td>26 - 40 dB HL, n (%)</td>
<td>86 (47.0)</td>
</tr>
<tr>
<td>≥ 41 dB HL, n (%)</td>
<td>39 (21.3)</td>
</tr>
</tbody>
</table>
Desire for hearing aids*, n (%) (n = 227)

<table>
<thead>
<tr>
<th>Desire for Hearing Aids</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t want them</td>
<td>48 (21.1)</td>
</tr>
<tr>
<td>Slightly want them</td>
<td>39 (17.2)</td>
</tr>
<tr>
<td>Want moderately</td>
<td>83 (36.6)</td>
</tr>
<tr>
<td>Want them quite a lot</td>
<td>35 (15.4)</td>
</tr>
<tr>
<td>Want them very much</td>
<td>22 (9.7)</td>
</tr>
</tbody>
</table>

Perceived hearing difficulty without hearing aids*, n (%) (n = 240)

<table>
<thead>
<tr>
<th>Perceived Hearing Difficulty</th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No difficulty</td>
<td>20 (8.3)</td>
</tr>
<tr>
<td>Slight difficulty</td>
<td>84 (35.0)</td>
</tr>
<tr>
<td>Moderate difficulty</td>
<td>84 (35.0)</td>
</tr>
<tr>
<td>Quite a lot of difficulty</td>
<td>42 (17.5)</td>
</tr>
<tr>
<td>Very much difficulty</td>
<td>10 (4.2)</td>
</tr>
</tbody>
</table>

*Questions are from the Wishes and Needs Tool (WANT; Dillon, 2012)

a n values for sociodemographic and audiometric characteristics vary due to missing data
3.3.2 Measures

3.3.2.1 Treatment Self-Regulation Questionnaire

The TSRQ was used to assess motivation for hearing aid adoption. In this study, we adapted the TSRQ from the Health Care SDT package (http://www.selfdeterminationtheory.org/questionnaires) by replacing words associated with medical treatment such as medication, diabetes or glucose with the words hearing, hearing aids or communication where appropriate. The scale consisted of 19 items that represented possible reasons for considering hearing aid adoption. Participants were presented with the item “I am thinking about getting hearing aids because…” and were then asked to rate how true each item was to them on a 7-point Likert scale that ranged from 1 (not at all true) to 7 (very true). Items varied in the extent to which they reflected autonomous and controlled motivation. Examples of more autonomous items were “I’ve carefully thought about hearing aids and believe that getting them is the right thing to do,” and “I personally believe that doing something about my hearing will improve my quality of life.” Examples of more controlled items were “I would be ashamed of myself if I didn’t,” and “I think other people would be upset with me if I didn’t.”

3.3.2.2 Wishes and Needs Tool

The wishes and needs tool (WANT; Dillon, 2012) was designed as a measure of desire for hearing aids and perceived hearing difficulty. The WANT uses a 5-point Likert scale, and consists of the following two items: “How strongly do you want to get hearing aids” (1 Don’t want them; 2 Slightly want them; 3 Want moderately; 4 Want them quite a lot; 5 Want them very much), and “Overall, how much difficulty do you have hearing (without hearing aids)” (1 No difficulty; 2 Slight difficulty; 3 Moderate difficulty; 4 Quite a lot of difficulty; 5 Very much difficulty). Thus, higher scores on the two WANT items are suggested to be associated with increased desire for hearing aids and more perceived hearing difficulty respectively. The WANT was developed for the Australian Government Hearing Services Program to assist practitioners to assess motivation for hearing aid adoption in clients with minimal or mild hearing losses. The two questions were originally included as part of a fitting outcomes survey conducted for the program in 2005 (Dillon, 2012).

Participants were also asked to answer the following questions: ‘Whose idea was it to seek services?’ (mine / my spouse or family member / my doctor / someone else); and ‘Have you worn a hearing aid before?’ (yes / no).
3.3.3 Procedure

The study questionnaires were provided before the first consultation with a hearing practitioner. On receipt of completed questionnaires, responses were collated, and then contact was made with participants’ hearing service providers 4–6 months later to obtain the audiogram and to identify whether or not participants had agreed to get hearing aids (i.e. whether hearing aids were adopted). The delay of 4–6 months was to allow sufficient time for participants to attend for consultation with a hearing professional and to make a decision about hearing aid adoption.

If the hearing aid fitting had taken place by this time, a participant was considered to have adopted hearing aids (adopter). Participants not fitted with hearing aids at this time are referred to as non-adopters. A total of 230 of the 253 participants consulted with a hearing professional, at which time clinical history, audiometric and speech assessment, and discussion about rehabilitation options including hearing aids were completed. Audiograms were obtained for 183 of the 253 participants (34 participants did not authorise release of their audiogram, 23 participants did not attend for a hearing test and 13 audiograms were not available for various reasons, such as participant relocation to another hearing service provider).

All participants except one were eligible to receive subsidised hearing services through the Australian Government Hearing Services Program, which included the option of receiving free digital hearing aid/s of a variety of styles with the following minimum specifications: automatic directional microphone (if fitted with behind-the-ear hearing aids), feedback cancellation, adaptive noise reduction, multi-channel compression, multi-memory, and telecoil. The ineligible participant did not adopt hearing aids. The option of co-payment for hearing aids with features additional to these minimum specifications was also available to participants who adopted hearing aids. It was not known which participants (if any) opted to co-pay for hearing aids. Approximately 85% of adopters received two hearing aids. Information about the model or style of hearing aid/s adopted was not sought for this study. For participants with a 3-frequency average hearing loss ≤ 23 dB (measured at 500 Hz, 1000 Hz and 2000 Hz), the Australian Government Hearing Services Program allows hearing aids to be fitted if the following criteria are met: (1) the average hearing loss at higher frequencies (i.e., 2000 Hz, 3000 Hz and 4000 Hz) is ≥ 40 dBHL, or tinnitus can be addressed by hearing aid fitting, or significant vision impairment is present, and (2) responses to each WANT question are ≥ 2 with a combined score of ≥ 5. The number of participants meeting these criteria was not known.
Ethical clearance for this research was granted by the University of Queensland’s Behavioural and Social Sciences Ethical Review Committee, which adheres to the Australian Government National Health and Medical Research Council, National Statement on Ethical Conduct in Human Research (2007).

3.3.4 Data analysis

Data consisted of participant responses to the TSRQ, the WANT, sociodemographic questions, and the audiograms. These data were subjected to principal component analysis (PCA) and multivariate logistic regression performed using Stata version 11.1 (StataCorp, College Station, USA), to investigate the extent to which scores on the TSRQ describe motivation for hearing help-seekers, and to examine associations between motivation and hearing aid adoption, respectively. Alongside motivation, age, 4-frequency average hearing loss (4FAHL; the average of 500, 1000, 2000 and 4000 Hz in the better ear), gender, referral source, desire for hearing aids and perceived hearing difficulty were also included as independent variables.

3.4 Results

Data from the 253 participants were analysed to obtain statistics for the motivation, sociodemographic and audiometric variables. As the TSRQ had not been used with a sample of hearing help-seekers previously, its psychometric properties were tested using data from this study to establish motivation scores. Following this analysis, participant data were grouped as adopters and non-adopters to identify associations of independent variables with hearing aid adoption.

3.4.1 TSRQ factor structure and subscale derivation

In order to assess patterns of motivation in the sample of first time hearing help-seekers, the factor structure and internal consistency of the TSRQ was assessed initially. To establish the factor structure of the TSRQ, the inter-item correlation matrix was reviewed to identify correlation coefficients ≥ 0.3, correlations were tested for significance at the .05 level with the Bartlett test of sphericity, and the Kaiser-Meyer-Olkin (KMO) measure was used to examine sampling adequacy. A KMO value of ≥ 0.6 was considered to be acceptable (Kaiser, 1974). Inspection of the inter-item correlation matrix identified numerous coefficients ≥ 0.3, which according to Bartlett’s test of sphericity were not intercorrelated (χ² = 1612.63, df = 171, p < 0.001), and the KMO value was 0.89; therefore, the data were considered suitable for PCA. The PCA with varimax rotation was then...
applied to the TSRQ data to examine the factor structure. The first iteration of the PCA produced three factors with eigenvalues greater than 1, which explained 41.7%, 15.6% and 6.4% of the total variance in scores respectively. A scree plot mapping the eigenvalues for each factor in decreasing order of size confirmed the presence of three factors before the plot line elbow. The three-factor rotated analysis explained 63.8% of the variance, and all factors included at least three of the initial variables with factor loadings of 0.4 or above. Items were examined for suitability to their expected construct and eliminated if items loaded uniformly on more than one factor, or if their unique variance (communality) was below 0.4. Three items that did not load clearly onto any one factor (“It’s exciting to try to do something about my hearing”, “I want others to see that I can wear hearing aids and communicate well”, and “Wearing hearing aids is something I really want to do”) and one item with a communality score of 0.39 (“I just do it because my doctor said to”) were not included in the analysis based on the PCA findings.

The second iteration of the rotated PCA derived three factors (eigenvalues were 6.3, 2.8 and 1.1), which explained 41.8%, 18.7% and 7.2% of variance respectively. Nine items clearly loaded onto Factor 1 and four items loaded onto Factor 2. Because the third factor only contained one clearly-loaded item in the second iteration (“I like the challenge of pursuing something new and interesting”) the decision was made to eliminate this item from the analysis, leaving two distinct factors. One further item that loaded onto all three factors and whose communality was below 0.4 (“It’s a challenge to learn how to live with hearing aids”) was also removed.

Each of the 13 items that loaded onto Factors 1 and 2 was compared to its respective item from the original TSRQ and was found to fall into the same subscale as described in the TSRQ Health Care SDT package. Autonomous and controlled motivation emerged as distinct factors that described the content of items within the two subscales. This two-factor construct was largely consistent with previous research that used the TSRQ (see review of Ng et al., 2012), although four-factor (Levesque et al., 2007) and six-factor (Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013) solutions have also been reported. Table 3.2 shows the two-factor solution with factor loading, mean and standard deviation for each of the retained TSRQ items. Internal consistency of the TSRQ was evaluated with Cronbach’s $\alpha$ of 0.7 or above considered to show good internal consistency of the scale (Kline, 1999). Cronbach’s $\alpha$ for the revised TSRQ was 0.89, and was 0.91 and 0.83 for the two subscales respectively. Thus, each subscale demonstrated good internal consistency. The PCA results therefore suggest the adapted TSRQ to be a potentially useful measure of autonomous and controlled motivation for hearing help-seekers.
Responses to items in each TSRQ subscale were then averaged to obtain autonomous and controlled motivation scores for each participant, and were included as the independent motivation variables (autonomous motivation and controlled motivation).
Table 3.2: Treatment Self-Regulation Questionnaire principal component analysis with factor loading, mean and standard deviation for retained items (n = 253)

<table>
<thead>
<tr>
<th>TSRQ item “I am thinking about getting hearing aids because...”</th>
<th>Factor loading</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined Scale</td>
<td>3.48</td>
<td>(1.92)</td>
</tr>
<tr>
<td><strong>Autonomous Motivation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I personally believe that doing something about my hearing will improve my quality of life</td>
<td>0.76</td>
<td>5.77 (1.66)</td>
</tr>
<tr>
<td>10. I personally believe that hearing aids are important for effective communication</td>
<td>0.69</td>
<td>6.04 (1.47)</td>
</tr>
<tr>
<td>13. I've carefully thought about hearing aids and believe getting them is the right thing to do</td>
<td>0.84</td>
<td>5.34 (1.94)</td>
</tr>
<tr>
<td>16. I feel personally that wearing hearing aids is the best thing for me</td>
<td>0.83</td>
<td>4.84 (2.05)</td>
</tr>
<tr>
<td><strong>Controlled Motivation</strong></td>
<td>2.74</td>
<td>(1.71)</td>
</tr>
<tr>
<td>1. Other people would be angry with me if I didn’t</td>
<td>0.76</td>
<td>2.32 (1.91)</td>
</tr>
<tr>
<td>4. I would feel guilty if I didn’t do what my doctor said</td>
<td>0.74</td>
<td>2.72 (2.27)</td>
</tr>
<tr>
<td>5. I want my doctor to think I’m a good patient</td>
<td>0.74</td>
<td>2.51 (2.34)</td>
</tr>
<tr>
<td>6. I would feel bad about myself if I didn’t</td>
<td>0.61</td>
<td>2.87 (2.13)</td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td>Score</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>8</td>
<td>I don't want other people to be disappointed with me</td>
<td>0.81</td>
</tr>
<tr>
<td>9</td>
<td>I think other people would be upset with me if I didn’t</td>
<td>0.82</td>
</tr>
<tr>
<td>11</td>
<td>I would be ashamed of myself if I didn’t</td>
<td>0.74</td>
</tr>
<tr>
<td>12</td>
<td>It’s easier to do what I’m told than to think about it</td>
<td>0.77</td>
</tr>
<tr>
<td>17</td>
<td>I’d feel guilty if I didn’t do something about my hearing</td>
<td>0.54</td>
</tr>
</tbody>
</table>

SD = Standard Deviation

Range of scores for each item = 1 – 7.
3.4.2 Motivation and hearing aid adoption

To address whether motivation was associated with hearing aid adoption, participants were categorised as adopters or non-adopters (as described in the Method section) for the analyses. Prior to multivariate regression analysis, adopters were compared to non-adopters by testing each independent variable for association with hearing aid adoption using Student’s t-tests for continuous variables and chi-squared for categorical variables. Results were obtained for a total of 237 participants because hearing aid adoption data was missing for 16 participants. Table 3.3 presents a comparison of the means and standard deviations (or counts and percentages for categorical variables) of each independent variable for adopters and non-adopters groups. Sample sizes for independent variables varied due to pairwise deletion of missing values. Variables were included in the multivariate regression model if they were associated with the outcome with a p value below 0.1. Student’s t-test and chi-squared analyses showed higher autonomous motivation scores were significantly associated with hearing aid adoption (p < 0.001), whereas controlled motivation scores were not (p = 0.50). Relative to non-adopters, hearing aid adopters reported greater desire for hearing aids (p < 0.001), perceived greater hearing difficulty (p < 0.001), had greater 4FAHL (p < 0.001), and were male (p = 0.03). Age (p = 0.91) and source of referral (p = 0.72) were not associated with hearing aid adoption.
Table 3.3: Means and standard deviations (or counts and percentages for categorical variables) of independent variables for hearing aid adopters and non-adopters, along with their significance

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Adopters (n = 125&lt;sup&gt;c&lt;/sup&gt;)</th>
<th>Nonadopters (n = 112&lt;sup&gt;c&lt;/sup&gt;)</th>
<th>n</th>
<th>t / χ² value</th>
<th>p value (adoption vs. non-adoption)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous motivation</td>
<td>5.94 (1.23)</td>
<td>5.06 (1.64)</td>
<td>227</td>
<td>4.61&lt;sup&gt;a&lt;/sup&gt;</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Controlled motivation</td>
<td>2.73 (1.77)</td>
<td>2.57 (1.56)</td>
<td>215</td>
<td>0.68&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.50</td>
</tr>
<tr>
<td>Age in Years</td>
<td>69.58 (10.59)</td>
<td>69.74 (10.13)</td>
<td>230</td>
<td>0.12&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.91</td>
</tr>
<tr>
<td>4FAHL better ear</td>
<td>35.03 (10.97)</td>
<td>25.37 (12.92)</td>
<td>182</td>
<td>5.42&lt;sup&gt;a&lt;/sup&gt;</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Desire for hearing aids</td>
<td>3.10 (1.21)</td>
<td>2.41 (1.14)</td>
<td>213</td>
<td>4.24&lt;sup&gt;a&lt;/sup&gt;</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Perceived difficulty</td>
<td>3.11 (0.90)</td>
<td>2.36 (0.86)</td>
<td>225</td>
<td>6.36&lt;sup&gt;a&lt;/sup&gt;</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>237</td>
<td>4.72&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.03</td>
</tr>
<tr>
<td>Female</td>
<td>56 (23.63)</td>
<td>66 (27.85)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>69 (29.11)</td>
<td>46 (19.41)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source of referral</td>
<td></td>
<td></td>
<td>231</td>
<td>1.34&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.72</td>
</tr>
<tr>
<td>Self</td>
<td>74 (30.74)</td>
<td>64 (27.71)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spouse or family member</td>
<td>28 (12.12)</td>
<td>24 (10.86)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General practitioner</td>
<td>8 (3.46)</td>
<td>11 (4.76)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>10 (4.33)</td>
<td>12 (5.19)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> t values shown (continuous variables)

<sup>b</sup> Chi squared values shown (categorical variables)

<sup>c</sup> Data for 16 of the 253 participants were removed from the analysis, as their hearing aid adoption decision could not be determined. The n values for independent variables vary due to missing data.
The five significant variables (autonomous motivation, gender, desire for hearing aids, perceived difficulty and 4FAHL) were entered in the regression model and tested for multicollinearity using variance inflation factors (VIF). Variance inflation factors were all less than 2, which indicated low correlation among variables. Thus, all five variables were retained in the model. Outlying participant responses were eliminated from the model if the studentised residual had an absolute value ≥ 2.58. Four outliers were identified in the final model and were removed from the analysis. The final sample size for the regression model was 160 as only those participants with complete data for each of the five significant variables were included in the regression analysis.

Multivariate logistic regression reporting odds ratios was then used to explore associations between independent variables and the outcome variable (hearing aid adoption or non-adoption), accounting for the effects of other variables. The odds ratio (OR) describes the strength of association between motivation and hearing aid adoption by measuring the odds that hearing aid adoption would take place, given the presence or absence of the independent variables. The regression analysis showed autonomous motivation, perceived hearing difficulty and 4FAHL to be positively and significantly associated with hearing aid adoption after other variables were accounted for (Table 3.4). The analysis indicated that for each one-point increase in autonomous motivation score, participants were 55% more likely to adopt hearing aids (OR 1.55, \(p = 0.012\)). Likewise, for each one-point increase in perceived hearing difficulty score, participants had 2.3 times greater odds of adopting hearing aids (OR 2.32, \(p = 0.013\)). Participants were 16% more likely to adopt hearing aids for each 1dB increase in 4FAHL (OR 1.16, \(p < 0.001\)).

Table 3.4: Multivariate logistic regression analyses of associations between predictor variables and hearing aid adoption (n = 160)

<table>
<thead>
<tr>
<th>Predictor Variable</th>
<th>OR</th>
<th>95% CI</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous motivation</td>
<td>1.55</td>
<td>[1.10, 2.18]</td>
<td>0.012</td>
</tr>
<tr>
<td>Gender</td>
<td>1.29</td>
<td>[0.55, 3.02]</td>
<td>0.555</td>
</tr>
<tr>
<td>Desire for hearing aids</td>
<td>1.04</td>
<td>[0.63, 1.71]</td>
<td>0.874</td>
</tr>
<tr>
<td>Perceived difficulty</td>
<td>2.32</td>
<td>[1.19, 4.52]</td>
<td>0.013</td>
</tr>
<tr>
<td>4FAHL better ear</td>
<td>1.16</td>
<td>[1.10, 1.22]</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

\(^a\) Hosmer-Lemeshow goodness-of-fit (\(p = 0.74\)); Area under receiver operating characteristic (ROC) curve (0.87); OR = Odds ratio; CI = Confidence interval.
Post-estimation tests were used to evaluate the goodness-of-fit and the predictive accuracy of the logistic regression model. The Hosmer-Lemeshow goodness-of-fit results confirmed the final model fitted the data well ($\chi^2 = 5.17$, $df = 8$, $p = 0.74$). The classification matrix correctly classified 78.12% of cases using the model (68.33% of adopters and 84% of non-adopters were correctly classified). The receiver operating characteristic (ROC) curve portrayed excellent predictive power of the model (AUC = 0.87).

These results show that the multivariate regression model was a very good predictor of the decision to adopt or not adopt hearing aids. Participants with higher autonomous motivation, greater perceived hearing difficulty and greater 4FAHL were significantly more likely to adopt hearing aids than those with lower scores for these variables.

### 3.5 Discussion

The present study set out to determine how autonomous and controlled motivation were related to hearing aid adoption of a sample of first time hearing help-seekers using the TSRQ as the measure of motivation. Our finding that autonomous motivation was associated with hearing aid adoption represents the first empirical evidence linking autonomy to the health decisions of first time hearing help-seekers.

Although there was no literature to compare the results of this study with other samples of hearing help-seekers, studies that applied the TSRQ in the broader health literature also found positive associations between autonomous motivation and the adoption of other health-related behaviours. Shigaki et al. (2010), for example, administered the TSRQ to 77 patients with Type 2 diabetes and found autonomous motivation was associated with maintaining diet and increased testing of blood glucose. Likewise, in a large-scale cross-sectional study of elite athletes, Chan and Hagger (2012) reported that the more an athlete was autonomously motivated to engage in sports injury prevention and rehabilitation, the more likely she/he would regard the behaviour as positive and commit to engaging in future treatment. Autonomous motivation is therefore an important consideration for the adoption of health-related behaviours across a range of health settings, including for adults contemplating hearing aid adoption.

The lack of association between controlled motivation and hearing aid adoption found in this study was consistent with previous research, which has generally reported nil or negative associations between controlled forms of motivation and the adoption of health behaviours (Ng et al., 2012). In a study of 128 patients who took medication for diabetes, Williams, Freedman and Deci (1998a) reported that controlled motivation was not
significantly correlated with regulation of glucose levels. Furthermore, Levesque et al. (2007), who obtained TSRQ data from 2731 participants across three different health domains (smoking cessation, healthy eating, and exercise management), found that, in addition to positive associations between autonomous motivation and engagement with health behaviours, controlled motivation was significantly associated with adverse health outcomes such as depression, or negatively associated with healthy eating. Interestingly, Levesque et al. (2007) also found that controlled motivation was significantly associated with greater levels of physical activity. This positive association differs from the findings of the present study, and suggests that the effects of autonomous and controlled motivation may vary among different health behaviours and treatment environments.

As autonomous motivation, but not controlled motivation, was associated with hearing aid adoption, the link between autonomy and positive health behaviours, previously reported as fundamental to SDT (Ryan et al., 2008; Ng et al., 2012), was supported by the findings of this study. While differences in TSRQ autonomous motivation scores between adopters and non-adopters imply support for an internalisation continuum, the different behaviours of autonomous and controlled motivation subscales could also suggest these variables are independently scaled. Assuming the evidence for an internalisation continuum within the SDT model of health behaviour change (Ryan & Connell, 1989; Ng et al., 2012) is accepted, a two-factor TSRQ, such as that obtained in the present study, might not adequately represent the various forms of motivation along the continuum (see Ridgway et al., 2013). Illustrating the value of more precisely classifying motivation, Pelletier, Fortier, Vallerand, and Brière (2001) showed motivation for the practice of competitive sport varied with different forms of controlled motivation (introjected and external motivation). Moreover, in their large, multi-site study, Levesque et al. (2007) derived a four-factor TSRQ structure (autonomous motivation, introjected motivation, external motivation and amotivation) that more closely represented the internalisation continuum than the findings of this study. Differences in participant numbers, demographics and the wording of some items might have contributed to the different TSRQ subscale solutions of Levesque et al. (2007) and the present study. Pelletier et al. (2013), in two studies that used a version of the TSRQ (the sport motivation scale) to investigate motivation in athletes, acknowledged criticism that the scale may not completely represent all SDT motivation constructs, and presented the psychometric properties of a redesigned sport motivation scale that more closely aligned its item content with SDT. On balance, the two-factor TSRQ used in this study provided evidence that supported the principles of SDT, and was consistent with other health research that demonstrated the importance of
autonomy to health decisions. However, it is acknowledged that further review and refinement of the TSRQ for hearing help-seekers could more precisely classify motivation along the internalisation continuum so that motivations of people seeking to adopt hearing aids are further understood.

Our finding that perceived hearing difficulty was positively associated with hearing aid adoption was not surprising and has been consistently reported elsewhere (Knudsen et al., 2010; Meyer & Hickson, 2012). While awareness of hearing difficulty was evidently an important factor for people considering hearing aid adoption, it was interesting that no association was found between desire for hearing aids, as measured by the WANT, and hearing aid adoption in the multivariate analysis. Although Dillon (2012) reported increased desire for hearing aids to be associated with hearing aid use, benefit and quality of life 6–12 months post-fitting, its lack of multivariate association with hearing aid adoption in this study suggests that interrelationships among additional factors that influence desire for hearing aids at or following hearing aid adoption warrant further investigation. As the psychometric properties of the WANT have not been determined, research that explores associations between the WANT and hearing aid adoption might help clarify the sensitivity and validity of this measure.

The use of multivariate regression can reduce the confounding effects of interrelations between factors, which strengthens analyses (Meyer & Hickson, 2012). Nonetheless, the list of variables included in this study was not exhaustive (see Meyer, Hickson, Lovelock, Lampert and Khan, 2014, for a comprehensive list of factors). While the logistic regression model in this study predicted 87% of hearing aid adoption decisions with the ROC curve, its predictive power might have further increased with the inclusion of additional factors. For example, an exploration of the attitudes of significant others to hearing aid adoption might provide further insight into the decision to adopt or not adopt hearing aids (Meyer & Hickson, 2012).

This study found hearing aid adopters to have, on average, 9.7 dB greater 4FAHL than non-adopters, and for the proportion of the sample whose audiograms were available, the strong multivariate association between greater 4FAHL and hearing aid adoption was consistent with previous literature (Knudsen et al., 2010; Meyer & Hickson, 2012). Such a relationship is typically not evident for those with mild to moderate hearing impairment (Laplante-Lévesque, Hickson, & Worrall, 2012), but in this study 31.0% of those with 4FAHL ≤ 25 dBHL and 69.8% of those with 4FAHL 26–41 dBHL adopted hearing aids. A possible explanation for this finding is the ease with which people with mild to moderate hearing impairment can adopt hearing aids under the Australian Government Hearing
Services Program. As stated in the Method section, participants with hearing loss ≤ 23 dBHL (pure-tone average of 500 Hz, 1000 Hz and 2000 Hz) could be fitted with hearing aids if specific additional criteria were met. Although the number of participants who did or did not meet these criteria was not known, results for these participants would be of interest, because their results might reveal whether or not the ≤ 23 dBHL threshold influenced the decision to adopt or not adopt hearing aids. Nevertheless, the proportion of participants with mild to moderate hearing impairment who adopted hearing aids, irrespective of these criteria, suggests it was not a significant factor that influenced participant decisions.

Information about whether or not hearing aids were recommended to non-adopters in this study was not available, but may have been beneficial for the analysis, because removal of non-adopters for whom hearing aids were not recommended might have strengthened the regression model.

Overall, the empirical findings of this study add to the growing body of literature that recognises motivation as an important contributor to decision-making in hearing rehabilitation. The use of the TSRQ to classify autonomous and controlled motivation offers a new approach to understanding the relationships between motivation and hearing aid adoption. Our results associate autonomous motivation with hearing aid adoption and are similar to findings from other health disciplines such as tobacco abstinence, diabetes management, dental self-care and medication adherence, and reinforce the importance of autonomy to health decisions. According to SDT, development of a sense of autonomy is central to internalisation of health-related behaviours (Ryan, Lynch, Vansteenkiste, & Deci, 2011). That is, health-care decisions that come to be personally valued and are congruent with personal beliefs result in greater engagement with treatment. Our findings could therefore have implications for the ways practitioners evaluate motivation and the ways this information is used to guide discussions with clients about hearing aid adoption. Practitioners might, for example, consider how autonomous motivation can be encouraged in clients, so that clients who are not autonomously motivated can become more engaged with clinical decisions. Candidates for hearing aid adoption might also be predicted by identifying autonomous motivation in clients.

### 3.6 Conclusion

This study applied the TSRQ to explore relationships between autonomous and controlled motivation and the decision to adopt or not adopt hearing aids. While positive associations between autonomous motivation and hearing aid adoption highlight the role of
autonomy in the initiation of new health behaviours, further research to investigate relationships of different dimensions of motivation to client outcomes beyond hearing aid adoption, such as hearing aid use or satisfaction, would be of benefit.
3.7 References


Questionnaire (TSRQ) across three different health behaviors. *Health Education Research, 22*(5), 691–702.


Chapter 4 - Decision-making and outcomes of hearing help-seekers: A self-determination theory perspective

4.1 Abstract

Objective

To explore the explanatory power of a self-determination theory (SDT) model of health behaviour change for hearing aid adoption decisions and fitting outcomes.

Design

A quantitative approach was taken for this longitudinal cohort study. Participants completed questionnaires adapted from SDT that measured autonomous motivation, autonomy support, and perceived competence for hearing aids. Hearing aid fitting outcomes were obtained with the International Outcomes Inventory for Hearing Aids (IOI-HA). Sociodemographic and audiometric information was collected.

Study sample

Participants were 216 adult first time hearing help-seekers (125 hearing aid adopters, 91 non-adopters).

Results

Regression models assessed the impact of autonomous motivation and autonomy support on hearing aid adoption and hearing aid fitting outcomes. Sociodemographic and audiometric factors were also taken into account. Autonomous motivation, but not autonomy support, was associated with increased hearing aid adoption. Autonomy support was associated with increased perceived competence for hearing aids, reduced activity limitation and increased hearing aid satisfaction. Autonomous motivation was positively associated with hearing aid satisfaction.

Conclusion

The SDT model is potentially useful in understanding how hearing aid adoption decisions are made, and how hearing health behaviour is internalised and maintained over time. Autonomy supportive practitioners may improve outcomes by helping hearing aid adopters maintain internalised change.
4.2 Introduction

Hearing impairment is one of the most common chronic health conditions among older adults (Gopinath et al., 2012) and, when left untreated, has been associated with diminished psychological health (Kramer, Kapteyn, Kuik, & Deeg, 2002) and reduced quality of life (Dalton et al., 2003). Various intervention options are available to address the consequences of hearing impairment (Laplante-Lévesque, Hickson, & Worrall, 2011) and for suitable candidates, hearing aid fitting has been demonstrated to help (Vuorialho, Karinen, & Sorri, 2006). However, despite advances in technology designed to assist people with hearing impairment, it is human behaviour that accounts for the largest variance in decisions made and outcomes reached by people with hearing impairment (Meyer, Hickson, Lovelock, Lampert, & Khan, 2014; Hickson, Meyer, Lovelock, Lampert, & Khan, 2014). The decision to obtain hearing aids for the first time, for example, is influenced by attitudes and beliefs about hearing impairment (Meyer et al., 2014). Similarly, successful use of hearing aids can be attributed to factors such as positive attitudes toward hearing aids, perceived self-efficacy for handling of hearing aids and the extent of family support (Hickson et al., 2014).

Audiological literature suggests that behavioural factors are influential throughout the hearing rehabilitation process. To maximize the likelihood that those who may benefit from hearing aid fitting adopt hearing aids, and then maintain successful outcomes, several theoretical approaches to health behaviour change in hearing rehabilitation research have been investigated (Saunders, Frederick, Silverman, & Papesh, 2013; Laplante-Lévesque, Hickson, & Worrall, 2013; Meyer et al., 2014; Ridgway, Hickson, & Lind, 2015). However, questions remain about how behavioural factors might advance insight into the impact of psychological, cognitive and social aspects of human behaviour on the regulation of hearing health decisions such as hearing aid adoption.

One approach, self-determination theory (SDT; Deci & Ryan, 1985), is a theory of motivation that explores the ways a person initiates and sustains new health-related behaviours. SDT characterises motivation by the extent to which a person has internalised (i.e., accepted as one's own) ideas and values associated with behaviours (Deci & Ryan, 2000). The theory predicts that internalised perspectives of health-related behaviour will drive positive changes to that behaviour (Ryan, Patrick, Deci, & Williams, 2008). In our overview of SDT in Chapter 2 (Ridgway, Hickson, & Lind, 2013), different forms of motivation were classified along an internalisation continuum, and were described according to the relative autonomy experienced towards health behaviours. Autonomous
motivation (i.e., participation in treatment is perceived as self-determined behaviour) is critical to the internalisation process through which a person comes to engage with and maintain health behaviour conducive to improved quality of life and wellbeing (Ryan et al., 2008). By contrast, controlled motivation, in which client participation arises from susceptibility to external pressure or an internal sense of guilt or obligation, is considered a less internalised motivation source.

Our previous study in Chapter 3 (Ridgway et al., 2015), which was the first to research SDT in hearing rehabilitation, investigated if motivation was associated with adults’ decisions whether or not to adopt hearing aids. A total of 253 first time hearing help-seekers completed the Treatment Self-Regulation Questionnaire (TSRQ; Williams, Grow, Freedman, Ryan, & Deci, 1996), which was adapted to assess autonomous and controlled motivation for hearing aid adoption. After accounting for sociodemographic and audiometric factors, we showed a positive association between autonomous motivation and hearing aid adoption. Controlled motivation did not influence adoption.

SDT focuses on psychosocial processes to help explain behavioural determinants that might influence actions and emotions associated with health behaviour (Ryan et al., 2008). Specifically, three psychological needs fundamental for ongoing health and well-being are described: autonomy (feeling self-determination of one’s own decisions and behaviour), competence (feeling capable of attaining health outcomes), and relatedness (feeling understood and respected by others, including the practitioner). SDT health research provides evidence that client-centred practitioners who facilitate autonomy, competence and relatedness can foster healthier long-term self-management of chronic health conditions such as diabetes, heart disease and obesity in clients, which can then improve quality of life (Ng et al., 2012). Facilitating these needs is commonly referred to in SDT literature as autonomy support and has been commonly measured with the Health Care Climate Questionnaire (HCCQ; Williams et al., 1996). The SDT model of health behaviour change, therefore, argues that people who willingly participate in health treatment and who are provided with an autonomy supportive health care environment will have their needs for autonomy, competence and relatedness satisfied to a greater degree, which will in turn result in greater engagement with and maintenance of positive health behaviours, as well as improved psychosocial outcomes (Ryan et al. 2008).

To address whether SDT is an applicable model for understanding hearing health behaviour change, we expanded our previous study by introducing autonomy support to
the list of variables used to explore hearing aid adoption. We also continued the previous study longitudinally to investigate the role of motivation and autonomy support in maintaining hearing health behaviours over time. The International Outcome Inventory for Hearing Aids (IOI-HA; Cox & Alexander, 2002); a self-report measure of behavioural and psychosocial outcomes for hearing aid adopters, and the Perceived Competence Scale (PCS; Williams, Freedman, & Deci, 1998a); a psychological measure of perceived competence, were introduced as outcome variables. Therefore, the overall purpose of this study was to provide insight into the psychosocial and motivational factors that influence a person to initiate and maintain behaviour change, so that practitioners might better understand the ways clients make decisions in hearing health care, and also how clients internalise beliefs and skills for change.

The aims of the present study were 1) To explore associations between autonomy support and hearing aid adoption (i.e., engagement with hearing health behaviour), and 2) To investigate associations between both autonomy support and autonomous motivation and hearing aid fitting outcomes (i.e., establishment and maintenance of hearing health behaviour), from the perspective of SDT.

Possible confounding variables associated with hearing aid adoption and with hearing aid fitting outcomes (age, four-frequency average hearing level in the better ear, desire for hearing aids, perceived difficulty, gender and referral source) were controlled for in the analysis so that the specific influence of autonomy support and autonomous motivation could be examined.

4.3 Method

4.3.1 Participants

Adult hearing help-seekers were recruited from among 3347 individuals who had attended hearing promotion events, or who had directly sought services from an audiology clinic, and had been provided or sent research material (see section 3.3.1). Eligible participants had no previous hearing aid experience, did not live in residential aged care facilities, and had sufficient English to understand and respond to study materials. Participants had consulted with a hearing care practitioner at least once, and participated in the study regardless of whether or not they received hearing aids following consultation. At least one consultation was required so that participants could report their perceptions of autonomy support for the duration of rehabilitation. Participants who had completed the Treatment Self-Regulation Questionnaire (TSRQ) prior to consultation, but who did not attend a consultation with a practitioner, were excluded, as they could not provide Health
Care Climate Questionnaire (HCCQ) data. A total of 291 potential participants consented to the study, of whom 38 had previous hearing aid experience and were excluded. A further 20 were excluded because they did not consult with a practitioner, and 17 more were lost to follow-up (12 did not respond to repeat requests to complete the HCCQ, 4 had moved address and 1 refused further contact). The final sample consisted of 216 participants (109 female, 107 male) aged between 40 and 95 years (mean 69.6 years, SD 10.47). Among this group, 125 participants adopted hearing aids and 91 did not. Table 4.1 shows participant characteristics. Participants were from all states and territories of Australia, and 96% were recruited from a large, Government-owned, multi-site audiology service.
Table 4.1: Summary data showing participant characteristics as means and standard deviations (or counts and percentages) for the total sample, and classified as hearing aid adopters and non-adopters, along with statistical test results comparing adopters and non-adopters

<table>
<thead>
<tr>
<th>Participant characteristic</th>
<th>Sample (N = 216)</th>
<th>Adopters (N = 125)</th>
<th>Non-adopters (N = 91)</th>
<th>n</th>
<th>t/χ² value</th>
<th>p value (adoption vs. non-adoption)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous motivation (TSRQ)</td>
<td>5.55 (1.50)</td>
<td>5.93 (1.23)</td>
<td>5.00 (1.68)</td>
<td>210</td>
<td>-4.65¹</td>
<td>&lt; 0.001 (0.02)</td>
</tr>
<tr>
<td>Controlled motivation (TSRQ)</td>
<td>2.75 (1.66)</td>
<td>2.89 (1.76)</td>
<td>2.52 (1.46)</td>
<td>198</td>
<td>-1.53¹</td>
<td>0.13</td>
</tr>
<tr>
<td>Autonomy support (HCCQ)</td>
<td>6.01 (1.04)</td>
<td>6.09 (1.00)</td>
<td>5.89 (1.09)</td>
<td>150</td>
<td>-1.12¹</td>
<td>0.26</td>
</tr>
<tr>
<td>Age in Years</td>
<td>69.62 (10.47)</td>
<td>69.58 (10.59)</td>
<td>69.69 (10.36)</td>
<td>210</td>
<td>0.08¹</td>
<td>0.94</td>
</tr>
<tr>
<td>4FAHL better ear</td>
<td>31.16 (12.68)</td>
<td>35.03 (10.97)</td>
<td>25.37 (12.92)</td>
<td>182</td>
<td>-5.42¹</td>
<td>&lt; 0.001 (&lt;0.001)</td>
</tr>
<tr>
<td>Desire for hearing aids (WANT)</td>
<td>2.80 (1.22)</td>
<td>3.1 (1.21)</td>
<td>2.37 (1.11)</td>
<td>196</td>
<td>-4.26¹</td>
<td>&lt; 0.001 (0.83)</td>
</tr>
<tr>
<td>Perceived difficulty (WANT)</td>
<td>2.79 (0.96)</td>
<td>3.11 (0.90)</td>
<td>2.36 (0.86)</td>
<td>206</td>
<td>-6.04¹</td>
<td>&lt; 0.001 (0.01)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.81²</td>
<td>0.051</td>
</tr>
<tr>
<td>Female</td>
<td>109 (50.5)</td>
<td>56 (44.8)</td>
<td>53 (58.24)</td>
<td>216</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>107 (49.5)</td>
<td>69 (55.2)</td>
<td>38 (41.76)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source of referral</td>
<td></td>
<td></td>
<td></td>
<td>211</td>
<td>1.46²</td>
<td>0.69</td>
</tr>
<tr>
<td>Self</td>
<td>130 (61.61)</td>
<td>74 (61.67)</td>
<td>56 (61.54)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spouse or family member</td>
<td>46 (21.8)</td>
<td>28 (23.33)</td>
<td>18 (19.78)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General practitioner</td>
<td>18 (8.53)</td>
<td>8 (6.67)</td>
<td>10 (10.99)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>17 (8.06)</td>
<td>10 (8.33)</td>
<td>7 (7.69)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ t values shown (continuous variables)
² Chi squared values shown (categorical variables)
* Univariate p values shown, and, where applicable, multivariate p values shown in parentheses

The n values for independent variables vary due to missing data
4.3.2 Measures

Three self-report questionnaires from the SDT Health Care package (http://www.selfdeterminationtheory.org/questionnaires) were used: the Treatment Self-Regulation Questionnaire (TSRQ; Williams et al., 1996); the Health Care Climate Questionnaire (HCCQ; Williams et al., 1996); and the Perceived Competence Scale (PCS; Williams et al., 1998a). For some questionnaire items, words associated with medical treatment, such as medication or diabetes, were substituted with hearing, hearing aids or communication where appropriate. Additional questionnaires measuring desire for hearing aids, perceived hearing difficulty and hearing aid fitting outcomes were included. Participants were asked to provide their age, gender and referral source (self / spouse or family member / doctor / other). Participant audiograms were also obtained where possible.

4.3.2.1 Treatment Self-Regulation Questionnaire

The Treatment Self-Regulation Questionnaire (TSRQ; Williams et al., 1996) was used to assess motivation. It consists of 13 items that represent possible reasons for considering hearing aid adoption. Respondents are asked to rate how true each item was to them on a 7-point Likert scale that range from 1 (not at all true) to 7 (very true). The psychometric properties of a TSRQ adapted for hearing help-seekers were reported in Ridgway et al. (2015). The two-factor TSRQ solution derived by Ridgway et al. (2015) comprised four autonomous motivation items and nine controlled motivation items. Examples of autonomous items were “I’ve carefully thought about hearing aids and believe that getting them is the right thing to do,” and “I personally believe that doing something about my hearing will improve my quality of life.” Examples of controlled items were “I would be ashamed of myself if I didn’t” and “I think other people would be upset with me if I didn’t.” Autonomous and controlled motivation scores were calculated by averaging the responses to the items in each subscale.

4.3.2.2 Health Care Climate Questionnaire

The Health Care Climate Questionnaire (HCCQ; Williams et al., 1996) was used to measure perceptions of practitioner autonomy support. The 15-item HCCQ has a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), except for item 13, which is reverse coded. Items measure perceived support for autonomy (e.g., “My practitioner has provided me choices and options”), competence (e.g., “My practitioner has made sure I really understand hearing loss and what I need to do”) and relatedness (e.g., “I feel trust in my practitioner”). The HCCQ scores were calculated by averaging individual
item scores after item 13 was reversed. Thus, higher HCCQ scores indicated higher perceived autonomy support. Principal Component Analysis of the HCCQ in this study yielded a one-factor, 15-item solution (eigenvalue 10.54), consistent with previous research (Williams, Rodin, Ryan, Grolnick, & Deci, 1998b; Markland & Tobin, 2010). All factor loadings were between .67 and .92 and the Cronbach alpha reliability coefficient was .97. The one-factor structure suggested autonomy, competence and relatedness measured by the HCCQ were interrelated and can be distilled into a single autonomy support variable (Markland & Tobin, 2010).

4.3.2.3 Wishes and Needs Tool

The Wishes and Needs Tool (WANT; Dillon, 2012) was designed to measure desire for hearing aids and perceived hearing difficulty. The WANT has a 5-point Likert scale, and consists of two items: “How strongly do you want to get hearing aids” (1 Don’t want them; 2 Slightly want them; 3 Want moderately; 4 Want them quite a lot; 5 Want them very much), and “Overall, how much difficulty do you have hearing (without hearing aids)?” (1 No difficulty; 2 Slight difficulty; 3 Moderate difficulty; 4 Quite a lot of difficulty; 5 Very much difficulty). Higher scores on the two WANT items indicate greater desire for hearing aids and greater perceived hearing difficulty respectively. The WANT was originally included in our research because of its use in the Australian Government Hearing Services Program as a tool to evaluate motivation.

4.3.2.4 Perceived Competence Scale

The Perceived Competence Scale (PCS; Williams et al., 1998a) is a 4-item instrument that measures feelings of competence for the applicable health care domain, and was modified to encompass hearing aid use (e.g. ‘I feel confident in my ability to cope with wearing hearing aid/s’). The PCS has a 7-point Likert scale ranging from 1 (not at all true) to 7 (very true). Individual items were averaged to obtain an overall score, with higher PCS scores indicating higher perceived competence for hearing aids. The PCS can be administered alongside domain-specific outcomes to allow links between treatment outcome and motivational influences (Williams, McGregor, Zeldman, Freedman, & Deci, 2004). Previous health research has supported the internal consistency and construct

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6 The Australian Government Hearing Services Program subsidises the provision of hearing services to eligible Australians. More information: http://www.hearingservices.gov.au
validity of a single-factor PCS, and Cronbach’s alpha has been consistently above 0.84 (Williams et al., 1998a; Fortier, Sweet, O’Sullivan, & Williams, 2007). The current study supported a single-factor structure with an eigenvalue of 3.17. All factor loadings were between 0.76 and 0.96 and the Cronbach’s alpha was 0.91.

### 4.3.2.5 International Outcomes Inventory for Hearing Aids

The International Outcome Inventory for Hearing Aids (IOI-HA; Cox & Alexander, 2002) was used to measure domains of hearing aid fitting outcome. This inventory has seven items that cover 1. use, 2. benefit, 3. residual activity limitation, 4. satisfaction, 5. residual participation restriction, 6. impact on others and 7. quality of life. The IOI-HA has a 5-point scale with response options that vary for each item, and is scored by averaging individual item scores, with higher scores indicating better outcome. The IOI-HA is an internationally recognised questionnaire of hearing aid fitting outcomes, and IOI-HA data have been widely reported (Hickson, Clutterbuck, & Khan, 2010). Factor analysis of the IOI-HA has usually reported a two-factor structure (Cox & Alexander, 2002; Öberg, Lunner, & Andersson, 2007) with Cronbach’s alpha above 0.78 (Öberg et al., 2007). Items 1, 2, 4 and 7 form a “personal dimensions” factor, and items 3, 5 and 6 form an “environmental dimensions” factor. This grouping contrasts with the SDT behaviour change model that distinguishes between behavioural outcomes such as not smoking or healthier eating, and psychosocial outcomes such as less depression or improved quality of life (Ng et al., 2012), both of which are regarded as vital to optimising psychological need satisfaction and optimal health outcomes. Therefore, this study did not perform factor analysis of the IOI-HA and investigated each of the 7 outcome domains separately.

### 4.3.3 Procedures

Ethical clearance for this study was granted by the University of Queensland Behavioural and Social Sciences Ethical Review Committee, which complied with the Australian Government National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007).
Figure 4.1 outlines participant flow through the 4 to 6 month study period. A total of 216 participants provided consent and completed the baseline questionnaires (T1), consulted with a practitioner at their chosen audiology clinic, and decided to adopt or not adopt hearing aids. A total of 150 responses were received to the follow-up questionnaires at T2 (response rate 69.4%).

All participants received subsidised hearing services through the Australian Government Hearing Services Program. If suitable, hearing aids of various styles with the following features were available free to participants: automatic directional microphone (for behind-the-ear hearing aids), feedback cancellation, adaptive noise reduction, multi-channel compression, multi-memory, and telecoil. Participants could also access hearing aids with additional features by contributing towards a “top-up” cost. The specific hearing aid type or style fitted to adopters was not sought. Eighty-two percent of participants were fitted bilaterally.
4.3.4 Data Analysis

Data were analysed using Stata version 13 software (StataCorp, College Station, USA). Prior to the main analyses, participant characteristics were described with means and standard deviations for continuous variables and count and percentage for categorical variables. Missing data were treated as missing and not imputed. Associations between autonomy support and hearing aid adoption were explored using $t$-tests, $\chi^2$ tests and multivariate logistic regression. Independent variables were autonomy support (HCCQ scores), autonomous and controlled motivation (TSRQ scores), desire for hearing aids and perceived difficulty (WANT scores), age, gender, referral source, and four-frequency average hearing level in the better ear (4FAHL$^7$; measured at 500, 1000, 2000 and 4000Hz).

Associations between autonomy support, autonomous motivation and hearing aid fitting outcomes were investigated with pairwise correlations of the aforementioned independent variables and with multiple linear regression. Outcome variables were perceived competence (PCS scores) and the seven IOI-HA items (i.e., IOI-HA scores for use, benefit, residual activity limitation, satisfaction, residual participation restriction, impact on others and quality of life). Postestimation tests were performed to check the fit of the regression models.

4.4 Results

4.4.1 Autonomy support and hearing aid adoption

To explore univariate associations between autonomy support and hearing aid adoption versus non-adoption, characteristics of adopters and non-adopters were compared using $t$-tests for continuous variables and $\chi^2$ tests for categorical variables. The $t$-test and $\chi^2$ results comparing autonomy support and other independent variables for the 125 adopters and 91 non-adopters are shown in Table 4.1. Multivariate regression showed autonomous motivation, perceived difficulty and 4FAHL were significantly associated with hearing aid adoption (see Table 4.1). Autonomy support was not significant at the univariate level, which means that autonomy support appears to be unrelated to the adoption decision. Because the inclusion of autonomy support in the regression model did not change the pattern of associations between independent variables and hearing aid

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$^7$ The 4FAHL was adopted in this study to be consistent with World Health Organisation Grades of hearing impairment. See http://www.who.int/pbd/deafness/hearing_impairment_grades/en/ for more information.
adoption reported in Ridgway et al. (2015), the multivariate logistic regression analysis was discontinued.

4.4.2 Autonomous motivation, autonomy support and outcomes

To explore associations between autonomy support, autonomous motivation and hearing aid fitting outcomes, data for the 125 adopters (see Table 4.2) were subjected to a series of multiple linear regression analyses to explore associations between autonomous motivation, autonomy support and outcomes in that group. Pairwise correlations among sociodemographic, audiometric and motivation variables were calculated for adopters (Table 4.3), and revealed a relationship between autonomous motivation and autonomy support ($r = 0.27, p = 0.01$). A high correlation coefficient may indicate collinearity is present, which could mean the variables need to be modeled in separate regression equations. Therefore, variables were tested for collinearity using Variance Inflation Factors (VIF). All VIFs ranged between 1.01 and 1.70, which indicated low collinearity. Consequently, all variables, including autonomous motivation and autonomy support, were retained for the regression analyses, and modeled together rather than separately. In all, eight regression models were formed. Autonomous motivation, controlled motivation, autonomy support, gender, referral source, 4FAHL, age, desire for hearing aids and perceived difficulty were tested against perceived competence (PCS scores) and each of the seven IOI-HA outcomes. Each variable listed in Table 4.3 was screened for inclusion in its respective model with simple regression, then added into the multiple model if $p < 0.1$. Simple regression showed referral source and 4FAHL were not associated with any outcome and were dropped from the final analyses. Two of the eight outcomes (participation restriction and impact on others) were also dropped, as neither was significantly associated with any variable.
Table 4.2: Descriptive data of Perceived Competence Scale (PCS) and International Outcomes Inventory for Hearing Aids (IOI-HA) scores for hearing aid adopters

<table>
<thead>
<tr>
<th>Participant characteristic</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Competence (n = 87)</td>
<td>5.96</td>
<td>1.36</td>
<td>1 - 7</td>
</tr>
<tr>
<td>Hearing Aid Use (n = 84)</td>
<td>3.65</td>
<td>1.19</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Hearing Aid Benefit (n = 82)</td>
<td>3.84</td>
<td>1.00</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Residual Activity Limitation (n = 81)</td>
<td>3.95</td>
<td>0.89</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Hearing Aid Satisfaction (n = 82)</td>
<td>4.07</td>
<td>1.05</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Residual Participation Restriction (n = 80)</td>
<td>4.1</td>
<td>0.91</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Impact on Others (n = 80)</td>
<td>4.34</td>
<td>0.90</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Quality of Life (n = 83)</td>
<td>3.81</td>
<td>0.96</td>
<td>1 - 5</td>
</tr>
</tbody>
</table>

SD = Standard Deviation
Table 4.3: Matrix for pairwise correlation coefficients ($r$) showing linear relationships among independent variables for hearing aid adopters ($N = 125$)

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Autonomous motivation</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Controlled motivation</td>
<td>.34***</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Autonomy Support</td>
<td>.27*</td>
<td>.20</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Gender</td>
<td>.00</td>
<td>.17</td>
<td>-.05</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Referral Source</td>
<td>-.09</td>
<td>.14</td>
<td>-.19</td>
<td>-.01</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 4FAHL better ear</td>
<td>.08</td>
<td>.20*</td>
<td>-.06</td>
<td>.18</td>
<td>.17</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Age</td>
<td>-.22*</td>
<td>.00</td>
<td>-.08</td>
<td>-.11</td>
<td>.05</td>
<td>.32***</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>8. Desire for hearing aids</td>
<td>.45***</td>
<td>.29**</td>
<td>.19</td>
<td>.07</td>
<td>-.04</td>
<td>.18</td>
<td>-.20*</td>
<td>-</td>
</tr>
<tr>
<td>9. Perceived difficulty</td>
<td>.46***</td>
<td>.25**</td>
<td>.22*</td>
<td>.09</td>
<td>-.02</td>
<td>.18</td>
<td>-.37***</td>
<td>.55***</td>
</tr>
</tbody>
</table>

*p < 0.05.  
** p < 0.01.  
*** p < 0.001.
The remaining six multiple regression models were checked for heteroskedasticity using the Breusch-Pagan test (Breusch & Pagan, 1979). The presence of heteroskedasticity can invalidate linear regression models by incorrectly assuming equal variance and normal distribution of statistical errors. If heteroskedasticity is detected, regression may be run using robust standard errors to correct for misspecification (White, 1980). Three heteroskedastic models (perceived competence, activity limitation, satisfaction) were run with the robust test. The normality of the distribution of residuals was examined using quantile-quantile plots (Wilk & Gnanadesikan, 1968). All distributions were essentially linear which suggested normality was a reasonable assumption. For each analysis, outliers from the dataset were identified using the Studentised residual (Cook & Weisberg, 1982) with absolute values ≥ 2.58 removed. Three outliers were removed from the activity limitation model, two outliers were removed from each of the perceived competence, use, benefit and satisfaction models, and no outliers were identified for the quality of life model. Table 4.4 shows the regression models of factors associated with each outcome. The results of each analysis are described in turn below.
Table 4.4: Regression models of factors associated with each outcome of interest

<table>
<thead>
<tr>
<th>PERCEIVED COMPETENCE (PCS)*</th>
<th>USE (IOI-HA)</th>
<th>BENEFIT (IOI-HA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R² = 0.3712</td>
<td>R² = 0.3194 [Adj R² = 0.2898]</td>
<td>R² = 0.4288 [Adj R² = 0.3849]</td>
</tr>
<tr>
<td>F (6, 69) = 5.89, p &lt; 0.001</td>
<td>F (3, 69) = 10.79, p &lt; 0.001</td>
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<td>0.880</td>
<td>ns</td>
<td>0.120</td>
<td>0.094</td>
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<td>0.094</td>
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<td>&lt;0.001*</td>
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<td>0.113</td>
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<td>0.166</td>
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<td>0.743</td>
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<td>0.107</td>
<td>0.823</td>
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<td>0.993</td>
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<td>0.155</td>
<td>0.001*</td>
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<th>SATISFACTION (IOI-HA)*</th>
<th>QUALITY OF LIFE (IOI-HA)*</th>
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<td>R² = 0.4981</td>
<td>R² = 0.2953 [Adj R² = 0.2322]</td>
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<td>F (3, 73) = 4.11, p = 0.01</td>
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<td>F (6, 67) = 4.68, p &lt; 0.001</td>
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<td>0.221</td>
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a = Robust Estimates

* p significant at the 0.05 level

SE = Standard Error

ns = not significant at univariate level

N.B. Referral Source and 4FAHL variables not shown as not associated with any outcome. Participation Restriction and Impact on Others models not shown, as these produced no significant associations with simple regression.
4.4.2.1 Perceived Competence

Multiple regression revealed 37.12% of the variability in PCS scores was explained by autonomous motivation, controlled motivation, autonomy support, age, desire for hearing aids and perceived difficulty ($R^2 = 0.37, F (6, 69) = 5.89, p < 0.001$). When examining the predictive ability of individual variables, autonomy support was the only variable significantly associated with perceived competence ($\beta = .58, p < 0.001$): for every 1-unit increase in autonomy support there was a .58-unit increase in perceived competence after adjusting for other variables in the model.

4.4.2.2 Use

The regression model for hearing aid use (IOI-HA item 1) showed age, desire for hearing aids and perceived difficulty explained 28.98% of variance in scores (Adjusted $R^2 = 0.29, F (3, 69) = 10.79, p < 0.001$). Perceived difficulty ($\beta = .42, p = 0.001$) and younger age ($\beta = -.25, p = 0.02$) were the two variables significantly associated with increased use. Each 1-point increase in use score indicated a .42-point increase in perceived difficulty score and a reduction in age of .25 years.

4.4.2.3 Benefit

For the hearing aid benefit (IOI-HA item 2) model, 38.49% of variance in scores was explained by autonomous motivation, autonomy support, age, desire for hearing aids and perceived difficulty (Adjusted $R^2 = 0.38, F (5, 65) = 9.76, p < 0.001$). The two significant individual variables associated with increased benefit were perceived difficulty ($\beta = .33, p = 0.009$) and younger age ($\beta = -.28, p = 0.007$). For each 1-unit increase in benefit there was a .33-unit increase in perceived difficulty score and a reduction in age of .28 years.

4.4.2.4 Activity Limitation

Regression indicated 9.87% of variance in activity limitation scores (IOI-HA item 3) was explained by autonomy support, gender and age ($R^2 = 0.10, F (3, 73) = 4.11, p = 0.010$). The only variable significantly associated with reduced activity limitation was autonomy support ($\beta = .22, p = 0.006$). There was a .22-unit increase in autonomy support for each 1-unit increase in reduced activity limitation.
4.4.2.5 Satisfaction
For the hearing aid satisfaction (IOI-HA item 4) model, autonomous motivation, autonomy support, age, desire for hearing aids and perceived difficulty explained nearly half (49.81%) the variability in hearing aid satisfaction scores ($R^2 = 0.50, F (5, 64) = 13.71, p < 0.001$). The two variables significantly associated with hearing aid satisfaction were autonomous motivation ($\beta = .32, p = 0.025$) and autonomy support ($\beta = .48, p < 0.001$). For every 1-point increase in satisfaction, autonomous motivation increased by .32 points and autonomy support increased by .48 points.

4.4.2.6 Quality of Life
The quality of life (IOI-HA item 7) model revealed autonomous motivation, controlled motivation, autonomy support, age, desire for hearing aids and perceived difficulty explained 23.22% of variance in scores (Adjusted $R^2 = 0.23, F (6, 67) = 4.68, p < 0.001$). No individual variable showed significant association with quality of life.

In summary, autonomy support was not associated with the decision to adopt or not adopt hearing aids. However, hearing aid adopters who perceived greater autonomy support were significantly more likely to report higher perceived competence, reduced activity limitation and increased satisfaction. Autonomous motivation was positively associated with satisfaction.

4.5 Discussion
The current study investigated associations between autonomy support and hearing aid adoption, and between autonomous motivation, autonomy support and eight outcomes of hearing aid fitting, from an SDT perspective. As with our previous study (Ridgway et al., 2015), autonomous motivation was associated with increased hearing aid adoption. Assessing autonomous motivation could therefore help identify suitable candidates for hearing aid adoption. No association was found between autonomy support and hearing aid adoption. However, autonomy support was significantly associated with increased perceived competence, reduced activity limitation and increased hearing aid satisfaction. Autonomous motivation was positively associated with hearing aid satisfaction.

That no association arose between autonomy support and hearing aid adoption should be considered alongside our previous results (Ridgway et al., 2015), which framed hearing aid adoption as initiation of a particular new, internalised health-related behaviour.
that stemmed from autonomous motivation. Unlike other SDT health studies that reported positive associations between autonomy support and changes in autonomous motivation in health-related behaviours for chronic conditions such as diabetes or obesity (see Ng et al., 2012), autonomy support did not influence hearing aid adoption in this study. This could be because autonomy supportive environments that offer options other than hearing aid fitting, and minimise pressure to adopt hearing aids, might reduce the theoretical association between autonomy support and hearing aid adoption. Hearing aid fitting is not the only new health behaviour that people with hearing impairment might adopt in supportive hearing healthcare environments. Laplante-Lévesque et al. (2011) offered people the choice of hearing aids, individual or group programs and no intervention within a shared decision-making paradigm. In the Laplante-Lévesque et al. (2011) sample, 54.0% chose to be fitted with hearing aids, 24.4% individual or group programs and 21.6% no intervention. In the present study, we have focused on the health behaviour of hearing aid adoption and do not know whether other forms of intervention were offered and, if they were, what outcomes were obtained. However, in Australia, intervention options other than hearing aid fitting are not commonplace (Grenness, Hickson, Laplante-Lévesque, Meyer, & Davidson, 2015). Should a variety of intervention options have been available, autonomy support for the intervention decision itself, rather than adoption of hearing aids, may explain the similar autonomy support scores for adopters and non-adopters. Further investigation of the relevance of these findings to behaviour change in hearing rehabilitation is warranted.

For hearing aid fitting outcomes, autonomy support was positively associated with perceived competence, reduced activity limitation and satisfaction. That is, adopters who perceived their practitioners to be more autonomy supportive were more likely to feel confident and capable with hearing aids, report less difficulty with hearing aids, and report that getting them was worth the trouble. The inverse was also true for adopters who perceived less autonomy support. Hickson et al. (2014) reported that two key contributors to hearing aid success were greater confidence when handling advanced aspects of hearing aids and positive attitude. Alongside this finding, our study’s results highlight similarities between the constructs of perceived competence and self-efficacy and their importance to hearing aid success. Furthermore, SDT suggests high levels of perceived competence do not motivate behaviour change; rather, autonomy supportive environments that facilitate perceived competence are required (Markland, Ryan, Tobin, & Rollnick, 2005). The positive association between autonomy support and perceived competence in
this study therefore supports the SDT model by acknowledging the practitioner’s role in enabling hearing aid competence for some participants.

Autonomy support, however, was not associated with the hearing aid outcomes: use, residual participation restriction, impact on others, benefit or quality of life, although associations with increased benefit ($p = 0.07$) and improved quality of life ($p = 0.11$) neared significance. In the broader SDT health literature, autonomy support has provided small to moderate positive effects across a range of physical and mental health outcomes (Ng et al., 2012). For chronic health conditions, results have varied. For example, Hurkmans et al. (2010), in a cross-sectional study of 213 participants with rheumatoid arthritis who had attended outpatient clinics, reported participants’ perceptions of autonomy support from rheumatologists did not predict increased physical activity. Conversely, in a large-scale study of patients receiving health care for diabetes, Williams et al. (2009) reported that autonomy support was positively associated with autonomous self-management of medication, which in turn was positively associated with perceived competence for diabetes self-management. Differences in populations investigated, the time at which autonomy support was measured and whether or not autonomy support targeted single or multiple practitioners may account for some portion of the mixed findings. Moreover, sociodemographic factors that contributed to outcomes, such as age, desire for hearing aids and perceived difficulty, may have reduced the strength of contribution of motivation variables to outcomes in this study. Outcomes measured four to six months after hearing aid adoption may not represent long-term maintenance of behaviour change, and may affect comparison with long-term outcomes studied in other chronic health conditions (e.g., Williams et al., 2009). This is acknowledged as a potential limitation of this study. Nevertheless, on balance, our results support the value of SDT to explore relations between autonomy support and several dimensions of hearing aid fitting outcome. Results from a longitudinal study of a larger sample of hearing aid owners may clarify how autonomy support might influence perceived competence, hearing aid satisfaction and reduced activity limitations over time, and might explain how autonomy support affects other outcomes such as hearing aid use, hearing aid benefit and quality of life in the long term.

Our findings also provide some evidence for client-centredness in hearing health care because autonomy support is measured from the client’s perspective. Autonomy supportive environments have much in common with the client-centred approach to health care, wherein practitioners support acquisition of autonomy, competence and relatedness
by encouraging client perspectives and initiatives, providing clear rationales for change, supporting choice and minimising pressure (Williams et al., 2009; Markland & Tobin, 2010). Both clients and practitioners value client-centredness in hearing health care, yet in practice it is not always observed (Grenness, Hickson, Laplante-Lévesque, & Davidson 2014; Preminger, Oxenbøll, Barnett, Jensen, & Laplante-Lévesque, 2015). With this in mind, our finding that autonomy support was not associated with hearing aid adoption, yet was associated with several outcomes, suggests client-centredness in hearing health care may be less evident when decisions to adopt or not adopt hearing aids are made, and more evident when support is provided for psychosocial factors that facilitate hearing aid competence, activity and satisfaction. The divergence in findings between hearing aid adoption and outcomes also highlights differences in the processes that underpin health behaviours such as adoption, and psychosocial outcomes such as hearing aid satisfaction. Tailored interventions that explore clients’ perspectives, experiences and preferences can help practitioners acknowledge and address differences in how clients make decisions such as hearing aid adoption, and help clarify what characteristics facilitate satisfaction with hearing aids. Further research to link autonomy support with client-practitioner interactions would be beneficial, not just for hearing aid adopters, but also for non-adopters, whose outcomes were not explored in this study. Such research could also help identify whether the number of consultations helps strengthen the client-practitioner relationship over time, which may then influence perceptions of autonomy support.

Interestingly, hearing aid satisfaction was the only outcome positively associated with autonomous motivation, such that adopters with higher autonomous motivation were more likely to report that getting hearing aids was worth the trouble. This result provides only limited support for the SDT model. Most SDT health studies have reported direct associations between autonomous motivation and a variety of improved physical and mental health outcomes across disciplines, although effect sizes were usually small (Ng et al. 2012). A possible explanation for the lack of association between autonomous motivation and all but one outcome could be that the cohort of hearing aid adopters was highly autonomously motivated initially. A sample mean TSRQ score of 5.94 on a scale of 1 to 7 (Ridgway et al., 2015) could suggest there were ceiling effects with the data. Indeed, Mildestvedt, Meland and Eide (2007) found that among highly motivated groups of coronary heart disease patients (mean TSRQ score of 6.2), autonomous motivation had marginal effects on outcomes of dietary changes and smoking cessation.

A more likely explanation for the limited relationships between autonomous
motivation and outcomes may relate to the time point at which autonomous motivation was assessed. The current study measured autonomous motivation before participants consulted with their practitioners, thus before autonomy support was assessed but not afterwards. This contrasts with other SDT health studies, which have measured autonomous motivation before and following collection of autonomy support data (Ng et al., 2012). Therefore, a causal relationship between autonomy support and autonomous motivation cannot be inferred in this study because any possible effect on autonomous motivation by the practitioner was not measured. To ascertain interrelationships among SDT variables and hearing health care, a larger study that tests pathways among autonomous motivation, autonomy support, perceived competence and hearing health decisions and outcomes would be of benefit.

4.6 Conclusion

In summary, the SDT model was shown to be potentially useful for understanding how hearing health behaviour is internalised and maintained over time. This study found that autonomy support – a core component of the SDT model of health behaviour – was not associated with hearing aid adoption. This implies that client engagement with hearing health behaviour (i.e., hearing aid adoption) was not influenced by the practitioner. Autonomy support was, however, positively associated with perceived competence, reduced activity limitation and increased satisfaction in hearing aid adopters. Autonomous motivation was only associated with one outcome, hearing aid satisfaction. Autonomous supportive hearing health care settings may therefore help hearing aid adopters maintain internalised skills for change. To gain further insight into the ways that SDT can be applied in the clinical setting, research to explore interrelations among components of SDT, and the nature of how people engage with hearing health behaviours from a SDT perspective, is warranted.
4.7 References


Audiology, 26, 36–50.


Mildestvedt, T., Meland, E., & Eide, G. E. (2007). No difference in lifestyle changes by


Chapter 5 – What factors are associated with autonomous and controlled motivation for hearing help-seekers?

5.1 Abstract

**Background:** Hearing impairment is prevalent in older adults. Motivation is important in people’s choice to seek help for their hearing and whether to adopt or not adopt hearing aids.

**Purpose:** To investigate associations between sociodemographic and audiometric characteristics and autonomous and controlled motivation among a sample of hearing help-seekers.

**Research Design:** A quantitative approach was taken for this cross-sectional cohort study.

**Study Sample:** A total of 253 adult first-time hearing help-seekers were recruited to the study.

**Data Collection and Analysis:** Participants provided sociodemographic information and completed questionnaires adapted from self-determination theory (SDT; Deci & Ryan, 1985) that measured autonomous motivation (motivation that originates from within the self and is aligned with personal values and beliefs) and controlled motivation (motivation that stems from external pressures such as rewards or punishment, or conflicted inner feelings such as guilt or shame).

**Results:** Participants with higher autonomous motivation scores were younger, wanted hearing aids more and reported greater hearing difficulty in everyday life than those with lower scores. Participants with higher controlled motivation scores were more often referred to the service by others and wanted hearing aids more than those with lower controlled motivation scores. Controlled motivation scores were not associated with perceptions of hearing difficulty in everyday life.

**Conclusion:** Relationships among motivation and sociodemographic factors highlight the importance of characterizing autonomous and controlled motivation in first time hearing help-seekers. Attention to personal characteristics in order to understand motivational processes involved in rehabilitation decisions such as hearing aid adoption may aid in consultations.
5.2 Introduction

Hearing impairment is a chronic health condition that becomes more prevalent with age. Chia et al. (2007) identified that 36.3% of 60–69 year olds and 64.6% of 70–79 year olds had hearing loss greater than 25dB HL in at least one ear (pure tone average of the frequencies 500, 1000, 2000 and 4000 Hz). Hearing impairment may be associated with reduced health-related quality of life (Chia et al., 2007) and poor psychosocial outcomes such as depression (Kramer, Kapteyn, Kuik, & Deeg, 2002), yet people sometimes wait years after noticing their hearing loss before seeking help for the first time (Davis, Smith, Stephens, & Gianopoulos, 2007; Kochkin, 2009). A variety of non-audiological factors might be behind a person’s decision to delay or to seek help, and these factors have been researched elsewhere (Knudsen, Öberg, Nielsen, Naylor, & Kramer, 2010; Meyer, Hickson, Lovelock, Lampert, & Khan, 2014). Motivation is recognized as an important reason behind people’s decision to engage with health services, both in audiology (Laplante-Lévesque, Hickson, & Worrall, 2013; Ridgway, Hickson, & Lind, 2015; 2016) and in the broader health arena (Ryan, Patrick, Deci, & Williams, 2008; Ng et al., 2012).

Our previous studies (Ridgway et al., 2015; 2016) examined associations between motivational factors extrapolated from self-determination theory (SDT; Deci & Ryan, 1985), and hearing aid adoption and hearing aid fitting outcomes. Self-determination theory is a theory of motivation that classifies different forms of motivation along a continuum of internalization (Ryan & Connell, 1989; Ridgway, Hickson, & Lind, 2013). Internalization is regarded as the process of adoption of values and influences as one’s own (Ryan & Connell, 1989; Deci & Ryan, 2000). Autonomous motivation originates from within the self and is aligned with personal goals, values or beliefs. Controlled motivation, by contrast, stems from external pressures such as rewards or punishment, or conflicted inner feelings such as guilt or shame. Autonomously motivated behaviors and actions are more internalized than behaviors that stem from controlled forms of motivation, and SDT health research has consistently reported greater engagement in and maintenance of health behavior when clients are autonomously motivated (Ng et al., 2012). Adding to this work, Ridgway et al. (2015) explored autonomous and controlled motivation of a sample of 253 first-time hearing help-seekers using an adapted Treatment Self-Regulation Questionnaire (TSRQ; Williams, Grow, Freedman, Ryan, & Deci, 1996), a SDT measure of autonomous and controlled motivation. The results indicated that autonomous and controlled motivation
were independent of each other, in that autonomous motivation was associated with increased hearing aid adoption while controlled motivation was not. This finding could suggest a two-factor model of motivation that recognized multiple motives associated with hearing aid adoption.

A growing body of audiology research has applied models of health behaviour such as the health belief model (Rosenstock, 1966) and the transtheoretical stages of change model (Prochaska, Di Clemente, & Norcross, 1992) to understand how behavioral constructs and clinical processes influence actions such as hearing aid adoption and rehabilitation outcomes (e.g., Laplante-Lévesque et al., 2013; Hickson, Meyer, Lovelock, Lampert, & Khan, 2014; Saunders, Frederick, Silverman, Neilsen, & Laplante-Lévesque, 2016; Ekberg, Grenness, & Hickson, 2016). The health belief model provides a framework for conceptualizing health-related attitudes and beliefs (Janz & Becker, 1984). This model encompasses six constructs to explain and predict health behavior: 1) perceived severity, 2) perceived susceptibility, 3) perceived benefits, 4) perceived barriers, 5) self-efficacy, and 6) cues to action. The transtheoretical model describes the processes for changing health behaviour (Prochaska et al., 1992). Five stages through which people progress when attempting behavior change are depicted: 1) precontemplation, 2) contemplation, 3) preparation, 4) action, and 5) maintenance. People are hypothesized to move through stages sequentially, although may revert to earlier stages during the behavior change process. Together, both models may therefore help practitioners understand and predict hearing health behaviour by identifying characteristics that contribute to behavior change.

The health belief model, transtheoretical model and SDT all recognize the importance of understanding determinants of behavior for an intervention to be effective. However, SDT is the only model that explains behavior by contrasting forms of motivation, and which emphasizes autonomy as central to engagement in activity and personal well-being (Ryan & Deci, 2000; Ryan & Deci, 2006; Deci & Ryan, 2008; Ryan, Lynch, Vansteenkiste, & Deci, 2011). Further, SDT argues that client-centred practitioners can facilitate autonomous motivation with clients by supporting their psychological needs for autonomy, competence and relatedness (Ryan et al., 2008). Autonomy is experienced when a person’s actions are aligned with their personal values and beliefs. A person experiences competence when feeling confident and capable of action. Relatedness is experienced when a person feels connected with others. Clinical support for these three psychological needs is known as autonomy support (Williams, Frankel, Campbell, & Deci, 2000). In the clinic, autonomy support is a counseling approach that encourages active involvement
from clients in rehabilitation, accepts clients’ perspectives, provides a range of meaningful intervention options and minimizes pressure (Williams et al., 2000; Markland, Ryan, Tobin, & Rollnick, 2005; Patrick & Williams, 2012). Studies in a range of health care settings have linked autonomy support with increased autonomous motivation and positive health outcomes (see Ng et al., 2012, for a summary). Ridgway et al. (2016) reported that in the audiology clinic setting, autonomy support was not associated with increased hearing aid adoption, but for hearing aid adopters it was associated with improved outcomes. Specifically, these were (1) increased perceived competence with hearing aids, (2) reduced activity limitations and (3) increased satisfaction with hearing aids. In summary, it seems that first-time hearing help seekers have high autonomous motivation, but do not report additional motivational support from their interaction with the clinician in relation to hearing aid adoption. However, if help-seekers adopted hearing aids, perceptions of greater practitioner support were linked with greater confidence with hearing aids, fewer difficulties with hearing aids, and a greater belief that getting hearing aids was worth the trouble.

In addition to motivational characteristics, Ridgway et al. (2015; 2016) both included sociodemographic and audiometric characteristics in their analyses. Ridgway et al. (2015) reported associations between greater self-reported hearing difficulty, higher 4-frequency average hearing loss (4FAHL, measured at 500, 1000, 2000 and 4000Hz) in the better ear, and increased hearing aid adoption. In that study, desire for hearing aids was associated with hearing aid adoption at the univariate level, but there was no significant association with adoption when autonomous motivation, gender, perceived difficulty and 4FAHL were taken into account. In Ridgway et al. (2016), younger age and greater self-reported difficulty were both associated with higher reported hearing aid use (hours per day) and greater reported benefit. Together, these results highlight the need to take into account a range of personal factors that might influence motivation for engagement with hearing services and successful hearing aid use.

Ridgway et al. (2015; 2016) examined sociodemographic and audiometric characteristics in relation to hearing aid adoption and hearing aid fitting outcomes, not motivation scores. Relationships between personal characteristics and motivation are studied here because autonomous and controlled motivation contributed to hearing aid adoption and outcomes in different ways. These differences might influence how participants engage with hearing services, and may also reveal characteristics of potential hearing aid candidates. In SDT health research, personal differences are known to
influence autonomy, which is in turn associated with health engagement, well-being and satisfaction (Ryan et al., 2008; Ng et al., 2012). In audiology research, personal factors such as self-reported hearing difficulty and degree of hearing impairment are associated with internalized decision-making and outcomes (e.g., Knudsen et al., 2010; Meyer & Hickson, 2012; Saunders et al., 2016). These two factors were included in the study because relationships between self-reported hearing difficulty and degree of hearing impairment and autonomous and controlled motivation might explain how help-seekers internalize decisions such as hearing aid adoption. Referral source was also included because in SDT health research, self-referral reflects internalized engagement in health behavior, while non-self-referral indicates external directives for engagement (Ng et al., 2012). Although SDT research has shown no gender difference in autonomy (Chirkov, Kim, Ryan, & Kaplan, 2003; Guérin, Bales, Sweet, & Fortier, 2012), associations between gender and autonomous and controlled motivation for hearing help-seekers were explored here because Ridgway et al. (2015) found a univariate relationship between being male and increased hearing aid adoption. Age was added as a variable because hearing help-seekers are typically older adults (Kochkin, 2009), and in SDT, different types of motivation are evident across the lifespan (Ryan & Deci, 2006). Older adults may exhibit reduced engagement and internalized motivation with cognitively demanding activities (Hess, 2014) and may experience less autonomy (Custers, Westerhof, Kuin, Gerritsen, & Riksen-Walraven, 2012).

Together, analyses of relationships among sociodemographic and audiometric characteristics and motivation may advise practitioners of factors that might influence motivation. Potentially, this may enable practitioners to tailor their rehabilitation so that motivational factors pertinent to rehabilitation decisions such as hearing aid adoption, and outcomes such as hearing aid use, can be identified and addressed. With this in mind, the aim of the current study is to find out if autonomous and controlled motivation of the sample of hearing help-seekers can be characterized by sociodemographic and audiometric attributes. Given the independence of autonomous and controlled motivation (Ridgway et al., 2015) the impact on the two forms of motivation of the various demographic and audiological factors will be considered separately.
5.3 Method

5.3.1 Participants

Participants were 253 adults (129 female, 124 male) aged between 40 and 95 years who had sought help for their hearing for the first time, but had not yet consulted with a practitioner. Participants had attended a promotional event or information day organized by participating audiology clinics, or had made direct contact with the clinic, and were recruited to the research if they consented to participate and responded to the study materials. The following criteria were used to determine eligibility for participation in the research: (1) no previous hearing aid experience; (2) did not reside in an aged-care facility; and (3) had sufficient English to understand and reply to the research materials. All participants were 18 years or older and there was no upper eligibility criterion for age. Participation was open to any adult who attended the event or clinic. The majority of participants (91%) were recruited from a large, Australia-wide audiology service, with the remaining 9% recruited from several other audiology clinics across different states and territories of Australia (see Ridgway et al., 2015; 2016). All participants except one received services through the Australian Government Hearing Services Program. For eligible participants, this program provided subsidized hearing services including hearing assessment, access to a range of hearing aids either partially or fully-subsidized, and if hearing aids were fitted, ongoing support, rehabilitation and maintenance. The current study used the same participant sample described in Ridgway et al. (2015) and Ridgway et al. (2016). Although all eligible participants had sought help at their chosen clinic for the first time, it is not known if participants had consulted for hearing services prior to becoming eligible. Table 5.1 shows the sample characteristics.
Table 5.1: Summary data showing participant sociodemographic, audiometric and motivation characteristics as means and standard deviations (or counts and percentages) for the total sample.

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<thead>
<tr>
<th>Characteristic</th>
<th>Sample (N=253)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years, mean (SD) (n=241)</td>
<td>69.9 (10.5)</td>
</tr>
<tr>
<td>&lt; 65, n (%)</td>
<td>61 (25.3)</td>
</tr>
<tr>
<td>65 – 74, n (%)</td>
<td>105 (43.6)</td>
</tr>
<tr>
<td>&gt; 75, n (%)</td>
<td>75 (31.1)</td>
</tr>
<tr>
<td>Gender, n (%) (n=253)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>124 (49.0)</td>
</tr>
<tr>
<td>Female</td>
<td>129 (51.0)</td>
</tr>
<tr>
<td>Source of referral, n (%) (n=246)</td>
<td></td>
</tr>
<tr>
<td>Self</td>
<td>148 (60.2)</td>
</tr>
<tr>
<td>Spouse or family member</td>
<td>56 (22.8)</td>
</tr>
<tr>
<td>General practitioner</td>
<td>20 (8.1)</td>
</tr>
<tr>
<td>Other</td>
<td>22 (8.9)</td>
</tr>
<tr>
<td>Four-frequency average hearing loss in better ear measured at 500, 1000, 2000 and 4000 Hz (dB), mean (SD) (n=183)</td>
<td>31.2 (12.7)</td>
</tr>
<tr>
<td>≤ 25dBHL, n (%)</td>
<td>58 (31.7)</td>
</tr>
<tr>
<td>26 – 40 dBHL, n (%)</td>
<td>86 (47.0)</td>
</tr>
<tr>
<td>≥ 41 dBHL, n (%)</td>
<td>39 (21.3)</td>
</tr>
<tr>
<td>Desire for hearing aids¹, n (%) (n=227)</td>
<td></td>
</tr>
<tr>
<td>Don’t want them</td>
<td>48 (21.1)</td>
</tr>
<tr>
<td>Slightly want them</td>
<td>39 (17.2)</td>
</tr>
<tr>
<td>Want moderately</td>
<td>83 (36.6)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Want them quite a lot</td>
<td></td>
</tr>
<tr>
<td>Want them very much</td>
<td></td>
</tr>
</tbody>
</table>

Self-reported difficulty\(^1\), n (%) (n=240)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>No difficulty</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Slight difficulty</td>
<td></td>
<td>84</td>
</tr>
<tr>
<td>Moderate difficulty</td>
<td></td>
<td>84</td>
</tr>
<tr>
<td>Quite a lot of difficulty</td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>Very much difficulty</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous motivation(^2), mean (SD) (n=241)</td>
<td>5.52</td>
<td>1.46</td>
</tr>
<tr>
<td>Controlled motivation(^2), mean (SD) (n=229)</td>
<td>2.83</td>
<td>1.70</td>
</tr>
</tbody>
</table>

Hearing aid adoption decision (n=237)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopted hearing aids, n (%)</td>
<td>125</td>
<td>52.7</td>
</tr>
<tr>
<td>Did not adopt hearing aids, n (%)</td>
<td>112</td>
<td>47.3</td>
</tr>
</tbody>
</table>

\(^1\) Scores are from the Wishes and Needs Tool (WANT; Dillon, 2012)

\(^2\) Scores are from the Treatment Self-Regulation Questionnaire (TSRQ; Williams et al., 1996)

\(^3\) NOTE: n values vary due to missing data

5.3.2 Self-report Measures

The following self-report questionnaires were used in the study.

5.3.2.1 Treatment Self-Regulation Questionnaire

The Treatment Self-Regulation Questionnaire (TSRQ; Williams et al., 1996) assesses autonomous motivation and controlled motivation. Items from the original TSRQ were modified by Ridgway et al. (2015), substituting words such as ‘medication’ or ‘diabetes’ with ‘hearing’ or ‘hearing aids’, so the TSRQ was applicable to hearing help-seekers. Participants were asked to consider how true particular reasons for considering hearing aids were for them, along a scale of 1 (not at all true) to 7 (very true). Questions were autonomous (“I feel personally that wearing hearing aids is the best thing for me”) or
controlled ("I would feel bad about myself if I didn’t") in nature. The 2-factor, 13-item TSRQ reported by Ridgway et al (2015) consisted of 4 autonomous items and 9 controlled items. Cronbach’s α was .91 for the autonomous motivation factor (factor loadings ranged from .69 to .84) and .83 for the controlled motivation factor (factor loadings were .54 to .82). These results indicated good scale reliability (Kline, 1999). Participant responses for items in their respective subscales were averaged to determine autonomous and controlled motivation scores.

5.3.2.2 Wishes and Needs Tool

A 2-item questionnaire called the Wishes and Needs Tool (WANT; Dillon, 2012) was included in this study to measure desire for hearing aids and self-reported difficulty. The WANT is used in the Australian Government Hearing Services Program\(^8\) with people whose 3-frequency average hearing level (measured at 500, 1000 and 2000 Hz) in the better ear is \(\leq 23\) dB HL. The WANT asks how strongly a person wants to get hearing aids (1 Don’t want them; 2 Slightly want them; 3 Want moderately; 4 Want them quite a lot; 5 Want them very much), and how much a person perceives difficulty hearing without hearing aids (1 No difficulty; 2 Slight difficulty; 3 Moderate difficulty; 4 Quite a lot of difficulty; 5 Very much difficulty). Higher WANT scores suggest greater desire for hearing aids and greater self-reported difficulty.

5.3.2.3 Demographic Questionnaire

Demographic information was collected with a purpose-designed questionnaire that asked about participant age, gender, and whose idea it was to seek services. Referral sources were categorized numerically as follows: 1) mine, 2) my spouse or family member, 3) my doctor and 4) someone else.

5.3.3 Procedures

Ethical clearance for this study was granted by the University of Queensland Behavioural and Social Sciences Ethical Review Committee, which complied with the Australian Government National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007). Before consulting with a practitioner, participants received an introductory letter describing the research and completed a

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\(^8\) More information about the Australian Government Hearing Services Program and its use of the WANT is found at the following url: http://www.hearingservices.gov.au/wps/portal/hsc/site/about/legislation/other/mhlt/
consent form, the baseline questionnaires (TSRQ, WANT and Demographics) and an authorization for release of their audiogram. Participants were asked to return the completed consent form, authorization and baseline questionnaires to the principal researcher at the University of Queensland. Participants then consulted with a practitioner of their choice, at which time a clinical history, hearing assessment and discussion of rehabilitation needs took place. Audiometric information (i.e., pure tone air and bone conduction thresholds at 500, 1000, 2000 and 4000Hz in both ears) was collected from the audiology clinic that the participant attended.

5.3.4 Data Analysis

Data were analyzed with Stata version 13 (StataCorp, College Station, USA). Sociodemographic and audiometric variables were the independent variables, and motivation variables were the dependent (outcome) variables. Sociodemographic variables were age, gender, referral source, desire for hearing aids (WANT question 1) and self-reported difficulty (WANT question 2). The audiometric variable was four-frequency average hearing loss in the better ear (4FAHL; the average of 500, 1000, 2000 and 4000 Hz). Motivation variables were autonomous and controlled motivation (TSRQ subscale scores).

To identify whether sociodemographic or audiometric variables were associated with autonomous and controlled motivation, data from the sample of 253 first-time hearing help-seekers were first screened for univariate relationships with pairwise correlation analysis. Correlation coefficients (Pearson's $r$) and $p$-values were identified (see Table 5.2). Relationships that were significant at the 0.1 level were included in the regression analyses. Variables with significant coefficients were tested for collinearity using Variance Inflation Factors (VIF) to ensure they could be included together in the regression analyses. All VIF scores were found to be below 2, which was acceptably low collinearity to enable all variables to be modeled together.

Two multivariate linear regression models were then formed, for autonomous motivation and controlled motivation. Finally, regression diagnostic tests were performed to evaluate the validity of the models.
Table 5.2: Matrix for pairwise correlation coefficients (r) showing linear relationships among independent and dependent variables for the sample (N = 253)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
<th>6.</th>
<th>7.</th>
<th>8.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Autonomous motivation</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Controlled motivation</td>
<td></td>
<td>.37***</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Desire for hearing aids</td>
<td></td>
<td>.52***</td>
<td>.25***</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Self-reported difficulty</td>
<td></td>
<td>.45***</td>
<td>.22***</td>
<td>.64***</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Age</td>
<td></td>
<td>-.25***</td>
<td>-.05</td>
<td>-.20**</td>
<td>-.26***</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Referral Source</td>
<td></td>
<td>-.10</td>
<td>.20**</td>
<td>-.03</td>
<td>-.03</td>
<td>.09</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>7. Gender</td>
<td></td>
<td>.02</td>
<td>.09</td>
<td>.14*</td>
<td>.17**</td>
<td>-.11</td>
<td>-.01</td>
<td>1.00</td>
</tr>
<tr>
<td>8. 4FAHL in the better ear</td>
<td></td>
<td>.11</td>
<td>.25***</td>
<td>.26***</td>
<td>.34***</td>
<td>.32***</td>
<td>.07</td>
<td>.15*</td>
</tr>
</tbody>
</table>

Significance level: * p < 0.05  ** p < 0.01  *** p < 0.001
5.4 Results

5.4.1 Independent variables and autonomous motivation

To identify linear associations among independent variables and autonomous motivation, multivariate linear regression analyses were performed. In the autonomous motivation regression model, the pairwise correlation analysis revealed $p$-values over 0.1 for referral source, gender and 4FAHL in the better ear, and these variables were, therefore, dropped for the final regression analysis.

The autonomous motivation model with the retained independent variables (age, desire for hearing aids and self-reported difficulty) was then checked for heteroskedasticity using the Breusch-Pagan test (Breusch & Pagan, 1979). This test revealed a significant $p$ score < 0.001 ($\chi^2 = 35.8$), which predicted heteroskedasticity. Therefore, White’s Robust test (White, 1980) was run. The quantile-quantile plot, which plotted probability distributions of differences between the predicted and actual values of the outcome variable (Wilk & Gnanadesikan, 1968), indicated that residual values followed a normal pattern of distribution, and were thus acceptable. The studentized residual (Cook & Weisberg, 1982) detected 3 outliers with absolute values ≥ 2.58. These cases were, therefore, removed from the analysis.

Multiple linear regression revealed 33.27% of the variability in autonomous motivation scores was explained by younger age, greater desire for hearing aids and greater self-reported difficulty ($R^2 = 0.33$, $F (3, 205) = 28.74$, $p < 0.001$) (see Table 5.3). When examining the predictive ability of individual variables, all three variables significantly contributed to autonomous motivation. The $\beta$ scores indicated that for every 1-unit increase in autonomous motivation score there was a .42-unit increase in desire for hearing aids score, a .31-unit increase in self-reported difficulty score and a .02-year reduction in age, after adjusting for other variables in the model.

5.4.2 Independent variables and controlled motivation

For the controlled motivation regression model, pairwise correlation identified two variables (gender and age) with $p$-values over 0.1 when screened
for significance. These were, therefore, omitted and the multivariate linear regression for controlled motivation retained self-reported difficulty, desire for hearing aids, referral source and 4FAHL in the final analysis. As with autonomous motivation, the controlled motivation model was heteroskedastic ($\chi^2 = 12.48, p < 0.001$). The Robust test (White, 1980) was conducted and indicated that quantile-quantile plots were essentially normal distribution of residuals. Five outliers were identified and removed from the final analysis.

The controlled motivation model showed 23.49% of total variance in controlled motivation scores was explained by referral source, desire for hearing aids, self-reported difficulty and 4FAHL in the better ear ($R^2 = 0.23, F (4, 146) = 8.00, p < 0.001$) (see Table 5.3). Two variables were significantly associated with controlled motivation – referral source ($\beta = 0.31, p = 0.016$), and desire for hearing aids ($\beta = 0.27, p = 0.018$). For each 1-unit increase in controlled motivation, there was a .27-unit increase in desire for hearing aids. The referral source score increased by .31 units for each 1-unit increase in controlled motivation score. That is, the likelihood of participants being referred by someone other than themselves increased by 31% for each 1-point increase in controlled motivation. Self-reported difficulty and 4FAHL in the better ear were not statistically significant.
Table 5.3: Regression model of independent variables associated with autonomous motivation and controlled motivation

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>β</th>
<th>SE</th>
<th>p-value</th>
<th>β</th>
<th>SE</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.0230</td>
<td>0.0079</td>
<td>0.004*</td>
<td>ns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral source</td>
<td>ns</td>
<td></td>
<td></td>
<td></td>
<td>0.3055</td>
<td>0.1256</td>
</tr>
<tr>
<td>Desire for hearing aids</td>
<td>0.4156</td>
<td>0.0908</td>
<td>&lt; 0.001*</td>
<td>0.2721</td>
<td>0.1136</td>
<td>0.018*</td>
</tr>
<tr>
<td>Self-reported difficulty</td>
<td>0.3087</td>
<td>0.1166</td>
<td>0.009*</td>
<td>0.2608</td>
<td>0.1565</td>
<td>0.098</td>
</tr>
<tr>
<td>4FAHL (better ear)</td>
<td>ns</td>
<td></td>
<td></td>
<td></td>
<td>0.0183</td>
<td>0.0104</td>
</tr>
</tbody>
</table>

Autonomous Motivation

\[ R^2 = 0.3327 \]
\[ F (3, 205) = 38.74 \ p < 0.001 \]

Controlled Motivation

\[ R^2 = 0.2349 \]
\[ F (4, 146) = 8.00 \ p < 0.001 \]

* p significant at the 0.05 level

SE = Standard Error

ns = not significant at univariate level

Gender was not associated with either autonomous or controlled motivation at the univariate level and is not shown.
5.5 Discussion

This study explored the relationships among sociodemographic, audiometric and motivation characteristics for a sample of first-time hearing help-seekers. On the basis of our previous research (Ridgway et al., 2015), which suggested that autonomous and controlled motivation did not sit on a single continuum but rather represented two separate factors, each type of motivation was compared separately with the sociodemographic and audiological variables in the study. Participants with higher autonomous motivation scores wanted hearing aids more, reported greater hearing difficulty and were younger than those with lower autonomous motivation scores. Participants with higher controlled motivation scores were referred by others more often and had higher scores on the desire for hearing aids WANT question than those with lower controlled motivation scores.

The positive association between autonomous motivation scores from the TSRQ and scores from both WANT questions illustrated the complementary nature of these measures when describing motivational characteristics of hearing help-seekers. Four TSRQ questions formed the autonomous motivation variable. Scores for each question suggested participants with higher autonomous motivation scores might have: (1) reported giving careful consideration to hearing aids prior to consultation with a practitioner; (2) believed hearing aids were important for effective communication; (3) felt personally that wearing hearing aids was the best thing for them; and (4) believed doing something about their hearing would improve their quality of life. If considered alongside higher WANT scores, these findings could indicate that participants with higher autonomous motivation scores have reflected on the impact of hearing loss, and the potential influence of hearing aids on their own function and circumstances, when contemplating hearing aids. Together with results from Ridgway et al. (2015), which described the association between autonomous motivation and hearing aid adoption, both the TSRQ and WANT could be useful for exploring internalization of decisions such as hearing aid adoption. This finding is also in line with Laplante-Lévesque et al. (2013), who investigated an application of the transtheoretical model of behavior change (Prochaska et al., 1992) with hearing help-seekers, and reported that participants in a more advanced stage of change described greater hearing difficulty and were more likely to take up an intervention such as hearing aids.

Younger age was also found to be associated with higher autonomous motivation in the present study. Although the $\beta$ score of -0.02 indicated that age differences for participants with higher and lower autonomous motivation were small, the low standard
error score of 0.0079 suggested the regression estimate was highly predictive. In a study that investigated relationships between autonomy and age in a cohort of undergraduate psychology students and their parents, Sheldon, Houser-Marko and Kasser (2006) reported goal-related autonomous motivation increased with age through from early adulthood to middle age. By contrast, Edmunds, Ntoumanis and Duda (2007) studied people who were overweight or obese aged between 16 and 73 years and found no effect of age on motivation for participation in a prescribed exercise program, although age was associated with reduced exercise. Custers et al. (2012) found older people with higher cognitive function residing in aged care facilities attributed greater importance to autonomy than those with lower cognitive function, with some participants preferring others to make decisions for them about everyday activities such as choice of mealtime or outfit. Studies of people who have either Type 1 and Type 2 diabetes (Williams, Freedman, & Deci, 1998) and coronary disease (Mildestvedt, Meland, & Eide, 2007) found younger participants were more likely to make the decision to drop out of the research if they had fewer health complications. Varied associations between age and autonomy revealed in the above studies suggest that across the adult lifespan, changing personal circumstances, interests and health status appear to impact upon autonomous motivation and the decisions people make (Kasser & Ryan, 1999). Rather than age itself, autonomous motivation of younger hearing help-seekers in this study might, therefore, be affected by the presence or absence of other health conditions that, in an older demographic, might affect their actions and behaviors. However, as this study did not ask participants about their general health, it is not possible to determine whether or not this influenced their autonomous motivation for hearing rehabilitation decisions.

Surprisingly, there was a positive association between controlled motivation and desire for hearing aids as measured by the WANT. That is, people who felt guilt or shame about their hearing impairment, or who thought others would be upset or disappointed in them if they did not do something about their hearing, wanted hearing aids more than those who did not report these feelings. This finding appears to contradict the assertion that participants with higher controlled motivation scores (who have not internalized the need to act on their hearing loss) may not be motivated to act for a range of reasons. As discussed in Ridgway et al. (2015), the present finding also suggests that the TSRQ autonomous and controlled motivation subscales may not precisely capture the spectrum of motivations of hearing help-seekers along the SDT internalization continuum (Ryan & Connell, 1989). For example, a person with higher controlled motivation scores may have
reported via the TSRQ a sense of guilt or shame if they did not do something about their hearing, and also report being motivated because they understand the personal benefits of wearing hearing aids. That is, they have sought hearing help for both autonomous and controlled reasons. Making changes to health behavior requires juggling multiple motives, within the behavior itself and across other life arenas (Deci & Ryan, 2008; Ryan et al., 2011). This helps explain our previous findings that autonomous and controlled motivation may separately exert influences on clients’ decisions to seek help and consider hearing aids (Ridgway et al., 2015). Overall, the relationship between controlled motivation and desire for hearing aids suggests the need to explore elements of controlled motivation in more detail. Further analysis of the psychometric properties of the TSRQ and refinement of this questionnaire for hearing help-seekers would be of benefit.

Although there was an association between controlled motivation and desire for hearing aids, there was not a significant relationship between controlled motivation and self-reported hearing difficulty. The 20 participants who did not report any hearing difficulty (i.e., scored 1 on WANT question 2) had a mean controlled motivation score of 3.31, which was proportionally higher than the mean controlled motivation scores of participants who reported slight and moderate difficulty (2.34 and 2.75 respectively). This result could suggest that a small number of participants who exhibited higher controlled motivation might not accept the possibility of their own hearing loss. Indeed, Helvik, Wennberg, Jacobsen and Hallberg (2008), who sampled 173 first-time adult help-seekers, reported that participants who did not perceive or disclose hearing difficulties were less likely to adopt hearing aids after other variables such as age and degree of hearing impairment had been considered. This supports our previous results, which showed positive associations between self-reported difficulty and hearing aid adoption (Ridgway et al., 2015). Therefore, help-seekers who do not report hearing difficulties might come to recognize their own difficulties and decide to take action such as adopting hearing aids if practitioners explore underlying feelings of guilt, shame or anxiety that accompany controlled motivation in clients.

Participants with higher controlled motivation were more likely to have sought help at the suggestion of others than to have personally made the decision to seek help. Some participants who sought hearing services at the behest of others might have done so because they had not fully internalized the value or need to act (Ryan & Deci, 2000). If participants attended to appease family members, they may have done so to maintain a sense of pride or self-worth, or to overcome feelings of guilt or shame associated with their
hearing impairment. In these circumstances participants would be exhibiting introjected motivation, a controlled form of motivation that is not fully internalized (Ridgway et al., 2013). This finding calls for family members to be involved in rehabilitation decisions, so practitioners can recognize and address underlying questions or concerns involving family that might shape client choices. In the clinic, discussions between practitioners, clients and family members about rehabilitation options might reveal thoughts and feelings about hearing aid adoption that reflect autonomous and controlled forms of motivation. Practitioners who identify clients with controlled motivation might ask clients whether or not they feel comfortable with the rehabilitation options presented to them, and to reflect on which options they feel are best for them. Family involvement is linked with self-care confidence and autonomous motivation in cardiovascular patients (Stamp et al., 2015), and in audiology, greater family member involvement in hearing rehabilitation is warranted (Ekberg, Meyer, Scarinci, Grenness, & Hickson, 2015).

5.5.1 Clinical Implications

The findings from this study have important implications for practitioners seeking to better understand autonomous and controlled motivation on hearing help-seekers’ behaviors. The WANT was originally developed for use in the Australian Government Hearing Services Program as a tool for measuring motivation of hearing help-seekers with minimal hearing loss⁹. However, significant correlation between the WANT and TSRQ in this study suggests both measures could be applied in the clinic to assist practitioners’ discussions about rehabilitation intervention options, irrespective of hearing level. Together with the TSRQ, which measured autonomous and controlled motivation, the WANT could provide practitioners with a detailed motivation profile of hearing help-seekers, from which rehabilitation could be planned. For example, help-seekers with higher controlled motivation scores who do not report any hearing difficulties may require counseling about awareness or acceptance of hearing loss, and exploration of the reasons behind their scores. On the other hand, help-seekers with higher autonomous motivation scores who report hearing difficulties and who want hearing aids are likely to have given careful consideration to wearing hearing aids and are ready to act. Therefore, practitioners who explore results of the TSRQ and WANT can potentially engage help-seekers in discussion about the psychosocial factors that may underlie clients’ actions. This form of counseling

⁹ More information about the use of the WANT in the Australian Government Hearing Services is found at the following URL: http://www.hearingservices.gov.au/wps/portal/hso/site/about/legislation/other/mhlt/
could be regarded as autonomy supportive because it helps reveal rationales for health behavior and encourages discussion from clients’ perspectives (Markland et al., 2005). However, as autonomy support was not associated with hearing aid adoption, and was associated with increased perceived competence, increased satisfaction and reduced activity limitation (Ridgway et al., 2016), further work is needed to understand how characteristics of autonomy support relate to discussions about interventions such as hearing aid adoption.

Autonomous motivation was positively associated with younger age in this study. Although not directly researched in this study, age-related decline in health, cognitive and physical capacity and participation in life (Rowe & Kahn, 1997; Meyer et al., 2014) may have contributed to this association. There is evidence that links autonomous motivation to vitality in an older population (Kasser & Ryan, 1999), which supports this assertion. Furthermore, the psychosocial and functional effects of chronic health conditions associated with aging may reduce communicative competence and autonomous motivation (Ferrand, Nasarre, Hautier, & Bonnefoy, 2012). Although Meyer et al. (2014) did not study autonomous motivation, they found adults with hearing impairment consulted practitioners and adopted hearing aids more often if they were younger, reported better general health and perceived greater benefits of hearing aids. As healthy aging is crucial to reducing the social and economic burden of chronic health conditions (WHO, 2011), exploring associations between autonomous motivation, attitudinal beliefs and health and well-being with hearing help-seekers would therefore be of interest. Although this study did not question participants about their health status, practitioners who explore the physical, cognitive and sociocultural features of healthy aging with hearing help-seekers might gain insight to how autonomy can be promoted with potential hearing aid candidates.

5.5.2 Future Research Implications

It should be noted that the current study did not explore relationships among autonomy support and sociodemographic or audiometric characteristics, as the purpose of this paper was to investigate associations among these characteristics and autonomous and controlled motivation. Identifying whether or not factors such as age or self-reported difficulty affect autonomy support might inform what practitioners look for to help motivate healthy behavior and well-being with clients, because in hearing aid adopters, autonomy support was positively associated with increased satisfaction, reduced activity limitation and greater perceived competence (Ridgway et al., 2016). Practitioners recognize
sociodemographic and audiometric factors during clinical consultation when decisions such as hearing aid adoption are being considered (Knudsen et al., 2010; Meyer et al., 2014; Hickson et al., 2014), yet the ingredients of autonomy support influential to motivating decisions and maintenance of healthy behavior in hearing rehabilitation are not yet fully understood (Ridgway et al., 2016). Further exploration of autonomy support in audiology consultations is warranted.

Our study was not the first to challenge the structure of the SDT internalization continuum (e.g. Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013). Recognizing these potential structural issues, Sheldon et al. (2015) performed a detailed psychometric evaluation of the continuum by analyzing the items of multiple autonomy scales. Their analyses confirmed a sequential model structure of six subscales of relative autonomy, which supported the SDT continuum proposed by Ryan and Connell (1989). However, their study found both positive and negative dimensions of introjected motivation, a relatively controlled, partially internalized form of motivation. This suggests that items that characterize introjection, such as acting from guilt or shame (Cohen, Wolf, Panter, & Insko, 2011), to boost self-esteem (Crocker, Karpinski, Quinn, & Chase, 2003) and for hubristic, or overly arrogant, pride (Tracy, Cheng, Robins, & Trzesniewski, 2009) should be differentiated in the model because they may have both positive and negative effects on internalization. Sheldon et al. (2015) acknowledged the need for further psychometric evaluation of items across multiple life domains to confirm the universal validity of the continuum. Therefore, further evaluation of concepts such as introjected motivation in audiology research would be of interest, to determine if this form of motivation is influential to rehabilitation help-seeking and decision-making.

In the current study, all participants but one were eligible for subsidized hearing services through the Australian Government Hearing Services Program. Receiving subsidized hearing services may increase help-seeking behavior (Meyer et al., 2014) and hearing aid adoption (Laplane-Lévesque, Hickson, & Worrall, 2012) when compared with those ineligible for the Government subsidy. Cost of hearing services is known to delay help-seeking (Kochkin, 2009). Consequently, WANT and TSRQ scores might differ in adults who do and do not receive subsidized services. Further investigation of associations between subsidized versus unsubsidized hearing services and motivation would therefore be of interest.

Given the range of cognitive, behavioral and affective processes that appear to be involved in the decision whether or not to adopt hearing aids, further work to explore how
hearing help-seekers develop agency (Bandura, 2006) would be of benefit. According to Bandura (2006), agency refers to the human capacity to influence one's own functioning in everyday life. In doing so, people develop personal goals and anticipate possible outcomes to motivate their courses of action. They develop strategies to attain an outcome, and reflect on the rationale and adequacy of their thoughts and actions. Within SDT, agency is interpreted as competence to accomplish behaviors necessary to achieve an outcome (Deci & Ryan, 2000), and a positive association between perceived hearing aid competence and autonomy support found by Ridgway et al. (2016) suggests that practitioners can help people develop agency in the hearing rehabilitation setting, to facilitate autonomous motivation. People need to feel competent in their surroundings in order to enact behaviors that contribute to reaching an outcome (Deci & Ryan, 2000). In hearing rehabilitation, a starting point to investigate this could be a study of competence in relation to engagement with hearing services and decisions such as hearing aid adoption. First time hearing help-seekers could be interviewed about their confidence towards hearing rehabilitation and hearing aids and about perceptions of control over decision-making.

5.6 Conclusion

In conclusion, complex interrelations among motivation and sociodemographic factors underscore the utility of practitioners’ attention to the personal factors that may characterize autonomous and controlled motivation in first time hearing help-seekers. Practitioners’ focus on cognitive, emotional and motivational processes underlying client behaviors and actions may help facilitate clinical decision-making such as hearing aid adoption.
5.7 References


Chapter 6 – How do people engage with hearing services? A qualitative study exploring motivation for help-seeking and perceptions of autonomy support in first time hearing help-seekers.
6.1 Introduction

The study described in this Chapter follows the earlier research that investigated the motivations and experiences of first time hearing help-seekers within an SDT framework. Previous findings in the three quantitative studies supported application of SDT in hearing rehabilitation with evidence that autonomous motivation, but not controlled motivation, was positively associated with the hearing aid adoption. In SDT, autonomy is considered central to engagement with health treatment (Ryan & Deci, 2000; Ryan, Patrick, Deci, & Williams, 2008; Ng et al., 2012), and for help-seekers was important in their decision to adopt hearing aids (Ridgway, Hickson, & Lind, 2015). Differences in the ways autonomous and controlled motivation associate with hearing aid adoption is a significant result for audiologists working with adult help-seekers hoping to better understand how hearing help-seekers decide whether or not to adopt hearing aids.

Practitioners can facilitate autonomous motivation by being autonomy supportive. Autonomy supportive practitioners encourage patient perspectives and initiatives, provide clear rationales for health behaviour, support choice, and minimise pressure (Williams, Frankel, Campbell, & Deci, 2000; Markland, Ryan, Tobin, & Rollnick, 2005; Patrick & Williams, 2012). Autonomy support was not associated with hearing aid adoption, however, for hearing aid adopters was positively associated with greater perceived competence, greater hearing aid satisfaction and reduced activity limitation. Results suggested that autonomy support might be more evident once patients had adopted hearing aids than when the decision to adopt or not adopt hearing aids was made. Although practitioners rarely present options other than hearing aids to patients (e.g., Grenness, Hickson, Laplante-Lévesque, Meyer, & Davidson, 2015), hearing rehabilitation decision-making is broader than hearing aid adoption or non-adoption if options other than hearing aids are available (e.g., Laplante-Lévesque et al., 2012). Research to explain how practitioners discuss hearing aids with patients would increase understanding about those elements of autonomy support influential to how help-seekers make decisions such as hearing aid adoption in the clinic.

The previous studies in this thesis identify that, when characterising motivation according to personal attributes, younger participants, those who wanted hearing aids more, and those who reported greater hearing difficulty were more likely to report greater autonomous motivation. Participants reported greater controlled motivation if they were referred to the clinic by others and wanted hearing aids more. The variety of personal
characteristics that influenced autonomous and controlled motivation suggested multiple factors motivated hearing help-seeking. It was decided that greater insight into the ways that personal attributes motivate help-seeking, and how help-seekers make decisions such as hearing aid adoption, would be gained with a complementary qualitative study that explored what is important to individual participants when they engage with hearing health care and discuss rehabilitation options with practitioners. Individual stories bring quantitative findings to life by personalising theoretical associations and helping explain individual variability in findings (Creswell & Plano Clark, 2011; Knudsen et al., 2012). By illustrating how people discuss motivation when talking about help-seeking and hearing aid adoption, practitioners may relate qualitative results to personal stories they are presented with in the clinic.

Qualitative research is a widely used approach to conducting real world research in health sciences (Creswell & Plano Clark, 2011). Semi-structured interviews of participants were chosen as the data collection method, as such interviews are one of the most common ways of collecting rich and detailed data about participants’ circumstances and experiences (Barriball & While, 1994; DiCicco-Bloom & Crabtree, 2006; Knudsen et al., 2012). Thematic analysis was used to analyse the interview data, and is a well-established form of data analysis in social science (Braun & Clark, 2006). This method enables structured analysis of interview content from a social constructivist perspective (Kukla, 2000), within which participants create meaning and social reality through language, dialogue, and their considered interpretations of events. An advantage of thematic analysis for the current research is that its analytical processes are sufficiently flexible to enable pre-existing theoretical frameworks to be considered together with emergent concepts (Braun & Clarke, 2006). Thus, theoretical constructs from SDT such as autonomous motivation, controlled motivation and autonomy support can inform the reading of the transcripts (deductive reasoning), and also allow data to be coded inductively without seeking to place text segments into preconceived categories. This dual approach improves credibility of qualitative analysis (Fereday & Muir-Cochrane, 2006) and is valuable when exploring data within pre-existing theoretical constructs (Joffe, 2012), such as in the present study.

There are several qualitative research studies in audiology that have interviewed hearing help-seekers about hearing health care (Laplante-Lévesque, Hickson, & Worrall,
In a study that sought the perspectives of 34 adults with hearing impairment, Laplante-Lévesque et al. (2012) found participants described hearing help-seeking and rehabilitation in the context of their daily lives, and often regarded their clinical experiences as isolated events abstracted from their life experiences. Heffernan et al. (2016) conducted semi-structured interviews with 25 adult hearing aid users to explore the lived experiences and psychosocial impact of hearing impairment. Leventhal’s model of self-regulation (Leventhal, Leventhal, & Contrada, 1998) was applied to categorise the cognitive and emotional responses of participants. The majority of participants experienced activity limitations and participation restrictions, and often described reduced competence, as a result of hearing impairment. Overwhelmingly, hearing impairment engendered negative emotions such as anxiety, frustration and embarrassment in participants.

Despite the importance of psychosocial and emotional aspects of hearing impairment for hearing help-seekers evident in these studies, research that explored patient-centredness in hearing rehabilitation has suggested that practitioners may ignore these factors (Ekberg, Grenness, & Hickson, 2014). Grenness et al. (2015) analysed 62 initial rehabilitation consultations between participants and 26 different audiologists, and found hearing help-seekers may not be engaged in rehabilitation decisions such as hearing aid adoption or have their preferences considered. Hearing aid owners value a therapeutic relationship built on trust and loyalty, and place importance on an information exchange that provides the opportunity for help-seekers to voice their perspectives and preferences for rehabilitation decisions (Grenness et al., 2014). Preminger et al. (2015), who analysed semi-structured interview transcripts of 29 adult hearing help-seekers, described trust as a central component of the client-practitioner relationship. Trust was found to evolve throughout rehabilitation, and could be encouraged by the practitioner and the clinic. In SDT, the relationship between trust and autonomy support is synergistic: autonomy supportive practitioners help foster trust, which in turn further strengthens perceptions of autonomy support and the patient-practitioner relationship (Weinstein & DeHaan, 2014).

The previous research that interviewed hearing help-seekers about their
perspectives, experiences and preferences has highlighted a range of psychosocial characteristics important to hearing rehabilitation. The purpose of the current study is to build on this work by exploring in greater detail how such characteristics might influence hearing rehabilitation help-seeking, and decisions such as hearing aid adoption or non-adoption from the perspective of SDT. The aims of the current study were (1) to investigate the motivational processes that guide help-seeking behaviour, to better understand how first time hearing help-seekers engage with hearing rehabilitation; and (2) to explore first time hearing help-seekers’ perceptions of their interactions with practitioners, to better understand how autonomy support might influence hearing aid adoption.

6.2 Methods

6.2.1 Participants

Thirteen participants who had recent experiences of hearing assessment and/or hearing aid fitting (referred to as hearing help-seekers for the purposes of this thesis), but who had not previously participated in this body of research, were interviewed about their motivations for help-seeking and their experiences in attending hearing health care practices.

Participants were from among first time hearing help-seekers attending (a) the Melbourne metropolitan area offices of a large audiology service that has clinics across all states and territories of Australia, and (b) a not-for-profit audiology clinic in metropolitan Melbourne. First time hearing help-seekers were selected as they were the specific participant group in the first three studies of the thesis and it was important to be able to compare quantitative and qualitative findings across studies. First time hearing help-seekers were also considered suitable to provide insights into motivations of people to attend for hearing services in the first instance and subsequently what contributed to their decision regarding hearing aid adoption. Furthermore, the researchers wanted to

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10 The sample of 253 hearing help-seekers who participated in the studies described in Chapter 3 were not selected for interview, because several years had elapsed since that data were collected and this time delay could potentially reduce participants’ recollection of their experiences (Coughlin, 1990).
investigate whether, and if so, how, autonomy support might contribute to the adoption decision.

There were five criteria for inclusion in the study. Participants (1) were 60 years or older, (2) had sufficient English to understand and respond to interview questions, (3) were not living in a residential aged care facility, (4) were available for interview within 4 weeks of their first assessment at the clinic, and (5) had at least one pure tone threshold greater than 25 dB HL between 500Hz and 4000Hz in the better ear\(^\text{11}\). Participants aged over 60 were included because hearing impairment is more prevalent in older adults and this is the typical profile of first time hearing help-seekers. There was no upper limit on participant age.

Purposive sampling (Patton, 2015) was applied in order that participant interviews represented a diverse and complex range of experiences and views of first time adult hearing help-seekers making a decision about hearing aids. Equal representation of participants’ gender and decision to adopt or not adopt hearing aids was sought. Adequacy of sample size was determined using a process of data saturation (Glaser & Strauss, 1967). Data collection continued until three successive interviews did not reveal new insights to further enhance themes or categories, at which point JR determined that saturation had been reached (Francis et al., 2010), and the final sample consisted of 13 participants (see Table 6.1 for participant characteristics).

\(^{11}\) This criterion for hearing impairment was selected to ensure the sample had some degree of measured hearing impairment, and is consistent with Preminger et al. (2015).
Table 6.1: Summary of participant characteristics (n=13)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Percent (number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years (range 63 – 87)</td>
<td></td>
</tr>
<tr>
<td>60 – 69</td>
<td>62% (8)</td>
</tr>
<tr>
<td>70+</td>
<td>38% (5)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>46% (6)</td>
</tr>
<tr>
<td>Female</td>
<td>54% (7)</td>
</tr>
<tr>
<td>Hearing impairment (average hearing thresholds at 0.5, 1, 2, &amp; 4 kHz) (n=26 ears)</td>
<td></td>
</tr>
<tr>
<td>Minimal (&lt; 25 dB HL)</td>
<td>38.5% (10)</td>
</tr>
<tr>
<td>Mild (25 – 40 dB HL)</td>
<td>38.5% (10)</td>
</tr>
<tr>
<td>Moderate (41 – 60 dB HL)</td>
<td>23% (6)</td>
</tr>
<tr>
<td>Eligibility for public payment of hearing aids</td>
<td></td>
</tr>
<tr>
<td>Eligible</td>
<td>92% (12)</td>
</tr>
<tr>
<td>Not eligible</td>
<td>8% (1)</td>
</tr>
<tr>
<td>Adopted hearing aids</td>
<td>46% (6)</td>
</tr>
<tr>
<td>Did not adopt hearing aids</td>
<td>54% (7)</td>
</tr>
<tr>
<td>Autonomous motivation (TSRQ, averaged autonomous motivation scores)</td>
<td>5.38* (1.73)</td>
</tr>
<tr>
<td>Controlled motivation (TSRQ, averaged controlled motivation scores)</td>
<td>2.66* (1.36)</td>
</tr>
<tr>
<td>Autonomy support (HCCQ, averaged autonomy support scores)</td>
<td>6.53* (0.82)</td>
</tr>
</tbody>
</table>

*Mean (SD) is shown

1 Treatment self-regulation questionnaire (TSRQ; Williams, Grow, Freedman, Ryan, & Deci, 1996)
2 Health care climate questionnaire (HCCQ; Williams et al., 1996)

Note: Eligibility for hearing aids in the Australian Government Hearing Services Program is legislated with the Minimum Hearing Loss Threshold (MHLT). MHLT Criteria and Exemptions are described at the following URL (http://www.hearingservices.gov.au/wps/wcm/connect/9d72901f-f144-44e0-a526-1d8972336e6/MHLT_Guidelines.pdf?MOD=AJPERES). The true number of candidates for amplification was not known because the interview did not explicitly discuss eligibility or exemption criteria.

6.2.2 Procedures

Ethical clearance for this study was granted by the University of Queensland Behavioural and Social Sciences Ethical Review Committee, which complied with the Australian Government National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007). The principal researcher (JR), who is an experienced clinical rehabilitative audiologist, conducted the interviews. Nine participants were interviewed immediately after their initial assessment appointment and prior to their hearing aid fitting. One participant was interviewed immediately after the hearing aid fitting.
appointment (2 weeks after initial consultation) and three participants were interviewed immediately after their first hearing aid follow-up appointment (4 weeks after the initial consultation). Interviews were conducted immediately following participants’ clinical consultations to maximise the likelihood of accurate recollection of information. Participants completed the TSRQ and HCCQ prior to interview, which might have influenced their responses at interview. To minimise this potential response bias, all participants were informed of the purpose of the interview, provided a comfortable environment within which they were encouraged to talk openly and honestly, advised they could opt out of the interview and any time, and assured their responses would remain confidential and not be disclosed to their practitioner. JR was blind to participants’ TSRQ and HCCQ responses until after the interview. Participants’ TSRQ and HCCQ scores were not matched to transcripts until the inductive analysis had been completed.

The purpose of the semi-structured interviews was to elicit participants’ perspectives about their experiences in the audiology consultation, with respect to both help-seeking and decision-making. In doing so the study is designed, (1) to identify what was important to participants’ decisions to attend a clinic (2) to identify how decisions about adoption or non-adoption of hearing aids were made, and (3) to document the diverse perspectives of adopters and non-adopters regarding what motivated their decisions.

An interview guide was developed that included introductory comments, a list of topics and questions, prompts and closing remarks (Robson, 2011). To improve theoretical validity, the interview guide was written to reflect the research questions (Leedy & Ormrod, 2013). Topic questions were developed through a review of the literature outlined in Chapter 2, and from the findings in Chapters 3, 4 and 5. The topic questions focused on hearing help-seeking and clinical experiences so that participants understood the purpose of the interview and could frame their responses accordingly (Robson, 2011). The sequence of questions was determined to address the research aims while assisting with the flow of discussion. The questions were piloted with a small group of older people to reduce ambiguities (Barriball & While, 1994). As a consequence, changes were made to reduce jargon and to widen the scope of some questions (see the final interview guide in Appendix G). Throughout the interviews, elaboration probes such as “Why is that?” and “Could you tell me more about that?” were used to elicit greater depth of information (Bowling, 2014). Interviews were recorded with an iPhone 4 and were transcribed verbatim using an external transcription service that specialises in health care qualitative data
transcription. When transcripts were returned, JR checked each one against the recordings for accuracy.

6.2.3 Analysis

Following Braun and Clarke (2006), JR familiarised himself with the material by reading and rereading transcripts to identify and link the content and meaning of the data. During this process, observations and comments were written alongside meaningful segments of text to gain a general sense of concepts or themes that surfaced. Text segments within each transcript were then coded to develop preliminary categories and themes. An inductive/deductive method was applied when coding data (Fereday & Muir-Cochrane, 2006). There were two steps involved in the coding process.

Firstly, data were interpreted inductively, which enabled themes to emerge from the data without superimposing the pre-existing SDT theoretical framework. NVIVO text analytics software (Version 10.2.2, QSR International) was used to organise and code the content, grouping similar text segments under category and theme headings as meaning units. Grouped content was checked with respect to category membership and rechecked to improve consistency of categorization across transcripts. Data collection and analysis took place concurrently, and newly-coded meaning units were constantly compared against and integrated into the growing body of data (Glaser & Strauss, 1967). Meaning units that did not fall into distinct categories were set aside and progressively added back into the analysis as category and theme headings were developed. JR then developed a mind map to assist with grouping, connecting and refining preliminary categories and themes. Reflective notes were also written for each transcript to critically examine personal interpretations of meaning and to create transparency in the research process (Finlay, 2002). At this point, an external reviewer with expertise in qualitative analysis and methodology then checked the preliminary analysis by reviewing and providing comments on four transcripts. The external reviewer was not familiar with self-determination theory and interpreted the transcripts inductively. The researchers then discussed and reviewed the conceptual interpretation of data and the meaning unit categorization process to ensure consistency of meaning. If discrepancies were identified, these were discussed so that consensus of meaning could be reached. The researchers reached agreement for all meaning units.

Secondly, JR undertook a post hoc analysis of data to organise data within theoretical constructs of SDT. An a priori template of codes was developed (Crabtree &
Miller, 1999) that titled categories according to the SDT internalisation continuum (i.e., intrinsic, integrated, identified, introjected, external and amotivation) and of psychological need satisfaction (i.e., autonomy, competence and relatedness). In order to study how participants described SDT constructs, a summative method of content analysis (Hseih & Shannon, 2005) was employed, to interpret underlying meanings of the words and content used by participants at interview. A review of literature relevant to descriptive terminology of SDT was undertaken to identify definitions, interpretations, words and phrases that characterised each SDT construct (Williams et al., 2000; Ryan & La Guardia, 2000; Markland et al., 2005; Patrick & Williams, 2012; Ng et al., 2012). Interview transcripts were then searched for specific terms that indicated commentary relating to internalisation (e.g., “need”, “want”, “do”, “done”, “come”, “came”, “within myself”, “I thought”, “I think”, “I feel”, “I guess”, “don’t want”, “don’t like”) and to identify items relating to need satisfaction. Words and phrases relating to autonomy (e.g., “choice”, “free”, “choose”, “chose”, “option”, “decision”, “will”, “reason”, “change”, “I think”) competence (e.g., “I know”, “I guess”, “confident”, “happy”, “ability”, “I don’t know”, “able”, “goal”, “confirm”) and relatedness (e.g., “accept”, “comfortable”, “welcome”, “audiologist”, “practitioner”, “family”, “friends”, “joining in”, “missing out”, “listens”) were searched. There was some overlap in search terms to identify items that may have been missed. Meaning units were then cross-checked against participants’ reasons for help-seeking and interactions with the practitioner that were identified in the inductive analysis. All manuscripts were then reread to provide context for the identified meaning units. Meaning units were then reinterpreted deductively and categorised in the context of the SDT internalisation continuum, and of psychological need satisfaction, where appropriate.

### 6.3 Results

Results are presented in two parts. Part A describes findings relating to the inductive analysis, and Part B describes results of the deductive reinterpretation of data. A total of 412 meaning units were identified. For Part A, meaning units were refined and clustered into three overarching categories and 15 subcategories (see Table 6.2). The overarching categories were (1) Communication Experiences, (2) Personal Influences, and (3) Clinical Experiences. During analysis, it became apparent that the categories of Communication Experiences and Personal Influences related to the first study aim, which was to investigate the motivational processes that guided help-seeking. The Clinical
Experiences category was associated with the second study aim, which was to explore autonomy support and the ways it contributed to hearing aid adoption. Part B addressed the first aim by grouping reasons for help-seeking into six categories of motivation described in the SDT internalisation continuum, and the second aim by describing perceptions of practitioner interactions as the psychological needs for autonomy, competence and relatedness (i.e., “need satisfaction”). In each section, selected statements from participants illustrate each category within the model. In some instances, contextual information from JR’s written notes are included in parentheses to improve clarity. Names that appear in statements are pseudonyms.

PART A: Inductive Analysis

The following section describes findings relating to the three emergent categories identified in the inductive interpretation of data. Table 6.2 illustrates the dimensions of help-seeking and autonomy support that were important for hearing help-seeking and for participants’ hearing aid adoption decisions.

Table 6.2: Dimensions of help-seeking and autonomy support important for hearing help-seeking and hearing aid adoption or non-adoption.

<table>
<thead>
<tr>
<th>Communication Experiences</th>
<th>Personal Influences</th>
<th>Clinical Experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversation difficulties</td>
<td>Self-perceived difficulties</td>
<td>Audiogram</td>
</tr>
<tr>
<td>Impact on family</td>
<td>Self-image</td>
<td>Supportive practitioner</td>
</tr>
<tr>
<td>Participation</td>
<td>Promotion of service</td>
<td>Non-directive practitioner</td>
</tr>
<tr>
<td>Emotional response</td>
<td>Encouragement from family</td>
<td>Choice</td>
</tr>
<tr>
<td></td>
<td>Preconceptions about hearing aids</td>
<td>Cost</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General comments about service</td>
</tr>
</tbody>
</table>

6.3.1 Dimensions of help-seeking and autonomy support important for hearing help-seeking and hearing aid adoption or non-adoption

Participants expressed a range of views when describing help-seeking behaviour. Statements from participants were grouped into three categories: Communication Experiences, Personal Influences, and Clinical Experiences. Illustrative examples within each category are described below in turn.
6.3.1.1 Communication experiences.

Participants discussed a variety of communication experiences outside of the clinical setting that were important to help-seeking. Twelve of the 13 participants discussed their communication experiences when asked to recount why they decided to seek help. The one participant who did not discuss communication experiences at interview had not intended to seek help.

“I stumbled across one of the vans outside the supermarket. It was a very cold day so I thought if I pop in there they'll be able to shut the door for a minute.” (Female, 71).

Examples of comments on the importance of communication for help-seeking focused on the impact of participants’ hearing impairment on their communication.

“The hearing loss has caused a communication problem because I'm hearing words that aren't really the words being said.” (Male, 66);

“My eldest son would say something to me and I'd give him an answer and he'd say that's nothing to do with what we were even talking about.” (Male, 74);

“In conversation I was missing out a lot what they were saying ... that's how I noticed that a test of hearing would be good for me.” (Female, 70)

Four subcategories of communication experiences were identified: conversation difficulties, impact on family, participation, and emotional response.

6.3.1.1.1 Conversation difficulties.

Of the 12 participants who discussed their communication experiences outside of the clinic, 10 of them acknowledged conversation difficulties as driving help-seeking behaviour. For example,

“I got sick and tired of asking people to repeat themselves...I thought I've got to do something. So I went off and had a hearing test.” (Male, 74);

“I hear but sometimes I don't know what they're saying.” (Female, 66).

“Everyone keeps saying to me they need to repeat.” (Male, 67).

By contrast, one participant felt that conversation difficulties were due to the way that others communicate with them.

“A lot of times I think it’s them [my family] that’s got to speak up.” (Male, 63).
6.3.1.1.2 Impact on family.

Nearly three quarters of participants described how conversation difficulties that impacted on family prompted help-seeking. To illustrate:

“I thought I would have to go along and have a hearing test to please [my wife] because she was the one suggesting I do have a hearing loss and it was creating a little bit of an issue within our situation.” (Male, 69);

“I want to make peace with the families.” (Male, 67);

“We followed up with this meeting today to give us peace of mind…although my wife would quite often say I've probably got selective hearing.” (Male, 71);

6.3.1.1.3 Participation.

Continued participation in life activities was also important for two thirds of participants. Hearing and communication difficulties contributed to help-seeking if participants perceived them as diminishing their ability to participate socially. For example,

“There are times where you might get the gist of the conversation but you can't quite get yourself involved because you're not sure that you heard correctly and you don't want to embarrass yourself by saying the wrong thing.” (Male, 71);

“Well, over the years I have found that it's been harder and harder to concentrate…I used to be able to pick out a conversation in a crowd and listen to them and block everything else out, but I can't do that any more.” (Male, 63).

6.3.1.1.4 Emotional response.

The majority of participants who noticed conversation difficulties and associated these with reduced participation commented that the impact of communication difficulties resulted in negative emotions. Four participants described anxiety and embarrassment arising from communication difficulties, which motivated attendance. One participant, who described how her hearing had been affected by years of noise exposure at work, explained how she felt about her difficulties:

“I've become more of a recluse…if I can't understand what [people are] saying I feel stupid. They might say something to me and I'll say ‘Pardon?’ They'll say it again and I say ‘Pardon?’ and then I think ‘Are they waiting for an
answer?’ So, it’s just feeling inadequate sometimes…it is annoying. It is frustrating and sometimes I feel a bit embarrassed.” (Female, 66).

Further examples of emotional responses were:

“It’s stressing them (family) out and it’s stressing me out as well so, if you can alleviate that stress factor, that's something you haven't got to worry about in your life as well.” (Male, 66);

“I was very, very happy since I decided to do something.” (Female, 87).

Communication experiences, including difficulties in conversation and reduced participation were important contributors to participants’ help-seeking behaviour. The emotional impact of communication experiences and the impact on family were frequently mentioned.

6.3.1.2 Personal Influences.

In addition to communication experiences, participants described a range of personal factors with respect to help-seeking. Codes for this category were grouped into five subcategories. These subcategories revealed how a variety of proximal influences\textsuperscript{12}, such as local promotion of service from the clinic, preconceptions about hearing aids and encouragement from family, helped form participants’ views about help-seeking.

6.3.1.2.1 Self-perceived difficulties.

The self-perceived difficulties subcategory was closely linked with statements about communication experiences. For example:

“I could feel it within myself [that I needed to seek help] because people are having to repeat two and three times to get the communication.” (Male, 66);

“I thought ‘Oh God, I’ve got to do something, this is terrible’…people would walk up to me and tap me on the shoulder and scare the **** out of me, because I wouldn’t hear them.” (Female, 66);

“I’ve been having trouble for years now…it’s just getting worse.” (Female, 66).

\textsuperscript{12} Embedded in social constructivism, the philosophical stance taken in the current study, the term ‘proximal influences’ relates to the social and cultural conditions within which participants constructed knowledge and understanding about hearing rehabilitation and their communication experiences. Use of the term in psychology can be traced to Vygotsky (1930-1934/1978), whose ‘Zone of Proximal Development’ relates to the ways people communicate with and learn from others close to them.
6.3.1.2.2 Self-image.
Participants’ self-image helped form their personal views about help-seeking:
“From the day I decided to go I’ve noticed a difference in myself.” (Female, 87);
“If it’s family I’ll say ‘I don’t know what you’re saying,’ but when you’re talking to a stranger I start feeling like an idiot and I hate that feeling. So [the reason I sought help] was to overcome that [feeling] because…I’d rather not deal with having to bring [my husband] with me everywhere.” (Female, 66).

6.3.1.2.3 Promotion of service.
Promotion of services both facilitated and thwarted help-seeking. For approximately half of the participants, promotion of services enabled easy access to the audiology clinic:
“I knew about hearing aids, but having this [clinic] on my doorstep has prompted me to come here.” (Female, 66);
“I eventually came here because I had a test up at the chemist and she said I was slightly under the average and she suggested I come and get checked.” (Female, 64).
However, promotion of services generated cynicism about hearing services for two participants:
“I stumbled across one of the [hearing test] vans outside the supermarket…I almost didn't come because I thought they were stalking me. I must have had five phone calls about the appointment. I thought, well, what's going on here. They must be after the business.” (Female, 71);
“I saw this sign that said free hearing test and compensation…I asked this guy what he was talking about and he said to me ‘What was your work environment?’ Within a minute he said ‘I can make a claim for you.’ So I said ‘thank you very much.’ I didn’t even have the hearing test with him.” (Male, 74).

6.3.1.2.4 Encouragement from family.
One third of participants described how encouragement from family prompted their decision to attend. This had both positive and negative influences on help-seeking. For example, positive statements were:
“He [my husband]…is very supportive of anything I do but definitely with this [seeking help].” (Female, 66);
“My sister said to me ‘I don’t know why you don’t go to where I go, so I made some enquiries and spoke to the lady here.’” (Male, 74).

By contrast, one participant said:
“Was I excited [to attend]? Not really…I thought ‘Yep, I'll go along with it. We'll go and check it out,’ even if it was only to satisfy my wife.” (Male, 71).

6.3.1.2.5 Preconceptions about hearing aids.
Preconceptions about hearing aids also varied. One quarter of participants formed views on hearing aids based on others’ experiences with them. For example,
“My father had a hearing aid and he had nothing but bloody trouble…that could be a turn off I suppose.” (Male, 71);
“We hear of a lot of people that have hearing aids that don't wear them.” (Male, 69).

Two participants expressed optimistic views about hearing aids, which stemmed from positive expectations for improved communication:
“I've got no problem with hearing aids at all. I think they're basically a magic thing for people to be using…the sheer aspect of having accurate communication skills brought back is a pretty exciting sort of thing.” (Male, 66);
“I'm not worried about wearing hearing aids because at my time of life, I'm not out to impress anyone…if it’s going to make a difference I’m happy.” (Female, 66).

Participants described their personal influences when explaining help-seeking. Internal factors including self-perceptions of conversation difficulties and reduced participation in life activities, and external influences such as geographic proximity of service, clinic promotion, preconceptions about hearing aids and advice from others, helped explain personal differences for help-seeking.

6.3.1.3 Clinical experiences.
Participants’ clinical experiences helped explain the role of autonomy support in the decision to adopt or not adopt hearing aids. Participants described autonomy support and its relationship to hearing aid adoption when they discussed their interactions with practitioners and systemic factors associated with hearing health care, and when they contemplated their choices and experiences. The clinical experiences category included participants’ comments about the audiogram, support from the practitioner, the non-directive nature of interactions with the practitioner, choice, cost, and general comments about the service. The majority of codes that fell into this category related to decision-making.

6.3.1.3.1 Audiogram.

For seven of the nine participants who were interviewed immediately after their initial audiology consultation, the audiogram was important to the discussion. Participants interpreted audiometric information in different ways. Approximately one third of subjects used the audiogram to confirm self-perceptions of hearing, which helped justify their decision to adopt or not adopt hearing aids. For example,

“I suspected right from the beginning it (my hearing) wasn't that bad…by having this test today it confirmed my thoughts.” (Male, 71);

“I didn’t realise how much [hearing] I had lost. It's way outside the normal hearing range, which I knew, but when you actually hear it told you think ‘Wow'. So now there's an answer there.” (Female, 66);

“For my age it's pretty normal that the high pitch sounds are probably my weakness and it will probably deteriorate with age but that's normal.” (Female, 69);

“Well, I guess it's not dramatic enough of a loss to require a hearing aid”. (Female, 71).

One participant appeared overwhelmed when discussing her audiogram:

“My left ear dips down, right down on the high pitched - oh gosh. I mean it's all in the graph.” (Female, 70).
Two participants described how audiometric results helped them form views about self-perceived difficulties:

“You know, that's probably been my biggest problem, the background noise and that's fairly normal according to [the audiologist].” (Male, 71);

“We did the tests and apparently I'm not missing out too badly as much as I thought I was.” (Female, 70).

6.3.1.3.2 Supportive practitioner.
Three quarters of participants responded positively to an audiology consultation in which the practitioner was supportive:

“She put me at ease straight away... I didn't feel like she was false or anything like that. She was a nice lady and she listened which is a good thing.” (Female, 66);

“I thought [the practitioner] was excellent. She communicated honestly and [answered] any questions that I asked her. We had a fairly good relationship I suppose.” (Male, 71);

“You feel comfortable talking to them, like you're not having to think twice and you're saying the right thing, you can just talk normal.” (Female, 87).

6.3.1.3.3 Non-directive practitioner.
Nearly half the participants appreciated non-directive practitioners who encouraged open discussion about the choices available to them. For example,

“She didn't force me into any direction at all, you know, let me make my own decision.” (Male, 66);

“I didn't get ‘Well that's the right decision.’ We just sort of came to it [the decision] without a speech or something. I just said ‘I'm very happy to hear that,’ and that was it.” (Female, 70);

“I don't think it's necessary yet and she didn't think it was necessary yet either so I'm taking her advice and on my own initiative it's not necessary yet.” (Female, 71).

“Sometimes I'm a bit reserved and I'll hold back, but I told her how I felt and how it's affected me...I was happy with her, very happy.” (Female, 66).
6.3.1.3.4 Choice.

Choice was central to all but two participants’ experiences during the consultation. Practitioners supported participant choices, although options appeared to be limited to hearing aid adoption or non-adoption, or to different types of hearing aids. When questioned about the options available to them, six of the seven participants who did not adopt hearing aids referred to the suitability or unsuitability of hearing aids:

“I don’t think there was one [a choice] really. I don’t think [my hearing] is bad enough to get hearing aids.” (Male, 71);

“Well…would I prefer to have one [a hearing aid] or not…after my results were received I thought ‘Well perhaps my option is to not have one.’” (Female, 70);

“Well there aren’t any other options, other than just to leave a firm, come back in a couple of years’ time and have [my hearing] checked.” (Male, 71);

“Certainly I know that I do have a hearing loss but I just feel that at this point in time I don’t know whether hearing aids are completely appropriate.” (Male, 70).

By contrast, five of the six participants who adopted hearing aids, and only one of the seven who did not, discussed the range of hearing aid technology presented to them during interview:

“There were about five hearing aids that I could buy and one was for free or something like that.” (Male, 74);

“Once we’d done the test there’s a lot of options. You can go with the basic, which is covered by a voucher from the government, or you can go into the whiz-bang, all the bells and whistles, and get the top of the range, which is great. There is one that you can get that will actually throw the sound over to your good ear, but it wasn’t feasible because there is a cost involved.” (Female, 66);

“The audiologist talked about hearing aids and the type of hearing aid that would be suitable for my hearing loss.” (Male, 69).

6.3.1.3.5 Cost.

Three participants chose to adopt or not adopt hearing aids after weighing up costs and lifestyle. For example:
“It's a matter of selecting [a type of hearing aid] that, first, is affordable and not just picking something that is there for the cheapness of it…I look at what I'm doing in my life and there's a lot of areas that I want to filter out [noise].” (Male, 66);

“It's a fairly significant financial commitment and I guess I felt that my hearing was alright…I think about wearing hearing aids and whether you're going to put them on when you wake up in the morning…Just my lifestyle is such that a lot of the time I wouldn't have a hearing aid because I don't feel that I would need to wear them.” (Male, 69).

Hearing aid cost influenced choice, and several participants self-limited their options or expressed disappointment that certain hearing aids or features were not available. For example,

“I would like to eventually go for the one which helps you in a crowd with background noise, but at this stage I'm just going for that one which will help me around the home, but I would like to be with the background noise and hear [with] a lot more clarity…I'm going with the one that the government provides because we're both pensioners, so it's a bit hard.” (Female, 66);

“I've only had them [hearing aids] for about a month or so but if I find that I'm deficient in some other way where a more expensive hearing aid suits me then I guess I will have to strive to do something to achieve that.” (Male, 74);

“It [choosing to adopt hearing aids] was dealing with the disappointment that, oh, that's a terrific one but that's $3,500.00 or $4,000.00, I can't have that, I'll have to stick with the other one. That's the disappointing thing, was the fact that the government aren't prepared to pay for that one…I can't afford $3000 so I'll put up with it. Knowing I wasn't going to have to pay for it made it very easy.” (Female, 66).

However, participants did not always view financial limitations to choice negatively. One participant stated:

“I chose the free one because of my financial situation…Given the questions that I asked and then answered from the practitioners, I could not see why you would want to spend more money than getting the basic ones. They worked perfectly for me.” (Male, 74).
Another participant was dissatisfied that options did not involve communication strategies, and called for greater involvement of family and advice about communication strategies:

“I don’t think there were any other options suggested [other than hearing aids]…It could be important to have communication with your partner or the one person who’s going to be close by who really feels that there is a problem with the hearing… There could be a discussion on how you should speak with one another.” (Male, 69).

6.3.1.3.6 General comments about service.

Half of the participants also made general comments about the service and broader aspects of hearing health care. These general comments were therefore given their own subcategory, as they were identified as contributors to the choices participants made.

“They’re very patient, very polite and they make you feel welcome.” (Male, 67).

“If you could trial hearing aids for a week to see whether it’s going to work for you, that would be good.” (Male, 69).

Eligibility for hearing aids contributed to the choice made for two participants:

“I don’t qualify for a hearing aid” (Female, 69);

“She mentioned that the left ear would qualify for a hearing aid…the right ear is not quite bad enough. So if I wanted to do something about the left ear [sic] it’d be out of my pocket. That was my understanding.” (Male, 71).

For two participants who did not adopt hearing aids, discussion about the timing of future reassessment accompanied discussions about choice. This was illustrated by the following:

“I will come back in three years…the lady said that three years is the standard at the moment.” (Female, 70);

“I don’t have to do anything, there are no choices I have to make, just come back in three years and have another test.” (Female, 69).

Participants described clinical experiences in which audiometric information was
central to discussions with practitioners, and felt comfortable when practitioners were supportive and non-directive. In most but not all cases, participants said that practitioners supported their choices. Rehabilitation options appeared to be limited to hearing aids.

In summary, the inductive analysis revealed the variety of participants’ communication experiences and personal influences important to help-seeking, such as difficulties with conversation, the impact of communication difficulties on family, the ways hearing services are promoted and preconceptions about hearing aids. Further, the interviews identified key clinical experiences relevant to the hearing aid adoption decision, particularly participants’ perspectives on their relationship with the practitioner, the choices available to them, and cost. Participants often also described their thoughts and feelings about help-seeking (“I was very, very happy since I decided to do something”) and hearing aid adoption (“I feel comfortable that I’ve done something about it so good within myself as well”) when recounting their experiences and stories at interview.

PART B: Deductive Analysis

The following section describes results of the deductive analysis. When examining the data according to theoretical concepts in SDT, reasons for help-seeking were reinterpreted as motivational processes that prompted help-seeking, and were then categorised according to the types of motivation described in the SDT internalisation continuum (i.e., intrinsic, integrated, identified, introjected, external and amotivation). Data that described interactions with the practitioner were examined in relation to psychological need satisfaction (i.e., autonomy, competence and relatedness), to explore how practitioner autonomy support might influence these three needs.

6.3.2 Help-seeking motivation in SDT

Motivation for help-seeking was both autonomous and controlled in nature. Autonomous and controlled motivation scores from the TSRQ generally aligned with participants’ interview statements. For instance, an autonomously motivated participant who scored the maximum of 7 on the autonomous motivation scale reported the following:

“From the day I decided to go [and seek help] I’ve noticed a difference in myself…I’ve come out of myself. I haven’t sat and just not joined in the
conversation, because I was frightened of saying the wrong thing.” (Female, 87).

Controlled motivation was evident when participants did not report hearing or communication difficulties, and had sought help to please others. This is illustrated by the following quote from a participant with a high controlled motivation score of 5.1:

“[There are] times where I switch off; she [my wife] reckons I can't hear…Did I think it [the hearing test] was necessary? I thought ‘Well, I don't think it's necessary but I'll go anyhow and have it checked’.” (Male, 71).

A review of help-seeking reasons from the perspective of SDT revealed a variety of autonomous and controlled motives that varied in the extent of internalisation. The SDT internalisation continuum (Ryan & Connell, 1989; Deci & Ryan, 2000; Sheldon et al., 2015) was therefore applied to further classify help-seekers' motives according to their relative autonomy. Each reason for help-seeking was examined for relevance to SDT by comparing the reason against each type of motivation and the characteristics that denote the motivation type. Terminology and definitions from Ryan and Connell (1989), and Deci and Ryan (2000), were used for this purpose. Internalisation was evident when participants were inherently satisfied with their decision to seek help, and when help-seeking was integrated with personal values and beliefs. Less internalised responses to help-seeking stemmed from a sense of obligation to important others, to avoid conflict with family, or if little value was placed on seeking help. Illustrative examples from Ng et al. (2012), Patrick and Williams (2012), and Ridgway, Hickson and Lind (2013), guided content categorisation. Table 6.3 illustrates the relative autonomy of help-seeking motivation expressed by participants.
### Table 6.3: Examples of autonomous and controlled forms of help-seeking motivation of participants, from the perspective of SDT

<table>
<thead>
<tr>
<th>Motivation Type</th>
<th>Explanation / Characteristic</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic</td>
<td>Inherent enjoyment and satisfaction</td>
<td><em>I feel comfortable that I've done something about it so good within myself as well.</em> (M, 66)</td>
</tr>
<tr>
<td>(Autonomous)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated</td>
<td>Alignment with personal beliefs</td>
<td><em>I feel relieved knowing I'm going to get something done and I should be able to hold a conversation with someone and not say &quot;Pardon?&quot;</em> (F, 66)</td>
</tr>
<tr>
<td>(Autonomous)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identified</td>
<td>Value recognition</td>
<td><em>I knew sooner or later that I needed one. But because I'm so busy every day…</em> I tend to neglect myself. (M, 67)</td>
</tr>
<tr>
<td>(Somewhat autonomous)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introjected</td>
<td>Sense of guilt or obligation; pride</td>
<td><em>(My wife) suggested that my hearing has diminished a little bit because I'm always asking her to repeat things and so I guess I needed to have a hearing test. (M, 69) They (my family) kept on suggesting that I get my hearing tested, which I've done, so now it's back on them to speak up a little bit better. (M, 63)</em></td>
</tr>
<tr>
<td>(Somewhat controlled)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External</td>
<td>Conflict avoidance</td>
<td><em>Did I think it (attending for hearing test) was necessary? I thought &quot;Well, I don’t think it's necessary but I'll go anyhow and have it checked.&quot; even if it was only to satisfy my wife.</em> (M, 71)</td>
</tr>
<tr>
<td>(Controlled)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amotivation</td>
<td>Unintentional; unvalued</td>
<td><em>I stumbled across one of the vans outside the supermarket. It was a very cold day so I thought if I pop in there they'll be able to shut the door for a minute.</em> (F, 71)</td>
</tr>
<tr>
<td>(Controlled; Impersonal)</td>
<td></td>
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</tr>
</tbody>
</table>

References: Ryan & Connell, 1989; Deci & Ryan, 2000; Ng et al., 2012; Patrick & Williams, 2012; Ridgway, Hickson, & Lind, 2013).
6.3.3 Autonomy support and need satisfaction in SDT

Overall, participants reported high levels of autonomy support, with 11 of 13 participants scoring above 6 on the HCCQ (on a scale of 1 to 7). To explore how autonomy support might influence the decision to adopt or not adopt hearing aids, participant comments interpreted as need satisfaction were grouped into the three psychological need categories of autonomy, competence and relatedness in SDT. Classification of need satisfaction meaning units was guided by SDT literature that details how each psychological need might be observed (Markland et al., 2005; Williams et al., 2000; Ryan & La Guardia, 2000; Ridgway et al., 2013). Throughout all interviews there was evidence that these three needs contributed to need satisfaction (see Table 6.4).
Table 6.4: Summary of characteristics of autonomy, competence and relatedness associated with need satisfaction, from the perspective of participants in this study.

<table>
<thead>
<tr>
<th>Need satisfaction</th>
<th>Characteristic</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Autonomy          | Congruence              | I haven't completely closed it out about having aids but, at the moment, I think what I do in my lifestyle and the way how things are, I think that I'm okay about it. (M, 69)  
I feel comfortable that I've done something about it so good within myself as well. (M, 66)  
I'm glad I made that decision [to adopt hearing aids] and I hope it does make a difference to my life. That's what I want.” (F, 66)  
Ability to choose | I haven't completely closed it out about having aids but, at the moment, I think what I do in my lifestyle and the way how things are, I think that I'm okay about it. (M, 69)  
I feel comfortable that I've done something about it so good within myself as well. (M, 66)  
I'm glad I made that decision [to adopt hearing aids] and I hope it does make a difference to my life. That's what I want.” (F, 66)  
Ability to choose | I haven't completely closed it out about having aids but, at the moment, I think what I do in my lifestyle and the way how things are, I think that I'm okay about it. (M, 69)  
I feel comfortable that I've done something about it so good within myself as well. (M, 66)  
I'm glad I made that decision [to adopt hearing aids] and I hope it does make a difference to my life. That's what I want.” (F, 66)  
Choosing what's best for me | If I thought I really needed it, I'd take it. I don't think I really need it yet. (M, 71)  
I don't think it's necessary yet and she didn't think it was necessary yet either so I'm taking her advice and on my own initiative it's not necessary yet. (F, 71)  
I was the decision maker, not him. (F, 66)  
Competence | Confidence              | I really think I've come out of myself more. (F, 87)  
Goal-setting clarity | You set that goal and start to strive towards it (getting hearing aids). (M, 66)  
Empowerment | I'm quite happy with it. I know all the boxes have been ticked. I know exactly where I stand. (M, 63)  
I feel good…it [the audiometric results] just confirms what I thought [about my hearing] anyhow, but it's a bit of a relief I suppose too. (M, 71)  
<p>|</p>
<table>
<thead>
<tr>
<th>Overcoming doubts</th>
<th>I’m quite happy that I’m not that bad. (F, 64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional response</td>
<td>There’s more not to be worried about than to be worried about. I’ve got nothing to lose. (F, 66)</td>
</tr>
<tr>
<td></td>
<td>I’m quite excited actually to see how it [getting hearing aids] all pans out…Knowing it’s going to make a difference. (F, 66)</td>
</tr>
<tr>
<td></td>
<td>I think they (my family) will be happier that they haven't got to keep re-explaining themselves all the time. (M, 66)</td>
</tr>
<tr>
<td>Relatedness</td>
<td>I feel relieved knowing I’m going to get something done and I should be able to hold a conversation with someone and not say “Pardon?” and all that again. (F, 66)</td>
</tr>
<tr>
<td>Comfortable and at ease</td>
<td>All the questions I asked, all the emotional questions, physical questions, not a problem. I just talk to people and they talk to me so I’m very happy about that practitioner’s response. (M, 74)</td>
</tr>
<tr>
<td>Supported by practitioner</td>
<td>She’s very easy to talk to, nice lady, and (I feel) really comfortable. (F, 66)</td>
</tr>
<tr>
<td>Supported by practitioner</td>
<td>They gave me 100% satisfaction. (F, 70)</td>
</tr>
<tr>
<td>Connecting with others</td>
<td>I’ve got my grandkids coming down, so I’m looking forward to seeing how well it goes … That’s what I’m looking forward to, being able to actually hear my grandchildren. (F, 66)</td>
</tr>
<tr>
<td>Connecting with others</td>
<td>I think they [my family] will just take it in their strides [not adopting hearing aids] and say “Oh well, maybe you should listen a bit more dad, instead of ignoring us.” (M, 63)</td>
</tr>
<tr>
<td>Connecting with others</td>
<td>I really think I’ve come out of myself more. I haven’t sat and just not joined in the conversation, because I was frightened of saying the wrong thing. I think everything’s improved … It makes me feel as if I’m with the young ones, I’m joining in with them, I’m not missing out. (F, 87)</td>
</tr>
</tbody>
</table>

References: Markland et al., 2005; Williams et al., 2000; Ryan & La Guardia, 2000; Ridgway et al., 2013.
In summary, results of the deductive analysis revealed a variety of motives that helped explain help-seekers’ engagement with hearing rehabilitation. These motives included internalised reasons that revealed congruence between participants’ actions and beliefs ("I feel relieved knowing I’m going to get something done and I should be able to hold a conversation with someone"), and extrinsic reasons that implied participants felt obliged to attend or sought to avoid conflict ("I don’t think it [attending for hearing test] was necessary but I’ll go anyhow and have [my hearing] checked, even if it was only to satisfy my wife"). When participants contemplated their experiences in the clinic they described how these experiences influenced their decision to adopt or not adopt hearing aids and satisfied needs. For example, participants reported feeling relieved and empowered by the information provided to them during consultation ("I know exactly where I stand…I feel good…it [the audiometric results] just confirms what I thought [about my hearing] anyhow, but it's a bit of a relief I suppose too"). Participants also were satisfied when feeling able to discuss their concerns with the practitioner ("All the questions I asked, all the emotional questions, physical questions, not a problem…I'm very satisfied with the decision to get hearing aids"). The data appeared to fit well when reinterpreted and categorised within the SDT internalisation continuum and psychological need satisfaction constructs.

6.4 Discussion

The results showed that (1) Communication experiences, which encompassed conversation difficulties, impact on family, participation and emotional response, and (2) My story, which comprised perceived difficulties, self-image, promotion of service, encouragement from family and preconceptions about hearing aids, guided help-seeking behaviour, which helped explain motivation engagement of participants in this study. Participants’ perceptions of their interactions with practitioners were described by their Clinical experiences, which included discussions about audiometric results, supportive and non-directive practitioners, choice, cost, and general comments about the practitioner and service, and illustrated how autonomy support related to the decision to adopt or not adopt hearing aids. Motivation for help-seeking was able to be interpreted along the SDT internalisation continuum, and need satisfaction included autonomy, competence and relatedness.
6.4.1 Interpretation of data

The two types of data analysis presented in this study illustrated how participant comments might be interpreted as motivational when viewed through the lens of SDT. While the inductive analysis of reasons for help-seeking identified the variety of communication experiences and personal factors important to help-seeking, the deductive analysis organised these reasons according to the extent of internalisation. The clinical experiences that contributed to autonomy support and hearing aid adoption in the inductive analysis were reinterpreted as need satisfaction with the deductive analysis. Together, this dual approach to analysis has contributed a deeper understanding of the data than individual analysis could not provide. The results have captured how motivation for help-seeking and autonomy support for hearing aid adoption or non-adoption might be recognised from participant comments in the clinic. In the following two sections, reasons for help-seeking and autonomy support for the hearing aid adoption decision are discussed in turn. Inductive and deductive findings are integrated within each section.

6.4.2 Help-seeking

Not surprisingly, help-seeking behaviour was prompted by participants’ communication experiences. People whose conversations contain multiple miscommunications may withdraw from participation in conversation (Tye-Murray, Purdy, & Woodworth, 1992; Lind, Hickson, & Erber, 2010). A consequence of perceptions of communication difficulty and reduced participation can be diminished self-image (Lind et al., 2010), and poorer mental health outcomes such as depression (Mener, Betz, Genther, Chen, & Lin, 2013), anxiety (Hogan, Phillips, Brumby, Williams, & Mercer-Grant, 2015), social isolation (Kramer, Kapteyn, Kuik, & Deeg, 2002), reduced well-being (Hickson et al., 2008) and reduced health-related quality of life (Chia et al., 2007). Indeed, several participants in the current study described feelings of embarrassment, shame and anxiety resulting from communication difficulties and reduced participation, which led them to seek assistance.

However, others did not report that communication difficulties had an emotional impact on them. About half the participants reported being curious about whether or not their
communication experiences warranted further action such as hearing aid adoption. Differences in emotional responses therefore appeared to influence motivation. For instance, several help-seekers with self-reported communication difficulties discussed the impact of these difficulties on family, and how encouragement from family prompted help-seeking. For some participants, conversation difficulties made it difficult to stay involved socially, which made them feel anxious and frustrated. Together with family members they willingly sought help to overcome these difficulties (“Everyone keeps saying to me they need to repeat…I knew sooner or later I needed one [a hearing aid]…I wanted to make peace with the families”). By contrast, a small number of participants mentioned frustration at conversation difficulties that stemmed from the perception that others were not speaking clearly enough, and had sought help to avoid further conflict with family (“They [my family] kept on suggesting that I get my hearing tested, which I’ve done, so now it’s back on them to speak up”).

From the perspective of SDT, the range of communication experiences and personal factors involved in help-seeking were interpreted as motivation that varied in the extent of internalisation. When people internalise, external ideas and values are personally endorsed and accepted into an integrated sense of self (Ryan et al., 2008). Using the first example above, internalised motivation was evident when there was personal acknowledgment of the need to adopt hearing aids (“I knew sooner or later I needed one”), recognition of the impact on others (“Everyone keeps saying to me they need to repeat”), and a clearly stated internal goal (“I wanted to make peace with the families”). Less internalised motivation was apparent in the second example, in which the reason for help-seeking remained external to the self (“They kept on suggesting I get my hearing tested”), and limited acknowledgement of the impact on others (“it’s back on them to speak up”). If internalisation does not occur, personal values remain external or only partially integrated and behaviour is not fully self-determined, which means new behaviours promoted by others are not adopted (Deci & Ryan, 2000). In audiology research, help-seekers who have not internalised rehabilitation options such as hearing aids may resist practitioner recommendations and not take any action (Ekberg, Grenness, & Hickson, 2016). Practitioners who consider how communication experiences and personal influences impact upon internalised help-seeking might therefore relate this information to patients’ rehabilitation decisions.

In some instances, participants described both autonomous and controlled types of help-seeking motivation. For instance, two participants, who reported being motivated by
their spouses to attend (controlled), had given consideration to hearing aids and recognised their potential benefit (autonomous), and in both cases had decided to not adopt hearing aids. Multiple motives that vary in the extent of autonomy are not uncommon (Ryan, Lynch, Vansteenkiste, & Deci, 2011), and by describing different types of motivation in this study, an internalisation continuum for hearing help-seeking was supported. Results affirmed the suggestion in Chapter 3 that refining the TSRQ would be of benefit, because categorising motivation as autonomous and controlled may not sufficiently differentiate among the various types of motivation illustrated in this study.

6.4.3 Autonomy support and the hearing aid adoption decision

A range of clinical experiences emerged from the data that helped explain how autonomy support from the practitioner related to the decision to adopt or not adopt hearing aids. For example, the practitioner’s non-directive nature facilitated competence and relatedness for this participant: (“She put me at ease straight away…sometimes I’m a bit reserved and I’ll hold back but I told her how I felt and how it’s affected me…I was happy with her…I’m quite excited actually to see how it [getting hearing aids] all pans out…Knowing it’s going to make a difference…I feel relieved knowing I’m going to get something done and I should be able to hold a conversation with someone and not say ‘Pardon?’ and all that again”). All participants were engaged in the decision to adopt or not adopt hearing aids during their initial consultation and were actively involved in reaching a decision that was satisfactory for them. There was evidence of autonomy support when participants felt comfortable with their audiologist, when choices were supported, when relevant audiometric information was discussed and when they could talk freely about matters that concerned them. This finding reinforces the assertion from Chapter 4 that practitioner support for non-adoption reduced differences in autonomy support scores on the HCCQ between adopters and non-adopters.

Unlike Grenness et al. (2015), who found few instances of patients having their preferences considered during initial audiology consultations, several participants in this study reported that they were engaged in decision-making and were encouraged to make choices (“She didn’t force me into any direction at all, you know, let me make my own decision”; “I didn’t get ‘well that’s the right decision [to not adopt hearing aids].’ We just sort of came to it [the decision] without a speech”). In a study that asked 43 help-seekers who had been recommended hearing aids and 74 hearing health practitioners to rate the importance
of factors that influence hearing aid purchase decisions, Poost-Foroosh, Jennings and Cheesman (2015) found that clients, moreso than practitioners, regarded shared decision-making and supporting choice to be important to hearing aid adoption. As with Grenness et al. (2015), however, the range of rehabilitation options available to participants in this study appeared to be limited to hearing aids. Although many participants felt comfortable if their choice to adopt or not adopt hearing aids was supported or directed by the practitioner, one participant was dissatisfied that communication strategies and family involvement were not presented as options (“It could be important to have communication with your partner or the one person who’s going to be close by who really feels that there is a problem with the hearing…There could be a discussion on how you should speak with one another”). Two other participants reported communication difficulties that may not have been fully addressed by the practitioner (“We did the tests and apparently I’m not missing out too badly as I thought I was”; “That’s probably been my biggest problem, the background noise and that’s fairly normal according to [the practitioner]”).

Furthermore, several participants felt their choice of hearing aids was restricted by cost or eligibility. Hearing help-seekers value being fully informed and having the opportunity to carefully consider a decision (Laplante-Lévesque et al., 2010; Poost-Foroosh, Jennings, Shaw, Meston, & Cheesman, 2011; Grenness et al., 2014). In addition, help-seekers have reported that they trust and value practitioners who listen and respond to patient needs and communicate a range of rehabilitation options (Preminger et al., 2015; Poost-Foroosh et al., 2015). Provision of relevant information about hearing loss is important to hearing help-seekers (Poost-Foroosh et al., 2011; Grenness et al., 2014; Poost-Foroosh et al., 2015) and in SDT, educating clients with information that is relevant to treatment facilitates autonomy support (Williams et al., 2000). In SDT health research, autonomy support enables active participation in rehabilitation, creates an atmosphere of acceptance and trust, and helps people overcome barriers to change (Ng et al., 2012). According to Williams et al. (2000), several tenets of autonomy support can help improve healthcare engagement and need satisfaction: (1) expressing empathy and demonstrating understanding of patient perspectives and concerns; (2) being responsive to and encouraging the needs of patients and their families; (3) provision of information within the patient’s frame of reference, and (4) empowering choice. Therefore, presenting help-seekers with a range of intervention options and responding to their communication concerns might enhance autonomy support in audiology consultations when rehabilitation decisions are being made.
Although applications of most health behaviour change models regard change as important to patient well-being (Clark, Maatman, & Gailey, 2012; Ekberg et al., 2016), not changing behaviour (i.e., not adopting hearing aids) was desirable for some participants in this study. To respect non-adoption is to respect autonomy, and results showed non-adopters reported that they experienced autonomy and competence in situations where they made a choice themselves, and when they were presented with personally meaningful options. Autonomy relates to the value a person places on a decision, and not to a decision valued by audiologists. Subtle conceptual differences in SDT between autonomy and independence (Deci & Ryan, 2008; Vansteenkiste, Williams, & Resnicow, 2012) illustrate this point: one participant chose not to adopt hearing aids independent of advice received from the audiologist (“It was just a decision I made and it was not whether it was easy or not. I just decided that…”), whereas another non-adopter depended on the practitioner’s expertise (“If she had recommended a hearing aid, I would have got one because she’s the expert”). Respect for the autonomy of non-adopters’ choices both informed and empowered participants about their hearing rehabilitation options. Further research to understand practitioners’ approaches to counseling about choice is warranted.

The impact of communication difficulties on participants’ personal feelings was apparent in their use of emotionally-oriented talk when relaying their experiences at interview (“If I can’t understand what [people are] saying I feel stupid…it is annoying. It is frustrating and sometimes I feel a bit embarrassed”). Although Ekberg et al. (2014) found little evidence of emotional talk during initial clinical consultations, there was evidence in this study, albeit limited, that participants responded positively to practitioners who engage affectively (“All the emotional questions…not a problem”). Autonomy support regards affect (the thoughts and expression of feelings or emotion towards an experienced state) as important to the patient-practitioner relationship (Beach & Inui, 2006). By being attuned to emotional talk, practitioners can better address affective factors that influence help-seeking behaviour and hearing aid adoption decisions, which will enhance the autonomy-supportive hearing health care setting.

When participants reflected on their clinical experiences, the deductive analysis revealed how autonomy support facilitated need satisfaction. To use the examples described above, practitioners who supported choice (relatedness) helped participants feel confident that the choice they made was the right one for them (competence, autonomy): “I didn’t get ‘Well that’s the right decision’…We just sort of came to it without a speech. I just said ‘I’m
very happy to hear that’...they gave me 100% satisfaction”. On the other hand, needs that appeared to remain unmet following consultation resulted in uncertainty about hearing aid adoption, which suggests reduced competence (“There could be a discussion on how you should speak with one another…certainly I know that I do have a hearing loss but I just feel that at this point in time I don’t know whether hearing aids are completely appropriate”).

Experiencing autonomy, competence and relatedness was important for need satisfaction. Autonomy was facilitated when participants felt able to make a choice suitable to them (“It’s good to make the right decision for me”). By doing so, participants have personally endorsed the importance of a behaviour, which is evidence of integration of behavior with personal values (Ryan et al., 2008). Thus, hearing aid adopters who value the importance of hearing aids and who recognise their potential benefits to their lives have internalised the health behaviour of hearing aid adoption (“I feel comfortable that I’ve done something about it so good within myself”). Feelings of autonomy were not limited to hearing aid adopters: non-adopters also experienced autonomy when practitioners supported their choice (“I’m taking her advice and on my own initiative it’s not necessary yet”), and when reconciliation of the choice made with personal circumstances resulted in congruence between thoughts, values and actions (“I think what I do in my lifestyle and the way how things are, I think that I’m okay about it”). Similar evidence linking autonomy with integration and internalisation of behaviour is found across many areas of health that recognises autonomy as central to internalised engagement with services (Ryan et al., 2011; Ng et al., 2012). In this study, internalisation and engagement with services was evident for both adopters and non-adopters.

For adopters, competence was observed when action was taken to address communication difficulties and participants were confident that their choice would make a difference to their lives (“I’m glad I made that decision [to adopt hearing aids] and I hope it does make a difference to my life. That’s what I want”). For non-adopters, competence was evident when participants described relief or empowerment from information learned during the clinical consultation (“I’m quite happy with it. I know all the boxes have been ticked. I know exactly where I stand”). Competence is central to many theories of health behaviour change. Self-efficacy is akin to competence (see Ridgway, Hickson & Lind, 2016), and is described in social cognitive theory (Bandura, 1989), the transtheoretical model (Prochaska & Velicier, 1997) and the health belief model (Rosenstock, Strecher, & Becker, 1988). Within SDT, perceiving competence relies on autonomy for effective internalisation and maintenance of health behaviours (Ryan et al., 2008).
Of particular note was that relatedness was evident through the value participants placed on feelings of connectedness and belonging with friends and family ("I feel relieved knowing I’m going to get something done and I should be able to hold a conversation with someone"; "I’m joining in with them, I’m not missing out."). Although few qualitative studies in SDT health research have explored patient perspectives, relatedness with caregiving staff was of primary importance for physically frail but cognitively intact nursing home residents (Custers, Westerhof, Kuin, Gerritsen, & Riksen-Walraven, 2012) and for a sample of African-American participants with Type 2 diabetes (Bhattacharija, 2012). For hearing help-seekers, feeling comfortable about their clinical experiences, expressing hopes for improved communication and feeling relief at having sought help highlights the importance of relatedness in hearing rehabilitation.

### 6.4.4 Summary

Overall, these findings provided new insights into the characteristics of autonomous and controlled help-seeking and how internalisation might be observed in the clinic. Participants who described their clinical experiences revealed autonomy supportive elements of clinical consultations that related to their decision to adopt or not adopt hearing aids. Satisfaction with this decision was connected with feelings of autonomy, competence and relatedness.

The presence of multiple motives defended the importance of contrasting autonomous and controlled motivation in the clinic, and reiterated the suggestion in Chapter 3 that a refined TSRQ would more precisely measure the various forms of motivation along the SDT internalisation continuum. Practitioner support for participant choices might explain why autonomy support, as measured with the HCCQ in Chapter 4, was not associated with hearing aid adoption. Although Chapter 5 illustrated the nature of relationships between sociodemographic and motivational characteristics, the current study revealed the considerable variance of help-seekers’ experiences and attributes, and demonstrated the fundamental nature of how autonomy support is linked with satisfaction of autonomy, competence and relatedness for all help-seekers, which highlighted the importance of supporting these needs in the clinic.

It should be noted that the results described in this study were extrapolated from the views of an Australian sample of 13 English-speaking hearing help-seekers, 12 of which had received subsidized services. This represented a potential limitation to the generalisability of
the sample. Although the sample size was small and relatively homogenous, the SDT model was supported with evidence of varied internalisation for help seeking and need satisfaction that comprised autonomy, competence and relatedness. Future research with a larger, more diverse sample to distil specific aspects of autonomy support in audiology consultations relating to choice, emotion, and how audiometric information is presented, might help capture aspects of client-centredness in audiology consultations that appear to be missing.

6.5 Conclusion

In conclusion, participants revealed a range of experiences and personal factors that motivated help-seeking behaviour, and described how they engaged with hearing rehabilitation by discussing what was important to them when deciding to attend a clinic. The diverse perspectives of adopters and non-adopters provided detailed insight into the ways that participants interacted with practitioners and how autonomy support influenced decisions to adopt or not adopt hearing aids. Participants conveyed how their experiences, hopes, beliefs and relationships motivated their choices, and played a critical role in satisfaction of needs. The following Chapter summarises the body of research presented in this thesis, and discusses clinical implications and future research directions based on these findings.
6.6 References


Psychotherapy, 57, 749–761.


Chapter 7 – Summary, clinical implications and future directions

7.1 Research summary

The research presented in this thesis used SDT (Deci & Ryan, 1985) as a guiding theoretical framework to explore motivation for help-seeking, hearing aid adoption and hearing aid fitting outcomes in a sample of adult first-time hearing help-seekers. This body of work comprised three quantitative studies and one qualitative study, and was the first research to study SDT in the context of adult hearing rehabilitation. An explanatory sequential mixed methods research design (Creswell & Plano Clark, 2011) was employed in order to integrate quantitative and qualitative results and translate theoretical findings into real world practice. Figure 7.1 summarises the overall research findings of the thesis with a description of motivation and hearing rehabilitation according to SDT.
NOTE: As found in Chapter 5, the personal factor ‘Referred by Others’ is associated with controlled motivation.

Figure 7.1: SDT process model of hearing health behaviour for the findings of this thesis relating to motivation.
The literature review in Chapter 2 explained the nature of human motivation in broad terms, describing its reach across biological, cognitive, sociocultural and neuroscientific characteristics that drive behaviour. Research findings that supported application of different health behaviour models to explain and predict hearing health behaviours were discussed. The review argued that SDT is a candidate model to help explain the processes through which adult hearing help-seekers develop motivation to seek help, decide to adopt or not adopt hearing aids and sustain new behaviours over time. Unlike other models of health behaviour, SDT classifies different types of motivation along a continuum of internalisation, and describes motivation according to its relative autonomy. Autonomous types of motivation are commonly associated with internalised behaviour such as increased engagement with an activity and persistence with healthy behaviour, which leads to improved personal well-being and positive health outcomes. SDT also focuses on how internalised behaviour is facilitated or thwarted within peoples’ social and personal environments, according to whether or not three psychological needs for autonomy, competence and relatedness are fulfilled.

Consequently, the review contrasted SDT with other health behaviour models by describing its potential to explain and predict help-seeking and hearing aid adoption by classifying different types of motivation, and also by describing how practitioners can facilitate internalised behaviour conducive to health and well-being by supporting autonomy, competence and relatedness in the clinic (i.e., autonomy support). The theoretical associations described in the SDT framework, the theory’s potential to predict, explain and describe health behaviour, and the lack of research of SDT in adult hearing rehabilitation provided justification for further research.

Chapter 3 described a quantitative cohort study that used an adapted TSRQ to measure autonomous and controlled types of motivation, then investigated associations between motivation and the decision to adopt or not adopt hearing aids (Ridgway, Hickson, & Lind, 2015). Regression analysis showed higher autonomous motivation scores were associated with increased hearing aid adoption. Greater self-reported hearing difficulty and poorer better-ear hearing were also associated with increased hearing aid adoption, which is a finding consistent with evidence reported by Knudsen, Öberg, Nielsen, Naylor and Kramer (2010), Meyer and Hickson (2012), and Meyer, Hickson, Lovelock, Lampert and Khan (2014). By contrast, controlled motivation was not associated with hearing aid adoption. These results enabled hearing aid adoption to be represented as an internalised decision, which is consistent with a large body of SDT health research that links
autonomous motivation with initiation of other health-related behaviours conducive to well-being (Ng et al., 2012).

The second study in Chapter 4 explored relationships between autonomous and controlled motivation and hearing aid fitting outcomes, and between autonomy support, hearing aid adoption and hearing aid fitting outcomes. For hearing aid adopters, autonomous motivation was associated with only one outcome, hearing aid satisfaction. Although autonomy support was not associated with hearing aid adoption, participants who adopted hearing aids reported greater perceived competence with hearing aids, reduced activity limitations with hearing aids and greater hearing aid satisfaction if they perceived greater autonomy support from their practitioner. This result provided some evidence that autonomy supportive practitioners might help hearing aid adopters maintain internalised skills for change, an important finding in the context of SDT research that has associated autonomy support with positive psychosocial and physical health outcomes (Ng et al., 2012). However, the lack of association between autonomy support and hearing aid adoption suggested either: (1) support was evident for rehabilitation options other than hearing aid adoption, or (2) support was less evident during the consultation at which the decision to adopt or not adopt hearing aids was made. Taken together, differences in the ways motivation contributed to hearing aid adoption and outcomes prompted further investigation in two areas. Firstly, researching whether or not personal factors can characterise autonomous and controlled motivation might illuminate motivational processes that underlie behaviours and actions in the clinic. Secondly, exploring the practitioner’s role in the decision whether or not to adopt hearing aids might articulate the components of autonomy support most relevant to hearing aid adoption.

To address the first of these areas, Chapter 5 described a quantitative study that investigated associations among personal differences and motivation. Results showed participants with higher autonomous motivation scores were younger, wanted hearing aids more and reported greater hearing difficulties than those with lower scores. Participants with higher controlled motivation scores were more often referred to the service by others and wanted hearing aids more than those with lower scores. Controlled motivation scores were not associated with perceptions of hearing difficulty in everyday life. The nature of relationships among personal differences and motivation revealed the variety of cognitive, behavioural and affective processes that underlie why people seek help and make decisions such as hearing aid adoption. Further research of the multifaceted motivational processes that influence hearing help-seekers to make decisions such as hearing aid adoption was explored in Chapter 6.
In the qualitative study described in Chapter 6, participants were encouraged to discuss their personal experiences and their reasons for attending for hearing assessment and were questioned about their experiences with the practitioner and their choices made. Thirteen first-time hearing help-seekers were interviewed. Data were analysed inductively and deductively, to understand (1) help-seeking motivation and (2) autonomy support and the hearing aid adoption decision.

By classifying the variety of reasons for help-seeking with SDT, motivation was found to be autonomous and controlled in nature and to vary in the extent of internalisation. Autonomously motivated help-seekers responded emotionally to negative communication experiences such as conversation difficulties and reduced participation. Help-seekers with controlled motivation reported low perceived hearing difficulties, and negative preconceptions about hearing services and hearing aids.

Participants’ clinical experiences helped to explain the relationship between autonomy support and hearing aid adoption by highlighting practitioner characteristics help-seekers regarded as important. Help-seekers responded positively to practitioners who were helpful, encouraged open discussion, and supported their decisions to adopt or not adopt hearing aids. These findings might explain why autonomy support scores were not associated with hearing aid adoption in Chapter 4. Practitioners were autonomy supportive when acknowledging clients’ viewpoints and facilitating a comfortable environment within which clients could choose to adopt or not adopt hearing aids. However, autonomy support seemed to be less evident when practitioners did not acknowledge self-reported communication difficulties during discussions about audiometric results. Additionally, there was some evidence that rehabilitation options that focused on hearing aids and did not include communication strategies or partner involvement hampered the decision-making process.

A further finding in Chapter 6 related to how participants conceptualised need satisfaction from their interactions with the practitioner. When reflecting on their experiences, participants described satisfaction with the clinical interaction when their needs for autonomy, competence, and relatedness were fulfilled. Satisfaction was connected with the choices participants made regarding hearing aid adoption, and when participants considered the impact this choice might have on their lives. Participants’ needs were satisfied when they felt able to choose, were confident that their choice was acceptable and valid, and felt comfortable that the practitioner accepted their choice.

Together, the four studies revealed autonomous motivation and autonomy support, two important concepts of SDT, to play different roles in help-seeking, the decision to adopt
or not adopt hearing aids and hearing aid fitting outcomes. By integrating quantitative and qualitative findings, this body of work provided some evidence to support application of SDT in hearing rehabilitation.

7.2 Clinical Implications

Translating the research of this thesis into clinical practice may require a shift in thinking from practitioners working in a clinical environment away from the current focus on hearing aid prescription and fitting. Clinics that profit from hearing aid sales might resist changes to clinical practice that reduce emphasis on hearing aids and promote alternative models of rehabilitation, especially if funding models or remuneration structures are designed to reward hearing aid fitting. Practitioners could be encouraged to attend to client motivation and provide autonomy support as these might identify readiness for hearing aids and ultimately lead to improved client outcomes. For practitioners working in audiology clinics whose main focus is to prescribe and fit hearing aids, TSRQ and WANT scores could therefore help identify (1) whether or not clients are hearing aid candidates, and (2) when autonomy supportive counseling might be used.

7.2.1 Evaluating motivation with hearing help-seekers

This body of research was the first to use the TSRQ to measure motivational characteristics of first time adult hearing help-seekers. In the clinic, the TSRQ could be administered to identify autonomous and controlled motivation, and to predict hearing aid adoption with autonomous motivation scores. Researchers in other health domains have administered the TSRQ to link autonomous motivation with internalised health decisions (Ryan & Connell, 1989; Williams, Grow, Freedman, Ryan, & Deci, 1996; Williams, Freedman, & Deci, 1998; Williams et al., 2006; Münster Halvari & Halvari, 2006; Fortier, Sweet, O'Sullivan, & Williams, 2007; Levesque et al., 2007; Mildestvedt, Meland, & Eide, 2007; Shigaki et al., 2010; Hurkmans et al., 2010; Williams et al., 2011; Stamp et al., 2015), and in this thesis, the decision to adopt hearing aids was regarded as internalised. In other studies of health behaviour in audiology, internalisation has also been associated with increased uptake of intervention and adoption of hearing aids (e.g., Laplante-Lévesque, Hickson, & Worrall, 2012; Ekberg, Grenness, & Hickson, 2016). For clients who have not yet made a decision about hearing aids, the TSRQ could therefore be used to identify motivational characteristics prior to practitioner consultation. Practitioners might also consider the WANT, which measures self-reported hearing difficulty and desire for hearing aids, alongside the TSRQ to assist with decisions such as hearing aid adoption. Together,
these tools could profile hearing help-seekers’ motivation to assist practitioners tailor rehabilitation. For instance, clients with high autonomous motivation on the TSRQ, or high perceived difficulty and desire for hearing aid scores on the WANT, are likely to be ready to adopt hearing aids. Clients with high autonomous motivation and perceived difficulty scores and low desire for hearing aid scores might prefer to take up rehabilitation intervention options other than hearing aids, such as individual or group communication programs. Clients with high controlled motivation and low WANT scores may benefit from counseling about acceptance of hearing loss and the involvement of family during the consultation. For practitioners working in audiology clinics whose main focus is to prescribe and fit hearing aids, TSRQ and WANT scores could therefore help identify (1) whether or not clients are hearing aid candidates, and (2) when autonomy supportive counseling might be used.

Another clinical approach to understanding motivation was recently demonstrated by Ferguson, Maidment, Russell, Gregory and Nicholson (2016), who used the Ida Institute’s Motivation Tools (Ida Institute, 2013), which are based on the transtheoretical model of health behaviour change, to explore internalisation in hearing aid adopters at the initial appointment. Ferguson et al. (2016) found participants showed greater engagement with rehabilitation if practitioners used the Motivation Tools than if the tools were not used.

In the clinic, practitioners who explore communication experiences and personal influences might gain insight into how clients internalise motivation for seeking help and hearing aid adoption. Communication experiences that related to conversation difficulties and reduced participation might reveal internalised, or autonomous, types of help-seeking motivation. This finding is consistent with the World Health Organisation ICF framework, which considers the impact of activity limitations and participation restrictions on peoples’ lives as a catalyst for intervention. Practitioners might also consider clients’ emotional responses to conversation difficulties and reduced participation (Ekberg, Grenness, & Hickson, 2014; Heffernan, Coulson, Henshaw, Barry, & Ferguson, 2016). Chapter 6 provided some evidence that feelings of anxiety, embarrassment and frustration that accompanied discussion about communication often contributed to autonomous help-seeking and hearing aid adoption. These feelings were not usually described by help-seekers who did not adopt hearing aids. Exploring connections between clients’ communication experiences and emotions may therefore provide practitioners deeper understanding of the impact of hearing impairment on clients’ lives and those of their families, which can help facilitate intervention decisions such as hearing aid adoption or non-adoption. By contrast, controlled motivation, measured with the TSRQ, did not show any associations with hearing aid adoption or fitting outcomes. However, less internalised
types of motivation might be seen in the clinic when help-seekers feel obliged to seek help because of complaints from others, or when hearing rehabilitation is not personally valued. If the idea to seek hearing help has come from others, clients may not have fully internalised help-seeking. For clients presenting with controlled motivation, feeling pressure from practitioners or family to accept hearing aids is unlikely to encourage decisions about hearing aid adoption. Practitioners might assist clients with hearing aid adoption decisions by inviting family members to share their perspectives of communication experiences, and by welcoming their contributions to discussions (Ekberg, Meyer, Scarinci, Grenness, & Hickson, 2015; Singh & Launer, 2016).

To summarise, evaluating motivation in hearing rehabilitation can help practitioners understand how clients engage with hearing services. Motivation could be evaluated by using the TRSQ and/or the WANT, and by being sensitive to motivation during case history taking. Practitioners might recognize clients’ reasons for seeking help as autonomous and controlled. Practitioners who acknowledge clients’ emotions relating to their communication experiences, and the range of personal factors contributing to help-seeking, can gain insight into how motivational characteristics influence engagement with hearing rehabilitation.

7.2.2 Autonomy support in hearing rehabilitation

SDT argues that autonomy support can help clients internalise and integrate new health behaviours such as hearing aid adoption and to maintain these behaviours over time (Ryan, Patrick, Deci, & Williams, 2008; Ryan, Lynch, Vansteenkiste, & Deci, 2011; Ng et al., 2012). Evaluating autonomy support is therefore crucial in order to gain clients’ perspectives and experiences in the clinic. The HCCQ is a self-report measure of autonomy support that could be administered following consultation. Whereas the current research used the HCCQ with a large cohort of hearing help-seekers, the instrument could also be used with individual clients in the clinic to assess the extent to which a practitioner is autonomy supportive. Practitioners could use HCCQ results to reflect on their own practice. Clinics might also follow up help-seekers who report low HCCQ scores, for example, to address their potential concerns.

7.2.2.1 Autonomy support at the initial consultation

Chapter 6 found elements of autonomy support were present during initial consultations when practitioners were supportive, non-directive and promoted choice. For these consultations it may be assumed that practitioners created an environment within which participants felt comfortable and freely able to discuss their ‘story’. Hearing help-
seekers value being listened to (e.g., Laplante-Lévesque, Hickson, & Worrall, 2010; Grenness, Hickson, Laplante-Lévesque, & Davidson, 2014). Open discussion helps build rapport and enables clients to feel appreciated and accepted, which fosters trust between the practitioner and client (Preminger, Oxenbøll, Barnett, Jensen, & Laplante-Lévesque, 2015). A supportive, non-directive counseling approach helps facilitate autonomous motivation (Ryan & Deci, 2000; Ryan et al., 2008) because it enables an open exchange of information pertinent to rehabilitation and discussion about relevant treatment options (Markland, Ryan, Tobin, & Rollnick, 2005; Ryan et al., 2008; Patrick & Williams, 2012).

An important finding from Chapter 6 was that hearing help-seekers often felt supported in their choice to adopt or not adopt hearing aids, and if hearing aids were chosen, in the selection of the type of aid. Choice is a fundamental component of autonomy support (Williams, Frankel, Campbell, & Deci, 2000; Ryan et al., 2008), and clients who are presented with suitable information about a range of treatment options will experience autonomy (Ryan et al., 2008; Ng et al., 2012). Practitioners can support autonomy at the initial consultation by presenting rehabilitation options that enable clients the ability to choose what is best for them, and to feel comfortable with that choice (Williams et al., 2000; Markland et al., 2005; Patrick & Williams, 2012). Williams et al. (2000) emphasized how autonomy supportive practitioners can strengthen partnerships with clients by working together on mutually agreed goals and by involving important others in rehabilitation decisions. By contrast, “controlling” practitioners who attempt to persuade clients to agree to a particular treatment option may undermine autonomy and introduce resistance to change by implicitly or explicitly pressuring clients to accept their recommendation rather than respecting clients’ choice (Brehm, 1966; Rollnick & Miller, 1995; Williams et al., 2000; Ryan et al., 2008).

Although the current research found practitioners supported choice, there was little evidence that a full range of evidence-based rehabilitation options (Laplante-Levesque, Hickson, & Worrall, 2010; 2011; 2013) was offered to enable informed choice (Woolf et al., 2005). Despite the efficacy of rehabilitation options such as individual and group rehabilitation (Hawkins, 2005) and assistive listening devices (Chisolm, Noe, McArdle, & Abrams, 2007), choices appeared to be limited to adopting or not adopting hearing aids, or if hearing aids were accepted, the range of hearing aid styles. To promote rehabilitation options within an evidence-based practice framework, decision aids have been suggested as a method of addressing the issue of choice (Woolf et al., 2005; Laplante-Lévesque et al., 2013). Although decision aids were not studied in this thesis, they have been found to increase engagement with services (Woolf et al., 2005), facilitate hearing rehabilitation
decisions (Laplante-Lévesque et al., 2011), and improve concordance of personal values with choices (Stacey et al., 2014).

Practitioners can also support autonomy at the initial consultation by acknowledging help-seekers’ communication experiences and perceptions of difficulty. Participants who responded emotionally to communication experiences often adopted hearing aids, yet Grenness, Hickson, Laplante-Lévesque, Meyer and Davidson (2015) and Ekberg et al. (2014) both reported little evidence of emotionally focused discussions with hearing help-seekers during initial audiology consultations. In health care, engagement with services can be understood by acknowledging client emotions and expressing empathy for the concerns raised by clients (Patrick & Williams, 2012). Empathy involves reflective listening, seeking to understand clients’ perspectives, expressing concern and acknowledging personal distress (Davis, 1994; Sheldon, Williams, & Joiner, 2008). This in turn supports autonomy and can improve overall health outcomes (Lewin, Skea, Entwistle, Zwarenstein, & Dick, 2001; Ng et al., 2012). Practitioners who convey empathy are therefore well placed to acknowledge concerns of clients and identify readiness for action.

In summary, practitioners might demonstrate autonomy support with clients by: (1) offering meaningful information and rehabilitation options additional to hearing aids; (2) encouraging open discussion about communication experiences and acknowledging emotional responses; (3) involving important others during consultation; and (4) accounting for client preferences and values when decisions about hearing aid adoption are made.

7.2.2.2 Autonomy support following the initial consultation

Much of the literature describing the quality of client-practitioner discussions in audiology has focused on the initial consultations (e.g., Grenness et al., 2015; Ekberg et al., 2014), because it is at this time that clients ready themselves for change and initiate new health related behaviours such as hearing aid adoption. Likewise, the current body of research explored autonomy support at the initial consultation. However, autonomy support is important throughout the rehabilitation process to help clients sustain behaviours conducive to health and well-being (Williams et al., 2000; Ryan et al., 2008; Ng et al., 2012). Results from Chapter 4 that linked HCCQ scores and several hearing aid fitting outcomes provided some evidence that autonomy support continued to be important following initial consultation.
For hearing aid adopters, greater autonomy support was associated with increased perceived competence with hearing aids, which is a similar finding to research by Hickson, Meyer, Lovelock, Lampert and Khan (2014), which showed perceived self-efficacy for handling hearing aids was associated with hearing aid success. Practitioners who provide hearing aid adopters the skills to master challenges associated with hearing aid adoption and successful rehabilitation are autonomy supportive. To promote an autonomy supportive environment that facilitates satisfaction and sustains behaviour beyond the clinical setting, practitioners might encourage participation in life activities important to individual clients, explore the impact of communication on relationships with family, and acknowledge emotional responses to hearing aids. Practitioners might also foster autonomy support throughout the rehabilitation process by involving significant others (e.g. Hickson et al., 2014; Ekberg et al., 2015), and by building trust and loyalty through open communication (e.g., Grenness et al., 2014; Preminger et al., 2015).

7.3 Limitations and Future Directions

This body of research has several limitations. Firstly, as described in Chapters 3 and 4, only 8.7% of 3347 potential participants who were invited to participate in the quantitative studies responded to the initial research material. This low response rate could imply non-response bias for the sample (Berg, 2005). Although the detailed sociodemographic and audiometric information of non-responders is unknown, participants in the research had a similar age, gender and hearing loss to other research samples of Australian first time hearing help-seekers (e.g., Laplante-Lévesque et al., 2012). Another potential limitation to the generalisability of the sample was that most participants received subsidised hearing services through the Australian Government Hearing Services Program. Although application for subsidised services may increase the likelihood of participants obtaining hearing aids (Laplante-Lévesque et al., 2012), the potential influence of this factor on motivation and hearing aid adoption was not studied here. An additional limitation of the low response rate is that it was not possible to use techniques such as Structural Equation Modeling (SEM) to identify causal relationships among SDT variables and outcomes. SEM is a versatile statistical technique that has previously been used to explore causal relationships among the structural and measurement constructs of SDT in other areas of health (e.g., Williams & Deci, 2001; Williams et al., 2009; Münster Halvari, Halvari, Bjørnebekk, & Deci, 2012), and is one way of testing these pathways. For example, in a study of 2973 diabetes clients, Williams et al. (2009) tested pathways among autonomy support, autonomous
motivation, perceived competence and outcomes to develop a structural model of health behaviour among this cohort. A longitudinal study with a larger sample would contribute a deeper understanding of how the SDT model might function in hearing health care, and might identify the ways that autonomy support influences long-term outcomes for hearing aid adopters.

Secondly, participants completed the TSRQ prior to attending their first consultation and were not reassessed after the clinical consultation. One premise of SDT, that autonomy support has a positive association with autonomous motivation, was therefore not measured quantitatively, although there was evidence from the qualitative study that autonomy support was influential for autonomous motivation. This could be examined in future studies of motivation in hearing rehabilitation.

Thirdly, although the TSRQ was valuable for identifying autonomous and controlled motivation and exploring relationships with aspects of hearing rehabilitation, it might not sufficiently represent the distinct types of extrinsic motivation (external, introjected, identified and integrated motivation), classified along the SDT internalisation continuum (Ryan & Connell, 1989; Deci & Ryan, 2000; Sheldon et al., 2015). Whereas principal component analysis of the TSRQ in Chapter 3 reported a 2-factor solution with autonomous and controlled items, factor analyses in other domains have produced different solutions (e.g., Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013; Levesque et al., 2007). Furthermore, recent work by Sheldon et al. (2015) reported the presence of both positive and negative dimensions of introjection, a partially internalised type of motivation. Multiple help-seeking motives identified in Chapters 5 and 6 that involved feelings of external pressure or guilt, coupled with recognition of the potential benefits of hearing aids, might be more clearly understood if different types of motivation could be precisely classified. Future research to construct and test a refined TSRQ for use with first time hearing help-seekers might establish a psychometrically reliable and valid instrument that measures each type of motivation along the continuum, not just autonomous and controlled forms as reported in this thesis.

Finally, the research in this thesis only considered rehabilitation involving hearing aids. Although the decision to adopt or not adopt hearing aids is the most common one that hearing help-seekers face at an initial consultation (Grenness et al., 2015), rehabilitation options such as individual and group rehabilitation programs, assistive devices or no intervention may also be available (e.g., Laplante-Lévesque et al., 2011; Chisolm et al., 2007). This was flagged as a potential limitation of the research in Chapter 4 because it was
not known whether participants were offered other forms of intervention, and if they were, what impact this might have had on participants’ decisions. The qualitative findings in Chapter 6 suggested that although the majority of non-adopters were satisfied with the choice they made, they might not have been made aware of intervention options other than hearing aids.

### 7.4 Conclusion

In summary, together the studies reported in this thesis have demonstrated the importance of motivation in hearing rehabilitation involving hearing aid fitting. It has provided the first evidence to support application of SDT in hearing rehabilitation by exploring both the framework within which motivation can be classified, and also by reporting the motivational processes through which people initiate and sustain hearing health behaviour. More specifically, practitioners can evaluate autonomous and controlled motivation of adults with hearing impairment to identify barriers and facilitators of help-seeking and hearing aid adoption. Practitioners who support help-seekers’ autonomy, competence and relatedness can facilitate choice, increase satisfaction and improve hearing aid fitting outcomes. Hobbes would not have contemplated hearing rehabilitation in a health behaviour context when he wrote of deliberation and action in Leviathan (1651). However, the range of cognitive, behavioural and affective processes underlying human motivation remain relevant today when considering their importance to understanding help-seeking, hearing aid adoption and fitting outcomes in hearing rehabilitation.
7.5 References


Psychology, 31(6), 777–788.


Appendix A - Ethics Approvals & Amendments

THE UNIVERSITY OF QUEENSLAND
Institutional Approval Form For Experiments On Humans
Including Behavioural Research

Chief Investigator: Mr Jason Ridgway
Project Title: Identifying Motivation Of Hearing Aid Users And Investigating Its Effect On Outcome
Supervisor: Prof Louise Hickson, Dr Christopher Lind
Co-Investigator(s): None
Department(s): School of Health and Rehabilitation Sciences
Project Number: 2011000355
Granting Agency/Degree: PhD
Duration: 30th April 2013

Comments:
Expedited review - low risk.
Please add in the questionnaire instructions that participants may choose not to answer any individual questions if they do not not wish to.

Name of responsible Committee:-
Behavioural & Social Sciences Ethical Review Committee
This project complies with the provisions contained in the National Statement on Ethical Conduct in Human Research and complies with the regulations governing experimentation on humans.

Name of Ethics Committee representative:-
Associate Professor John McLean
Chairperson
Behavioural & Social Sciences Ethical Review Committee

Date 18/03/2011 Signature
THE UNIVERSITY OF QUEENSLAND
Institutional Human Research Ethics Approval

Project Title: Identifying Motivation Of Hearing Aid Users And Investigating Its Effect On Outcome - 12/02/2013 - AMENDMENT

Chief Investigator: Mr Jason Ridgway
Supervisor: Prof Louise Hickson, Dr Christopher Lind
Co-Investigator(s): None
School(s): School of Health and Rehabilitation Sciences
Approval Number: 201100355
Granting Agency/Degree: PhD
Duration: 30th April 2013

Comments:

Note: If this approval is for amendments to an already approved protocol for which a UQ Clinical Trials Protection/Insurance Form was originally submitted, then the researchers must directly notify the UQ Insurance Office of any changes to that Form and Participant Information sheets & Consent forms as a result of the amendments, before action.

Name of responsible Committee:
Behavioural & Social Sciences Ethical Review Committee
This project complies with the provisions contained in the National Statement on Ethical Conduct in Human Research and complies with the regulations governing experimentation on humans.

Name of Ethics Committee representative:
Associate Professor John McLean
Chairperson
Behavioural & Social Sciences Ethical Review Committee

Signature _______________________________ Date 14/2/2013
THE UNIVERSITY OF QUEENSLAND
Institutional Human Research Ethics Approval

Project Title: Identifying Motivation Of Hearing Aid Users And Investigating Its Effect On Outcome - 02/10/2015 - AMENDMENT

Chief Investigator: Mr Jason Ridgway
Supervisor: Prof Louise Hickson, Dr Christopher Linn

Co-Investigator(s): None
School(s): School of Health and Rehabilitation Sciences

Approval Number: 2011000355

Granting Agency/Degree: PhD

Duration: 30th April 2018

Comments/Conditions:

Note: This approval is for research conducted by researchers from whom a Clinical Trial Patient/Participant Information Sheet was directly signed. Any changes to that form and Participant Information Sheets & Consent forms as result of the amendments below occur.

Name of responsible Committee:
Behavioural & Social Sciences Ethical Review Committee

This project complies with the provisions contained in the National Statement on Ethical Conduct in Human Research and complies with the regulations governing experimentation on humans.

Name of Ethics Committee representative:
Associate Professor John McLean
Chairperson

Behavioural & Social Sciences Ethical Review Committee

Signature: [Signature]
Date: 01/10/2015

213
Project Title: Identifying Motivation Of Hearing Aid Users And Investigating Its Effect On Outcome - 28/01/2016 - AMENDMENT

Chief Investigator: Mr Jason Ridgway

Supervisor: Prof Louise Hickson, Dr Christopher Lind

Co-Investigator(s): None

School(s): School of Health and Rehabilitation Sciences

Approval Number: 2011000355

Granting Agency/Degree: PhD

Duration: 30th April 2016

Comments/Conditions:

Note: If this approval is for amendments to an already approved protocol for which a UQ Clinical Trials Protection/Insurance Form was originally submitted, then the researchers must directly notify the UQ Insurance Office of any changes to that Form and Participant Information Sheets & Consent Forms as a result of the amendments, before action.

Name of responsible Committee: Behavioural & Social Sciences Ethical Review Committee

This project complies with the provisions contained in the National Statement on Ethical Conduct in Human Research and complies with the regulations governing experimentation on humans.

Name of Ethics Committee representative: Associate Professor John McLean

Chairperson

Behavioural & Social Sciences Ethical Review Committee

Signature [Signature] Date 1/2/2016
## Appendix B - Treatment Self-Regulation Questionnaire

### Treatment questionnaire concerning hearing aids

There are many reasons why people might choose to wear hearing aids. Please think about the following statements and indicate how true each of these reasons is for you. You may choose not to answer any individual questions if you do not wish to. Your responses are confidential. Please be honest and candid.

The scale ranges from not at all true (1) to very true (7). For each statement, please place a mark in the circle that is most relevant to you, like this:

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>NOT APPLIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Other people would be mad at me if I didn’t</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>2. I find it a personal challenge to do so</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. I personally believe that doing something about my hearing will improve my quality of life</td>
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<td>4. I would feel guilty if I didn’t do what my doctor said</td>
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<td>5. I want my doctor to think I’m a good patient</td>
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</tbody>
</table>

If you have not made up your mind about getting hearing aids, or if the question is not relevant to you, please respond ‘not applicable’. 

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

**QUESTIONNAIRE STARTS HERE**

### I am thinking about getting hearing aids because...

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>NOT APPLIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Other people would be mad at me if I didn’t</td>
<td></td>
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<tr>
<td>2. I find it a personal challenge to do so</td>
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<tr>
<td>3. I personally believe that doing something about my hearing will improve my quality of life</td>
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<td>4. I would feel guilty if I didn’t do what my doctor said</td>
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<td>5. I want my doctor to think I’m a good patient</td>
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<td>Statement</td>
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<td>NOT APPLIC</td>
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<tr>
<td>6. I would feel bad about myself if I didn’t</td>
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<tr>
<td>7. It’s exciting to try to do something about my hearing</td>
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<td>8. I don’t want other people to be disappointed with me</td>
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<td>9. I think other people would be upset with me if I didn’t</td>
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<td>10. I personally believe that hearing aids are important for effective communication</td>
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<tr>
<td>11. I would be ashamed of myself if I didn’t</td>
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<tr>
<td>12. It is easier to do what I’m told than to think about it</td>
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<tr>
<td>13. I’ve carefully thought about hearing aids and believe getting them is the right thing to do</td>
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<tr>
<td>14. I want others to see that I can wear hearing aids and communicate well</td>
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<td></td>
<td></td>
<td></td>
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<td>15. I just do it because my doctor said to</td>
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<tr>
<td>16. I feel personally that wearing hearing aids is the best thing for me</td>
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<tr>
<td>17. I’d feel guilty if I didn’t do something about my hearing</td>
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<td></td>
</tr>
<tr>
<td>18. Wearing hearing aids is something I really want to do</td>
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</tr>
<tr>
<td>19. It’s a challenge to learn how to live with hearing aids</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix C - Sociodemographic Questionnaire

How strongly do you want to get hearing aids? (please circle)

<table>
<thead>
<tr>
<th>1. Don’t want them</th>
<th>2. Slightly want them</th>
<th>3. Want moderately</th>
<th>4. Want them quite a lot</th>
<th>5. Want them very much</th>
</tr>
</thead>
</table>

Overall, how much difficulty do you have hearing (without hearing aids)? (please circle)

|------------------|---------------------|------------------------|-----------------------------|------------------------|

Whose idea was it to seek hearing services?

|--------|-----------------------------------|--------------|----------------|

Have you worn hearing aids before? Y N (please circle)

Your date of birth:______________ Your sex: M F (please circle)

Your name:________________________________________

Your postal address:________________________________

__________________________________________________

__________________________________________________

Did someone help you complete these questions? Y N (please circle)

COMMENTS________________________________________________________________________

________________________________________________________________________________
Health Care Climate Questionnaire

This questionnaire contains items that are related to your visits to your hearing services practitioner. Individual practitioners may have different styles with clients, and we would like to know more about how you have felt about your encounters with your practitioner. You may choose not to answer any individual questions if you do not wish to. Your responses are confidential and your practitioner or his/her employer will not know your answers or be provided any feedback as a result of this research. Please be honest and candid.

The scale ranges from strongly disagree (1) to strongly agree (7). For each question, please place a mark in the circle that is most relevant to you, like this:

QUESTION

1 2 3 4 5 6 7
strongly strongly disagree disagree neutral agree agree agree

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

QUESTIONNAIRE STARTS HERE

1. I feel that my practitioner has provided me choices and options
2. I feel understood by my practitioner
3. I am able to be open with my practitioner at our meetings
4. My practitioner conveys confidence in my ability to use hearing aids now that I have them
5. I feel that my practitioner accepts me
6. My practitioner has made sure I really understand hearing loss and what I need to do
7. My practitioner encourages me to ask questions
8. I feel trust in my practitioner
9. My practitioner answers my questions fully and carefully
10. My practitioner listens to how I would like to do things
<table>
<thead>
<tr>
<th>QUESTION</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. I think my practitioner handles people’s emotions very well</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12. I feel that my practitioner cares about me as a person</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>13. I don’t feel very good about the way my practitioner talks to me</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. My practitioner tries to understand how I see things before suggesting anything new</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. I feel able to share my feelings with my practitioner</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Appendix E - Perceived Competence Scale

Perceived Competence for Hearing Aid Use

Please respond to each of the following items and consider how true it is for you with respect to wearing your hearing aids.

The scale ranges from not at all (1) to very true (7). For each statement, please place a mark in the circle that is most relevant to you, like this:

Did someone help you complete these questions?  
Y  N  
(please circle)

Comments

______________________________________________________________
______________________________________________________________
______________________________________________________________
______________________________________________________________
## INTERNATIONAL OUTCOME INVENTORY FOR HEARING AIDS (IOI-HA)

1. Think about how much you used your present hearing aid(s) over the past two weeks. On an average day, how many hours did you use the hearing aid(s)?

<table>
<thead>
<tr>
<th></th>
<th>none</th>
<th>less than 1 hour a day</th>
<th>1 to 4 hours a day</th>
<th>4 to 8 hours a day</th>
<th>more than 8 hours a day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
</tr>
</tbody>
</table>

2. Think about the situation where you most wanted to hear better, before you got your present hearing aid(s). Over the past two weeks, how much has the hearing aid helped in that situation?

<table>
<thead>
<tr>
<th></th>
<th>helped</th>
<th>helped</th>
<th>helped</th>
<th>helped</th>
<th>helped</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>not at all</td>
<td>slightly</td>
<td>moderately</td>
<td>quite a lot</td>
<td>very much</td>
</tr>
<tr>
<td></td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
</tr>
</tbody>
</table>

3. Think again about the situation where you most wanted to hear better. When you use your present hearing aid(s), how much difficulty do you STILL have in that situation?

<table>
<thead>
<tr>
<th></th>
<th>very much difficulty</th>
<th>quite a lot of difficulty</th>
<th>moderate difficulty</th>
<th>slight difficulty</th>
<th>no difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
</tr>
</tbody>
</table>

4. Considering everything, do you think your present hearing aid(s) is worth the trouble?

<table>
<thead>
<tr>
<th></th>
<th>not at all</th>
<th>slightly</th>
<th>moderately</th>
<th>quite a lot</th>
<th>very much</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>worth it</td>
<td>worth it</td>
<td>worth it</td>
<td>worth it</td>
<td>worth it</td>
</tr>
<tr>
<td></td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
</tr>
</tbody>
</table>

5. Over the past two weeks, with your present hearing aid(s), how much have your hearing difficulties affected the things you can do?

<table>
<thead>
<tr>
<th></th>
<th>affected very much</th>
<th>affected quite a lot</th>
<th>affected moderately</th>
<th>affected slightly</th>
<th>not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
</tr>
</tbody>
</table>

6. Over the past two weeks, with your present hearing aid(s), how much do you think other people were bothered by your hearing difficulties?

<table>
<thead>
<tr>
<th></th>
<th>bothered very much</th>
<th>bothered quite a lot</th>
<th>bothered moderately</th>
<th>bothered slightly</th>
<th>not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
<td>❑</td>
</tr>
</tbody>
</table>

7. Considering everything, how much has your present hearing aid(s) changed your enjoyment of life?

<table>
<thead>
<tr>
<th></th>
<th>worse</th>
<th>no change</th>
<th>slightly better</th>
<th>quite a lot better</th>
<th>very much better</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>❑</td>
<td>❑</td>
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</tr>
</tbody>
</table>

THIS QUESTIONNAIRE IS NOT APPLICABLE TO ME: NOT FITTED WITH HEARING AIDS ❑
Appendix G – Interview Protocol

Interview Question Guide

Tell me about your hearing.

Why did you come for a hearing test?

Tell me what happened at the appointment today?
   What did you and the practitioner talk about?

I see that you got/didn’t get hearing aids. Can you tell me about that?
   Can you tell me more about the options or choices you had in the appointment today?

Before your (first) appointment, how did you feel about coming for a hearing test? How do you feel now, afterwards (about your appointment)?

How comfortable were you talking about your thoughts, feelings or concerns to do with hearing, with your practitioner? Why is that?
   What are your thoughts and feelings about hearing aids?

Thinking about your decision (to get/not get hearing aids), how confident are you now with the decision you’ve made? Why is that?
   What is the easiest/most difficult thing about making the decision?
   Do you feel supported in the decision you’ve made? (what about the practitioner / your family)?

Now that you have had some experience with hearing aids (or with the practitioner), how have you been getting along with them (getting along with the advice you’ve received)? How do you think you will go? Why is that?

Our objective with this interview is to understand how your relationship with the practitioner might affect your decision, and/or how well you are going with hearing aids. Is there anything else you can think of that we should be asking you?

Could you say something more about that? / What do you mean by that? / Why is that?
Appendix H – Collated comments from questionnaires of quantitative sample

The following is a tabulated summary of comments from participants of the quantitative studies. Participants had the opportunity to provide comments in a free text format at the bottom of the questionnaires. Comments are grouped as responses to the TSRQ and responses to the HCCQ. The author has interpreted these responses and made comments alongside participant responses. Responses are verbatim, and where context is required this has been added in parentheses.

<table>
<thead>
<tr>
<th>Subject ID</th>
<th>Age</th>
<th>Participant response to TSRQ</th>
<th>Researcher comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>F adopter</td>
<td>78</td>
<td>My lack of hearing makes me anxious and I often give a silly answer to questions.</td>
<td>Anxiety and sense of inadequacy from self-perceived hearing loss.</td>
</tr>
<tr>
<td>M adopter</td>
<td>67</td>
<td>They tried to sell me a more expensive model (hearing aid). I felt they were putting pressure on me. I hope they tune the free hearing aid properly!</td>
<td>Aversion and cynicism towards professionalism and health care climate, yet with hope for positive outcome.</td>
</tr>
<tr>
<td>F adopter</td>
<td>82</td>
<td>Don’t want hearing aid but they are a necessity of ageing. One has to be sensible.</td>
<td>Acceptance and pragmatism about hearing loss and the decision to get hearing aids.</td>
</tr>
<tr>
<td>F adopter</td>
<td>63</td>
<td>I still haven’t had my tests done yet but I assume I will need hearing aids. I have to believe they will make a huge difference to my life.</td>
<td>Recognition of hearing difficulties and strong hope for improvement.</td>
</tr>
<tr>
<td>M adopter</td>
<td>68</td>
<td>No-one really wants them (hearing aids), but it makes life worthwhile to have them.</td>
<td>Acceptance of improvements to life with hearing aids.</td>
</tr>
<tr>
<td>F adopter</td>
<td>67</td>
<td>A hearing aid for me would be most beneficial, so that I can hear clearer especially in group situations.</td>
<td>Positive attitude towards hearing aids stemming from recognition of the potential improvements for communication.</td>
</tr>
<tr>
<td>F adopter</td>
<td>42</td>
<td>If you have been supplied with a hearing aid and you don’t wear it then why get one in the first place? Give it to someone who will respect and use it. I cannot wait to get my hearing aid and it will help me a lot in life.</td>
<td>Positive attitude with recognition of potential improvements; strong statements about others not respecting their potential benefits.</td>
</tr>
<tr>
<td>M adopter</td>
<td>59</td>
<td>I hope that a hearing aid could help me solve (my) problem.</td>
<td>Expressing hope for improvement.</td>
</tr>
<tr>
<td>F non-adopter</td>
<td>71</td>
<td>Tinnitus and conversational misses motivated my move towards seeking help.</td>
<td>Strong reason describing help-seeking.</td>
</tr>
<tr>
<td>F non-adopter</td>
<td>68</td>
<td>My 92 yo mum left it too late to get hearing aids because no one in her centre would wear them. Hopefully hearing aids have improved and I won’t ignore the early signs of hearing loss.</td>
<td>Relating experiences of others and own thoughts, which hint at concerns about technology and of own behaviour. Interestingly did not adopt hearing aids.</td>
</tr>
<tr>
<td>F adopter</td>
<td>84</td>
<td>I decided to have tests myself. Will be advised by specialist at hearing services.</td>
<td>Strong sense of agency with respect to making the decision to attend, and then was guided by advice from practitioner with the decision to adopt hearing.</td>
</tr>
<tr>
<td>Age</td>
<td>Status</td>
<td>Statement</td>
<td>Guiding Factors</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>68</td>
<td>Non-adopter</td>
<td>The assistance of (my provider) in testing me has assisted my decision to try a hearing aid.</td>
<td>Guided by practitioner advice to help form decision. Interesting said that he tried a hearing aid but ultimately did not adopt.</td>
</tr>
<tr>
<td>60</td>
<td>Non-adopter</td>
<td>I believe in having regular check ups with age. If and when I need a hearing aid whether by my decision or my doctor’s I will get one. I have no problem with the idea. It’s simply common sense.</td>
<td>Strong health belief statement and statement about own decision-making processes. Also guided by professional.</td>
</tr>
<tr>
<td>72</td>
<td>Non-adopter</td>
<td>I think my hearing is not as good as I think it should be.</td>
<td>Sense of possible hearing problems and curious to find out more.</td>
</tr>
<tr>
<td>No</td>
<td>Adopter</td>
<td>You have a test because your spouse thinks you’re deaf. Then you’re told you need them. Then you get them and you can’t stand them. Then you don’t wear them. It’s too easy to get hearing aids. That’s why they sit in drawers.</td>
<td>Strong opinion about the process of getting hearing aids suggests close experience of others, confident in her own decision.</td>
</tr>
<tr>
<td>85</td>
<td>Adopter</td>
<td>My husband has worn hearing aids for years. I see how frustrating and difficult they can be. I am aware that not hearing well limits one’s ability to communicate.</td>
<td>Experiences of others and recognition of difficulties that hearing impairment causes and associated emotions.</td>
</tr>
<tr>
<td>76</td>
<td>Non-adopter</td>
<td>I don’t want a hearing aid but everyone keeps telling me I need one. I believe people mumble.</td>
<td>Strongly against getting hearing aids, considering others’ viewpoint yet forming personal theory about own hearing.</td>
</tr>
<tr>
<td>73</td>
<td>Non-adopter</td>
<td>I do not have trouble hearing but feel that at age 73 I should have my hearing checked and if I need hearing aids would have no hesitation in wearing them.</td>
<td>Health beliefs suggest feelings towards help-seeking.</td>
</tr>
<tr>
<td>No</td>
<td>Adopter</td>
<td>I have only followed my doctor’s request to have a hearing test.</td>
<td>Valuing professional opinion and little personal agency demonstrated.</td>
</tr>
<tr>
<td>60</td>
<td>Non-adopter</td>
<td>Just going for a hearing test to see if I need them.</td>
<td>Curiosity.</td>
</tr>
<tr>
<td>78</td>
<td>Adopter</td>
<td>It’s not easy to find out which hearing aid to get.</td>
<td>Uncertainty from choice along with decision to adopt suggests was guided by professional opinion.</td>
</tr>
<tr>
<td>57</td>
<td>Adopter</td>
<td>I don’t know for sure if I need a hearing aid, but if I do, I would rather that than what I’m not hearing at the moment.</td>
<td>Curiosity about the rehabilitation process and has considered potential benefits and disadvantages. Hints at hope for improvement with hearing aids.</td>
</tr>
<tr>
<td>66</td>
<td>Non-adopter</td>
<td>I don’t really know yet (if I want hearing aids). I saw a free test van, had my hearing tested and left with a form to take to my doctor, who suggested “I might as well fill out the form to get a more sophisticated test, and they might try to sell you a hearing aid.”</td>
<td>Uncertainty and cynicism combined with considering value of professional advice.</td>
</tr>
<tr>
<td>60</td>
<td>Adopter</td>
<td>It will be interesting to hear better</td>
<td>Curiosity about hearing aids and</td>
</tr>
</tbody>
</table>

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rather than saying ‘what did you say.’ I really think hearing aids will assist. 

External prompt that prompted thoughts into action.

<table>
<thead>
<tr>
<th>Subject ID</th>
<th>Age</th>
<th>Participant response to HCCQ</th>
<th>Researcher comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>M adopter</td>
<td>76</td>
<td>There is a serious flaw in the procedure for obtaining a hearing aid. We have to buy before trying! It's a bit like buying a pair of shoes without trying them on first.</td>
<td>Suggests cynicism about rehabilitation process that raises questions about adequacy of elements of health care climate.</td>
</tr>
<tr>
<td>F adopter</td>
<td>82</td>
<td>I don’t seem to have any benefit from using them. I haven’t used them for many weeks.</td>
<td>Lack of use suggests possible lack of support from health care climate.</td>
</tr>
<tr>
<td>F adopter</td>
<td>67</td>
<td>Only given two choices of hearing aid, shown no other, asked to see free ones, told they were no good and not shown them.</td>
<td>Expresses disappointment and cynicism about rehabilitation process, brings in financial aspect.</td>
</tr>
<tr>
<td>M non-adopter</td>
<td>68</td>
<td>I never got a hearing aid as they or I were not convinced it would be of any help to me.</td>
<td>Mutually agreed decision</td>
</tr>
<tr>
<td>M adopter</td>
<td>66</td>
<td>My conclusions from my experience is that I need to talk to someone who listens to me and doesn’t quote the theory as life in the real world is far different to the hearing clinic or theory. After paying $4700 for aids and another $570 for the mini tec I am certainly not going to put them in the drawer and forget them.</td>
<td>Calling for client-centred care. Financial commitment is one motivator for ongoing use.</td>
</tr>
<tr>
<td>M adopter</td>
<td>64</td>
<td>My practitioner listens to how I feel and goes about her examination and makes me feel comfortable by speaking to me and not the computer.</td>
<td>Feeling comfortable and at ease through client-centred care.</td>
</tr>
<tr>
<td>F non-adopter</td>
<td>83</td>
<td>Did not need a hearing aid but had very helpful advice.</td>
<td>Helpful advice suggests health care climate supported client’s decision to not get hearing aids and empowered client with information to help manage hearing and communication.</td>
</tr>
<tr>
<td>F non-adopter</td>
<td>71</td>
<td>Have not acquired due to funds and needing the money at present. Also not certain that the ones I have chosen are going to be more of a hindrance than help because of the size.</td>
<td>Uncertainty and financial considerations given.</td>
</tr>
<tr>
<td>M adopter</td>
<td>69</td>
<td>Very pleased with the aids and service.</td>
<td>Positive feelings regarding health care climate.</td>
</tr>
<tr>
<td>F adopter</td>
<td>91</td>
<td>I was fitted but am not wearing my hearing aids.</td>
<td>Lack of use suggests possible lack of support from health care climate.</td>
</tr>
<tr>
<td>F adopter</td>
<td>77</td>
<td>It took some time to get it right.</td>
<td>Health care climate support has helped client with transition from unaided to aided.</td>
</tr>
<tr>
<td>F non-adopter</td>
<td>70</td>
<td>I feel that the hearing test I was given</td>
<td>Cynicism and sense of lack of</td>
</tr>
<tr>
<td>Category</td>
<td>Age</td>
<td>Description</td>
<td>Comments</td>
</tr>
<tr>
<td>----------</td>
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<td>----------</td>
</tr>
<tr>
<td>adopter</td>
<td>60</td>
<td>Very glad to have got them.</td>
<td>Satisfaction and perhaps relief at the decision.</td>
</tr>
<tr>
<td>M adopter</td>
<td>55</td>
<td>It is a process of accepting reality. I believe how quickly one accepts, it depends on how the supports of the practitioner and anyone using the hearing aids, besides my own personality.</td>
<td>Acceptance and strong commentary about internal though processes that shows knowledge of what contributes to choice.</td>
</tr>
<tr>
<td>M adopter</td>
<td>83</td>
<td>Being a pensioner, I only got what was available free of charge. I am a bit disappointed that the improvement isn’t as much as hoped for. My hearing without the aids is still good enough. The improvement is only minimal.</td>
<td>Suggests economic factors may have contributed to decision; disappointment with minimal benefit juxtaposed with acceptance that hearing levels are ‘good enough’. Reconciling expectations without practitioner involvement.</td>
</tr>
<tr>
<td>M non-adopter</td>
<td>71</td>
<td>For your info I did a basic hearing test in a pharmacy and was advised that I had a minor deficiency in the right ear. It was recommended that I follow up with a hearing practitioner, which I did not do. I will follow up when I consider I am having hearing problems. (Returned this comment on blank questionnaire)</td>
<td>Strong sense of agency about own needs and actions. Empowered with knowledge about own hearing levels from the screening test.</td>
</tr>
<tr>
<td>F non-adopter</td>
<td>83</td>
<td>I was advised to wait for hearing aids and it was my decision to wait. I was told I could still have hearing aids up to three years. I am travelling ok at the moment.</td>
<td>Acceptance of advice suggests mutually agreed decision took place. Empowered with information about future help as needed and confident with own abilities.</td>
</tr>
<tr>
<td>M non-adopter</td>
<td>75</td>
<td>I have not got to the stage where hearing aids are needed, but feel I have the support of both doctors and hearing specialist should the time for aids be necessary.</td>
<td>Empowered by support from specialists and knowledge that can take action if and when required.</td>
</tr>
<tr>
<td>F non-adopter</td>
<td>45</td>
<td>No practitioner advised me on hearing aid. No aid will gain hearing. Very disappointed.</td>
<td>Apparent poor service from practitioner has led to disappointment – did not get the service or advice she was expecting.</td>
</tr>
</tbody>
</table>