Dissertation

EVERYDAY LIFE WITH AGE-RELATED HEARING LOSS

Self-reported hearing handicap, coping strategies, social support and quality of life among older women and men with age-related hearing loss in Austria

LEBEN MIT ALTERSSCHWERHÖRIGKEIT

Selbsteinschätzung des Hörhandicaps, der Copingstrategien, sozialen Unterstützung und Lebensqualität bei älteren Frauen und Männern mit Altersschwerhörigkeit in Österreich

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STATUTORY DECLARATION

I hereby declare that this thesis is my own original work and that I have fully acknowledged by name all of those individuals and organizations that have contributed to the research for this thesis. Due acknowledgement has been made in the text to all other material used. Throughout this thesis and in all related publications I followed the 'Standards of Good Scientific Practice and Ombuds Committee at the Medical University of Graz'.

Feldkirch	July 4, 2016	
Place	Date	Signature

THANK YOU

Writing a dissertation was a great and exciting challenge. It allowed me to pursue and realize my ideas and hence to work intensely on a research topic which means a lot to me in many ways. However, this process demanded indeed patience, flexibility as well as persistence. Without great support of my personal and professional environment, this project could not have been finalized. There are a lot of people and institutions I want to express my gratitude to because of their relentless encouragement, time, professional contribution and / or financial support.

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ZUSAMMENFASSUNG

Hintergrund. Altersschwerhörigkeit ist eine der häufigsten sensorischen Beeinträchtigungen in der älteren Bevölkerungsgruppe und wird verbunden mit Konsequenzen wie Reduktion von kognitiven Fähigkeiten, Depression, Rückzug, Isolation und geringerem Wohlbefinden.

Ziele. In dieser Dissertation wurde das Ziel verfolgt, die Selbsteinschätzung des Hörhandicaps von älteren Frauen und Männern mit Altersschwerhörigkeit (≥ 55 Jahre) zu erfassen. Ebenso wurde der Einsatz von Copingstrategien, die Bedeutung sozialer Unterstützung sowie der Einfluss von Altersschwerhörigkeit auf Lebensqualität erforscht. Die Untersuchung des Zusammenhangs zwischen Hörverlust und wahrgenommenen Hörproblemen sowie der Prädiktoren für Lebensqualität waren weitere Studienziele. Darüber hinaus fand eine tiefgehende Auseinandersetzung mit den subjektiven Erfahrungen in Bezug auf die Folgen der Altersschwerhörigkeit im Alltag statt .

Methode. Die Umsetzung der Ziele erfolgte unter Anwendung einer Methodentriangulation. Im quantitativen Teil wurden im Zuge der schriftlichen Befragung in Österreich Daten von 65 Altersschwerhörigen und 73 Normalhörenden (Vergleichsgruppe) gesammelt. Hierfür wurden standardisierte Instrumente herangezogen: Hearing Handicap Inventory for the Elderly (HHIE), Fragebogen zur Erfassung der Lebensbelastungen und Bewältigung (FLB), World Health Organization Quality of Life (WHOQOL-BREF) und der Kurzfragebogen zur Sozialen Unterstützung (F-SozU-14). Im qualitativen Teil erfolgten problemzentrierte Interviews zur Erfassung der Erfahrungen mit Schwerhörigkeit und folglich die Analyse der Daten von vierzehn älteren Menschen.

Ergebnisse. Studienteilnehmende mit Altersschwerhörigkeit bezeichneten Probleme im Hör- und Sprachverständnis ohne sowie mit Hörgeräten als die Schwerwiegendsten. Die

Lebensqualität – mit der Berücksichtigung der Kovariaten Alter, Bildung und Multimorbidität – unterschied sich in dieser Gruppe verglichen zur normalhörenden Gruppe nicht signifikant. Allerdings konnte eine signifikant geringere psychologische Lebensqualität bei altersschwerhörigen Frauen im Vergleich zu Männern nachgewiesen werden (auch nach Auspartialisierung von Kontrollvariablen). In den qualitativen Interviews berichteten weibliche Befragte von negativen Gefühlen, die aufgrund von schwierigen Hörsituationen auftauchten, wohingegen Männer von gesteigerter Lebensqualität aufgrund durch die Hörgeräte verbesserter Klangqualität und Hörempfindung erzählten. Es konnte eine Vielfalt an adaptiven und maladaptiven Strategien zur Bewältigung von hörbedingten Situationen sowohl bei Männern als auch Frauen beobachtet werden. Darüber hinaus konnte die zentrale Bedeutung der positiven und negativen sozialen Unterstützung im Leben der Betroffenen sowie deren Einfluss auf die Lebensqualität identifiziert werden.

Schlussfolgerung. Ein patientenzentriertes Rehabilitations- oder Beratungsprogramm mit Einbezug von 1) objektiven und subjektiven Messinstrumenten zur Erfassung der Hörproblemen, 2) Familie oder nahestehenden Personen und 3) einer gemeinsamen Entscheidungsfindung könnte die Lebensqualität der Betroffenen und die Qualität der Versorgung verbessern.

Schlüsselwörter. Altersschwerhörigkeit, Lebensqualität, Coping, soziale Unterstützung, Gender, Erfahrungen mit von Hörschwierigkeiten, Methodentriangulation, quantitativ, qualitativ.

ABSTRACT

Background. Age-related hearing loss is one of the most common sensory impairment in the older population. This chronic condition is associated with bio-psychosocial consequences such as cognitive decline, depression, withdrawal, isolation and hence reduced well-being.

Aims. The objectives of this thesis were to investigate the perception of hearing problems among older women and men (≥ 55 years) with age-related hearing loss. In addition, the coping strategies they use in order to master their lives as well as perceived social support and self-reported quality of life were explored. Furthermore, the relationships between functional hearing loss and perceived hearing problems and predictors on quality of life were examined. Lastly, this study aimed at uncovering self-perceptions and experiences in order to gain a deeper understanding of consequences and influences of age-related hearing loss on daily life as well as on coping with this chronic condition.

Methods and Materials. With the aid of mixed methods, quantitative data of 65 hearing impaired and 73 normal hearing elderly (comparison group) was gathered by performing a paper-and-pencil survey with standardized questionnaires in Austria: Hearing Handicap Inventory for the Elderly (HHIE), Assessment for Coping and Stress (FLB), Social Support Questionnaire (F-SozU-14) and World Health Organization Quality of Life (WHOQOL-BREF). Moreover, qualitative data about experiences with living with hearing difficulties was collected by performing guided semi-structured interviews and analyzed materials of 14 older adults with age-related hearing loss.

Results. In this study, older women and men perceived most severe problems in hearing and understanding speech even when using hearing aids. In terms of quality of life, there were no significant differences between the hearing impaired participants compared to those with normal hearing ability, after controlling for covariates age, education and multi-morbidity. Within the hearing impaired group gender differences were observed, i.e., older women rated their psychological quality of life worse than did men, also after controlling for covariates. They focused rather on negative emotions provoked by challenging hearing situations whereas older men talked about enhanced quality of life due to hearing aids improving sound quality and auditory sensation. Both genders used various adaptive (e.g., ask for repetition, look for information) and maladaptive coping strategies (e.g., withdrawal, pretending), thus a wide variety of coping behavior to deal with hearing loss could be detected. Moreover, the findings highlight the role of positive and negative social support in the concerned persons' lives and the influence of social support on quality of life.

Conclusion. A patient-centered auditory rehabilitation program or counseling including objective and self-report measures, shared-decision making approach and involving family members and significant others could enhance quality of life of older adults with age-related hearing loss and quality of care in the (hearing) health care practices.

Keywords. Age-related hearing loss, quality of life, coping, social support, gender, experiences of hearing difficulties, mixed methods, quantitative, qualitative.

“Der Schwerhörige ist in der Gesellschaft einsam”

(Immanuel Kant)

“The hard of hearing is lonely in society”

(translated by Moser)

INTRODUCTION

Hearing, a complex process of absorbing and interpreting sound, is essential for understanding the world around us [1]. It allows us to feel safe since it warns us of possible dangers by hearing sirens or alarms. The sense of hearing also enables us to localize the direction of sounds [2] and hence, helps us to survive in nature and civilization [3]. It is not just critical for survival but inevitable for communication taking place in the personal and social environment. A successful exchange of information finally grants access to the social world [4].

> *“The sense of hearing also serves to integrate individuals with their environment through perception of normal, everyday sounds that characterize our environment and lets us feel connected to our world.”* [2]

Good capacity in hearing and understanding promotes self-assurance and self-confidence and prevents misunderstandings. Individuals with normal hearing do not need to be afraid to be unable to hear and understand something or to mishear and ask for repetition again and again [3]. The majority of individuals take hearing for granted. This attitude, however, will change once the normal hearing function declines and difficulties in communication, distorted perception of speech, signals and sounds are present [4].

Sooner or later, the sense of hearing will be reduced in each individual due to the aging process [5]. Naturally, hearing loss occurs most commonly among older or old aged individuals [6, 7]. Age-related hearing loss is furthermore one of the most prevalent chronic conditions among this age group [2, 8, 9].

EAR AND HEARING

Tones, sounds or noises are absorbed as sound waves in the ear. Sound waves are defined as mechanical wave that travels through, e.g., gas, liquid or solid medium [10]. The volume of sound is measured in decibel (dB) [11]. Individuals can hear sound in frequencies ranging from 16 hertz (Hz) to 16 kilohertz (kHz), also called as audible sound. The auditory thresholds in high frequencies (high-pitched sounds) reduce with age [10]. Figure 2 shows an audiogram which illustrates the hearing threshold at various frequencies.

How can we hear? The organ ear is divided into external (auris externa), middle (auris media) and internal ear (auris interna); its anatomy is depicted in Figure 1.

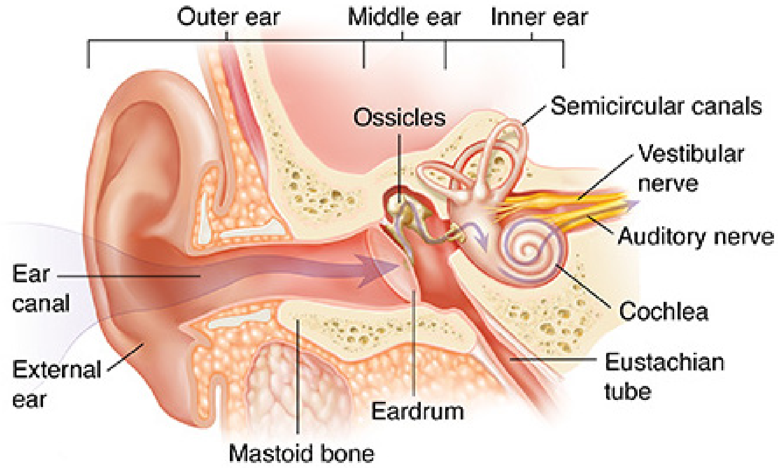

Figure 1. Anatomy of the ear. [12]

Simply worded, the outer and middle ear enable sound conduction and the inner ear sound sensation. The sound travels from the air-filled outer ear to the middle ear, i.e., from the pinna through the external auditory canal which intensifies the sound to the ear drum (tympanic membrane) [13, 14]. It then causes a vibration in the middle ear, i.e., in the eardrum and the chain of ossicles (malleus, incus and stapes), converting sound from air into mechanical waves [9, 14]. These mechanical waves are then transmitted to the inner ear, also called labyrinth, as it is a complex structure [9]. For the sense of hearing, the organ of Corti, a part of the cochlea comprising outer and inner hair cells (sensory cells) and a complex of support cells, is crucial. The inner hair cells transform the mechanical waves into neural signals. They transduce most information about sounds and primarily afford perception of acoustic stimuli [15]. Finally, these nerve impulses travel from the auditory nerve to the auditory cortex of the brain for interpretation [11].

AGE-RELATED HEARING LOSS

The inner ear undergoes dramatic changes with age [15]. Age-related hearing loss is defined as age-related physiologically and pathologically degenerative process predominantly located in the organ of Corti and auditory nerve [16]. This sensory impairment distinguishes in age of manifestation, characteristic and progressivity [5]. During life span individual's hearing ability can be influenced by a variety of exogenous and endogenous risk factors such as noise exposure, ototoxic drugs, genotype, pollutants and other environmental factors, diseases (e.g., diabetes, hypertension, circulatory disorder) [6, 9, 16, 17].

Schuknecht differentiates four specific types of age-related hearing loss: sensory, neural, strial or metabolic and mechanical or cochlear conductive [5, 17, 18]. These four types occur most commonly in combination; the most common combination is the sensorineural symmetric hearing loss which affects higher frequencies [16] and speech understanding since speech consonants occur between 0.25 und 3 kHz [2].

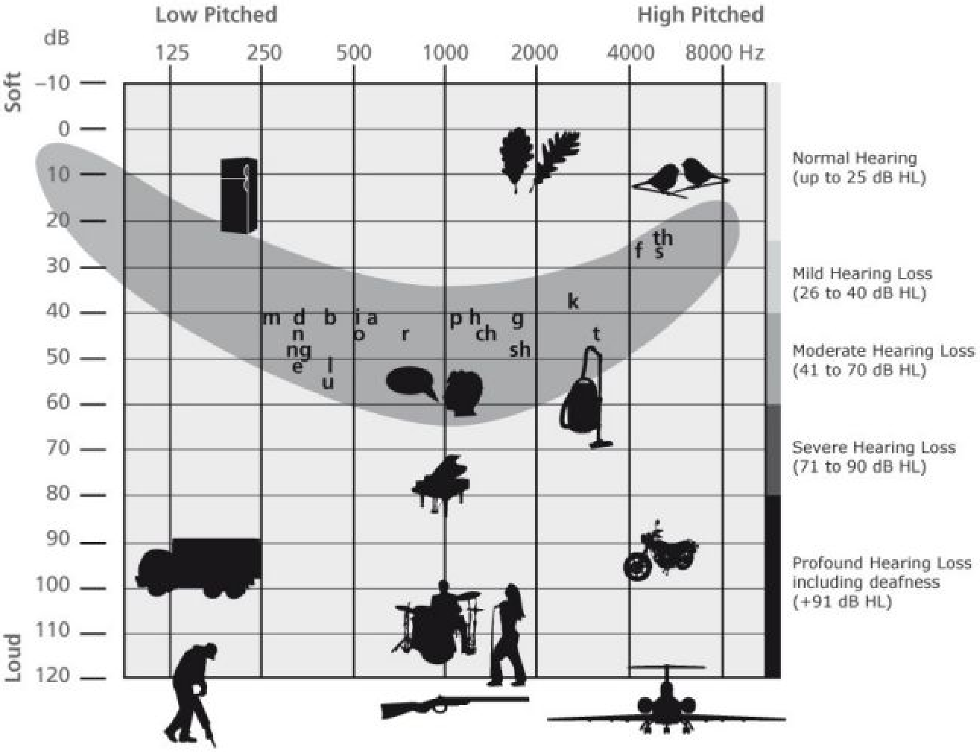

Figure 2. Audiogram. [19]

Hearing loss can be classified by its severity: mild, moderate, severe and profound. The traditional determination of hearing loss is a pure-tone average greater than 25 decibel (dB) at the frequencies 0.5, 1, 2 and 4 kHz [20, 21]. Hearing sensitivity is most commonly tested by the use of pure-tone audiometry. This method assesses the perceived sound intensity level at various frequencies in each ear. Sound intensity level indicates the pure-tone threshold for that ear and frequency; it is expressed in decibels hearing level (dB HL). These pure-tone thresholds are graphically displayed in form of an audiogram (Figure 2) which displays the individual's hearing capacity [2].

Use of hearing aid is the most common compensation method for age-related hearing loss [22, 23] amplifying complex sound signals based on sound frequency, loudness or direction. Thus, hearing aids do not restore a normal hearing; they may enhance speech intelligibility in different listening environments. The adoption of hearing aids also requires time since the brain which has a central role in interpretation of sound needs to assimilate to sounds that the individuals could not hear for a long time. Despite the benefits of hearing aids, they are not used regularly [2]. The following situations lead individuals to use their hearing aids occasionally or never: noisy and / or disturbing situations, no perceived need, no or poor perceived benefit, poor sound quality, difficulties to manage their hearing aids, and poor fit and comfort, unpleasant side effects (e.g., pain, builds up wax) [24] or distressful experience of volume of the amplified sound and visibility of the devices perceived as a stigma [25].

Medical interventions like surgeries or medication are so far not feasible for compensating hearing loss. However, there are some researchers trying to find solutions to cure hearing loss with hearing restoration [26]. Although replacing hair cells in the inner ear sounds promising, there are still several hurdles to overcome in order to execute this method successfully or effectively because the ear, in particular the inner ear, is a complex and delicate organ [27].

Age-related hearing loss is considered as a public health issue since the affected population increases steadily. Due to this demographic development, WHO estimates for 2025 that globally 1.2 billion persons will be 60 years or older whereof approximately 500 million (41.7%) will suffer from age-related hearing loss [28]. The prevalence of hearing loss has been found to be 45.1% in the population of Finnish people at 45-74 of age [29], 45.1% among elderly of ages 45-74 in the US [7], 63.1% in the US population of 70 years of age and older [30], and increases remarkably with age. Age-related hearing loss occurs more frequently among men than among women [7, 29]. In Austria, 20% of adults between 60 and 69 years old and 35% of adults older than 70 years have hearing loss [31]. A prevalence rate by gender was calculated in the course of statistical projection by Statistik Austria in 2007. 7.3% of men and 8.9% of women being 60 years old or older reported difficulties in hearing. Nonetheless, these results should be interpreted with caution since there was no clear definition of self-reported difficulties in hearing. In addition, the sample for this micro-census data collection was rather small so that there might be a great range of variation [32]. As Roth, Hanebuth & Probst [33] concluded, research data about prevalence do not allow us to gain a clear picture because of different standardized procedures in collection and reporting epidemiological data.

Elderly experience manifold limitations in their daily life due to their age-related hearing loss since they have difficulties in exchanging information [34]. These barriers in communication can have an impact on the relationships in their social and personal environment [35] and consequently reduce quality of life and psychosocial well-being [6]. Moreover, research literature recently reported an association between age-related hearing loss and depressive symptoms [36-39], feelings of anxiety [37, 39, 40], cognitive declines [39, 41-43], isolation [44-46], increased mortality [40, 47, 48] and development of frailty and falls [49, 50].

Age-related hearing loss can hence effect dependency and loss of autonomy [51] and its negative bio-psychosocial health outcomes may impede coping in and with daily life [52].

RELEVANCE OF THIS STUDY

The purpose of this dissertation was to receive an understanding about the lives of elderly with age-related hearing loss since their condition is a common phenomenon in society and delineates a public health issue due to the demographic development.

Age-related hearing loss comes along with negative and uncomfortable physical, social and emotional consequences affecting the everyday lives of persons concerned. Health professionals are, however, mostly not aware of these problems. In order to provide adequate care and rehabilitation, it is indispensable to understand these challenging aspects caused by hearing loss and affecting daily life [53-55].

The findings of the present study should, therefore, give an insight into the world of this vulnerable population for health professionals and significant others of hearing impaired elderly. The aim is to achieve a better understanding of the manifold consequences of age-related hearing loss as well as to raise awareness and enable a sensitization to optimize the care of this group. Moreover, this study ought to enhance the way they are treated (socially and emotionally) in rehabilitative care. In consideration of the demographic development and the increasing prevalence of age-related hearing loss there is an urgent need to give this population attention and to obtain a sensitization for their condition.

THEORETICAL FRAMEWORK

In this chapter, the aim is to approach the theoretical background that provides the foundation to create a working model for the present study. *Impairment, disability and handicap*, *quality of life, coping strategies* and *social support* may be significant in connection with the phenomenon *age-related hearing loss*, thus, they are included in this theoretical framework. These entities and their relationships are based on models of either health or disease. Therefore, this chapter deals at first with the description of the underlying models of health. Then, international classifications of *disability* and *handicap* are presented and furthermore the concepts *coping*, *social support* and *gender* in relation to *quality of life* are discussed. This chapter ends with the elaboration of the created theoretical working model.

MODELS OF HEALTH AND DISEASE

The bio-medical disease model is the foundation for all scientific theories about health and disease and thus is referred to as the scientific paradigm of the current health care delivery system. The regulation and methods for academic work are based on this model, which is characterized by its science-oriented access to the human body and disease with the aid of objective scientific research methods. In this way, the bio-medical disease model is aimed to explain the causal associations of the phenomena of diseases and consequently to deduce treatments or therapies. The human body is seen as a natural object and no emotions, psychological or behavioral issues or influences are incorporated, i.e., the physical-somatic part of the organism is considered separately from the psychosocial part. According to this model of disease, disease is defined as a disturbance of the normal function of the human body; each disease is seen to be linked to specific causes (etiology). Particularly, biological factors like, e.g., genetic factors, viruses, are responsible for the release of the disease, i.e., specific pathogens cause specific reactions or processes *inside* the individual [56]. The bio-medical disease model includes a negative definition of health by looking at health as an absence of disease (pathogenesis). In this case, health or disease can be determined clearly. Individuals without any symptoms of disease are seen as healthy; individuals who have symptoms and fulfill specific diagnostic criteria receive a diagnosis and are considered as ill [57].

The criticism in terms of the bio-medical model concerns on the one hand the limitation of a disease to a physical disease and the outdated separation of body and soul. On the other hand, it is considered as reductionistic, since complex phenomena are explained with a simple physical principle with inexplicable phenomena remaining excluded. In summary, the claim is that disease is only identifiable in the organism; however, the social aspects or social inclusion as well as the psychological issues of the individual are not incorporated. This was the reason why Engel [58] plead to extend the bio-medical model by including psychological and social dimensions. The bio-psychosocial model is also a model of disease (pathogenesis) but these days it represents the basis for health sciences. It is important to clarify that no paradigm change took place due to the challenge of the bio-medical model, which still plays a dominant role in medical treatment, research and practice.

Bio-psychosocial model

In the bio-psychosocial model, the patients as well as their psychological state and their social milieu should be considered beside the biological aspects in order to be able to understand the determinants of diseases and to offer appropriate forms of treatment and health care [56]. Engel [58] saw various levels of this model as systems that are in a hierarchical order according to the system theory, i.e., the organism is the biological system, the individual figures represent the psychological system, and the social and societal environment are seen as the social system. The bio-psychosocial model is not an elaborated theory but a dominant fundamental conviction [56]. Nonetheless, health professionals have been reluctant to adopt the bio-psychosocial or holistic perspective. The acceptance is presently growing, however, because of the increased prevalence of chronic health conditions and disabilities among the general population [59, 60].

Model of health: Salutogenetic approach to health

Since models of disease concentrate on disease and classify individuals as either being ill or healthy, Antonovsky [61] asked himself how individuals maintain their health despite plenty pathogens or how their health in an environment filled with risks would still not be affected. He suggested that the concentration should therefore be on the healthy population and not solely on ill individuals (pathogenetic theory). Therefore, Antonovsky developed the model of salutogenesis emphasizing health instead of disease. Each individual is considered irrespective of whether they are more or less ill or healthy. Another aim of the salutgenetic model is to determine which resources are able to maintain or enhance the individual's health situation. Within the scope of this approach, stressors can be pathogenetic but they can also have positive effects on health; the focus is, thus, on empowerment of the resources that help individuals to cope with stressors. The salutogenetic model consists of four central interactive components which have an influence on health: health-disease continuum, stress and coping, generalized resistance resources and sense of coherence [56] .

Health-disease continuum. There is no dichotomization of being ill or healthy. Thus, health is simply not considered as the opposite of disease but as positioned on a multidimensional health-disease continuum, i.e., individuals stand or move within this continuum between the pole of the maximum of health and the pole of the maximum of disease. It is not about the description of health or disease but on the movements on this continuum. In this concept, the person is relevant and does not disappear behind the disease. Furthermore, patients or persons with no diagnosed disease are not excluded either – an exclusion would happen in the case of the concentration on disease only or in the case of dichotomization into disease and no-disease.

Stress and coping. Individuals are confronted with stressful situations and they try to cope with subjectively perceived strains. If the coping is effective, the individual moves to the positive side of the health-disease continuum and vice versa, i.e., in case of ineffective coping, the individual stands rather on the continuum's negative part. In the latter case, the individual reacts to stress on the physical and psychological level; under certain conditions (e.g., physical, mental vulnerability) this can result in diseases. According to Antonovsky, stressors can be both exogenous and endogenous and they cannot always be prevented. He considered them as normal and omnipresent and not as health risks that need to be avoided. Therefore, in his salutogenetic approach rather the options of coping as well as the factors having influence on the effectiveness of dealing with stressors play a central role than stress itself. Within this scope, he introduced two concepts, *generalized resistance resources* and *sense of coherence* [56].

Generalized resistance resources. These resources can be effective in plenty of burdensome situations and they are able to make an important contribution to health status. Generalized resistance resources describe each characteristic of an individual, group or environment. Genetic and constitutional resources as well as psychosocial factors, such as personal identity, intelligence, good coping abilities, social engagement, social support, are included among generalized resistance resources. These resources are inter-individually different because individuals grow up in various socio-cultural and historical conditions or circumstances.

Sense of Coherence. Besides generalized resistance resources, the sense of coherence is a further centerpiece of the salutgenetic model. A relative stable life orientation and deep conviction in terms of the comprehensibility and meaningfulness of one's life as well as coping abilities can be developed by life experiences and the constant consistency, participation and balance of demands. Antonovsky condensed these convictions with the term sense of coherence consisting of three elements: sense of comprehensibility, sense of manageability und sense of meaningfulness [56].

The goal of the salutogenetic approach in health research is to identify, define and describe pathways, factors, and causes of positive health. These aspects should be considered as a supplement to our knowledge about how to prevent, treat, and manage disease or negative health (pathogenesis) [61, 62]. Thus, this model is particularly attractive for areas engaged with prevention and health promotion [56] as is clearly noticeable in the following quotation of Becker, Glascoff & Felts [62]:

> *"The assumption of salutogenesis, that action needs to occur to move the individual toward optimum health, prompts professionals to be proactive because their focus is on creating a new higher state of health than is currently being experienced."*

IMPAIRMENT, DISABILITY AND HANDICAP

In Public Health, acquired hearing loss among elderly is seen as an increasing issue [6]. The exchange of information and communication being essential for the workaday life will be considerably limited because of the hearing loss [34]. Subsequently, the barriers and difficulties in communication as well as the limited safety will lead to (long-term) consequences. Hearing impairment, therefore, impacts the lives of hearing impaired individuals as well as their families [63]. On this account, it is indispensable to approach the hearing loss and its consequences multi-perspectively. With the International Classification of Impairments, Disabilities and Handicaps (ICIDH) the World Health Organization (WHO) [64] offered a conceptual framework for disability or long-term consequences of disease, injuries or disorders. It is applicable directly "*to the care of individuals in diagnosis and treatment, evaluation of treatment results, assessment for work, and information, and to assess patients in rehabilitation, in nursing homes, and in homes for the elderly*". The background for creating this concept was the limited scope of the International Classification of Disease (ICD) based on the biomedical model focusing solely on diseases being preventable, self-limiting or curable [64], thus considering only hearing impairment itself but not its negative effects. Before continuing elaborating on ICIDH and its revision to International Classification of Functioning (ICF), the ICD is clarified in the following section.

International Classification of Disease

The bio-medical disease model provided a basis for the generation of the ICD, which is "depicted symbolically as a sequence of etiology, pathology and manifestation". In everyday practice, the ICD as an efficient approach is used for disorders that can be prevented or cured. This concept has the focus on bringing the released illness and its underlying condition under control. However, the consequences of disease are not taken into consideration because the treatment process stops prior to this. Particularly, these consequences have a negative impact on everyday life of the person concerned and these experiences, especially of individuals with chronic, progressive or irreversible disorders, are not included in this classification [64].

People make use of the health care services because of their health problems but according to WHO, the use of ICD is not always appropriate because it is not able to reflect the full range of problems. Therefore, it is beneficial or necessary to consider the actual reasons why people sought contact with health professionals. The rationale for adhering to this course of action is illustrated adequately in the following quotation:

> *"Sickness interferes with the individual's ability to discharge those functions and obligations that are expected of him. In other words, the sick person is unable to sustain his accustomed social role and cannot maintain his customary relationships with others."[64]*

International Classification of Impairment, Disabilities and Handicaps

The critique of the ICD with its sequence presented as etiology, pathology and manifestation, indicated a needed extension of the sequence, i.e., diseases, impairment, disability and handicap in order to include psychosocial consequences of diseases [64]. In the following, the entities *impairment* (diseases and impairment are jointed), *disability and handicap* of the extended ICIDH will be elaborated on theoretically by using the example of hearing loss:

Impairments are defined as structural and functional disturbances of the human body or abnormalities at the organ level [64]. Hearing loss as *impairment* refers to anatomical-physiological abnormalities or changes of the auditory system [4, 55].

Disabilities are specified as limitations of functional performance and activity of the individual caused by impairment. Thus, disabilities are disturbances at the level of the person [64]. Hearing *disabilities* concern limited functional performances such as difficulties with the perception of speech and discrimination of environmental sounds caused by hearing loss (measured by objective audiometric measures) [4, 55].

Handicaps are characterized as psychosocial and economic consequences of impairments and disabilities and have adverse impacts on participation in society or in milieus of affected people [64]. Hearing *handicap* is defined as the social and environmental consequences of the hearing disability in everyday life [4] and depends on the (subjective) perception of the circumstances of the individuals concerned [55].

According to Ventry & Weinstein [65], hearing handicap is a complex phenomenon. The perception of hearing handicap is influenced by such factors as personality, psychosocial adjustment, age, and physical health, i.e., the severity of hearing handicap differs from individual to individual [65]. On the one hand, persons with hearing loss could appraise the consequences of their hearing loss as severe and thus withdraw from their social network because of the perceived limited communication abilities. This action can result in social isolation and depression. On the other hand, there are also persons diagnosed with hearing loss who do not perceive any consequences. So, they do not report having a handicap and rather do not accept a hearing aid compared to the persons with a self-reported hearing handicap [66].

Hearing impairment is only one facet of a hearing handicap. Thus, the information provided by audiologic measures is not sufficient to evaluate a hearing handicap. In order to offer an adequate rehabilitative management of a hearing-impaired individual it is additionally necessary and beneficial to assess the effects of hearing impairment in everyday life [65, 66].

Although the ICIDH is a powerful tool due to its range of applications, a critical discussion is necessary. The main issue emerges with the term “handicap” which does not concentrate on individuals or their attributes but on the circumstances in which the individuals with disabilities might find themselves. These circumstances can place the individuals with handicap at a disadvantage compared to their peers without a handicap, when viewed with respect to social norms. The dimension of handicap solely respects circumstances at a social level in terms of the attributes of the individuals but environmental as well as personal factors are not included [64]. In addition, the ICIDH is predominantly oriented on deficits and does not define the role of the individual and the environment in relation to the disability. Thus, this model does not entirely conform to the bio-psychosocial model [67] encompassing interactive influences of physical, psychological and social factors on health. Furthermore, the understanding how individuals perceive their own health and well-being plays a significant role in this holistic approach [58, 60]. As a consequence, the primary disease-oriented ICIDH was broadened with the International Classification of Functioning, Disability and Health (ICF) to meet the holistic approach that reflects the reality of life much better [67].

International Classification of Functioning, Disability and Health

International Classification of Functioning, Disability and Health (ICF) with its holistic or bio-psychosocial approach is based on the concept of functioning (as an essential component of health) and addresses "functioning and disability related to a health condition within the context of individual's activities and participation in everyday life". Thus, ICF is oriented on resources and deficits [68] and its framework is constituted of the following two parts, *Functioning and Disability* and *Contextual Factors*, including two components respectively that are portrayed in the following.

The first part *Functioning and Disability* includes the components 1) body functioning and body structures and 2) activities and participation.

- Functioning (umbrella term) denotes the positive aspects of interaction between individuals with a health condition and their contextual factors, i.e., body functions (refer to physiology), body structures (refer to anatomy), activities (execution of a task or action) and participation (involvement in a life situation).
- Disability (umbrella term) denotes the negative aspects of the interaction between and individuals with a health condition and their contextual factors, i.e., impairments (anatomical-physiological changes, e.g., significant deviation or loss), activity limitations (difficulties in executing activities; limitations at a personal level) and participation restrictions (experienced problems in terms of involvement in life situations; restrictions at the social level).

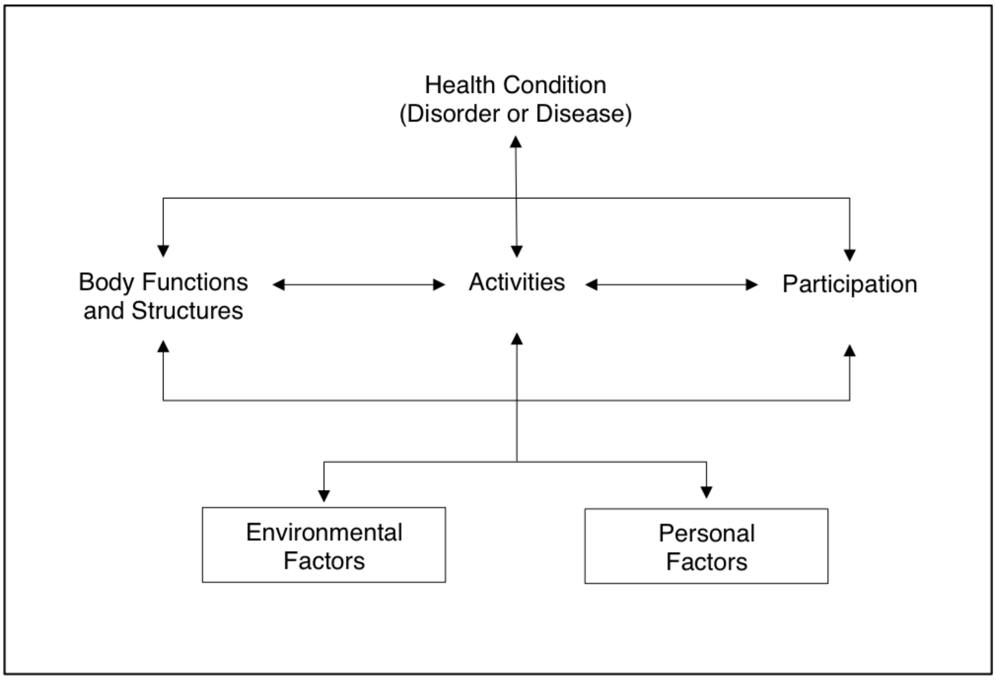

Figure 3. Interaction between ICF components. [69]

Contextual Factors as the second part of ICF consist of the components, environmental and personal factors shortly specified in the following.

- Environmental factors are viewed as barriers to or facilitators of the individual's functioning. These factors are covering physical, social an attitudinal environment in which an individual lives and conducts their life.
- Personal factors include gender, age, race, lifestyles, habits, education and profession because these factors may have an influence on how a person functions. Despite their potential influences on humans' functioning they are not currently classified in ICF because of their culture-specific variance." [68-70].

The ICF components *Health Condition* and the *Contextual Factors* interact and their relationships, which are complex, dynamic and often unpredictable, have an influence on the functioning of an individual. The directions of the interactions illustrated graphically by WHO [69] are displayed in Figure 3. This illustration shows two directions of the components' interactions. However, simple inferences from one component to another are insufficient and incorrect, e.g., "to infer overall disability from a diagnosis, activity limitations from one or more impairments, or a participation restriction from one or more limitations" [70].

The WHO emphasizes the importance of gathering independently all kinds of data in terms of these illustrated entities. After the data collection, the associations between the components should be explored empirically for understanding their complex and dynamic relationship [70].

Although the ICF has been accepted and extensively used, it has been reviewed critically in some literature. One of the concerns was that subjective dimensions such as quality of life were not implied [71, 72]. The advice to enlarge the ICF by comprising the concept of quality of life was enunciated. This was based on the assumption that a complete or holistic picture might possibly be gained of an individual while assessing the individual's health and functioning [60, 73, 74]. An alternative is to involve the concept of quality of life as a separate entity [63, 74]. Cieza & Stucki [75] articulated their expectation that ICF and quality of life as separated but related entities looking at functioning and health should be used concurrently in different fields such as clinical practice, research and health reporting.

QUALITY OF LIFE

Quality of life has been playing a crucial role in medical and psychological research for decades [76, 77]. The interest in this concept is linked to the change of the disease-oriented to the bio-psychosocial model [78]. Evidently, there is no nominal definition of quality of life because it is almost impossible to determine it distinctly [78-81]. Moreover, a clear differentiation between quality of life and related constructs such as happiness, life satisfaction or well-being is rather difficult [82, 83]. In addition, its assessment is intricate because an experience as subjective as this one is barely directly observable and can only be accessed indirectly [81].

Since a generally valid and binding definition of quality of life could not be generated yet, groups of researchers mainly aspired to finding an operational definition of this complex construct. They were finally in agreement about quality of life as a multidimensional construct that implies the following four dimensions: physical, psychological (emotional and mental), social and behavior-related components from the subjective viewpoint of the persons concerned [80, 81, 84, 85]. Although there is no universal definition of quality of life, the definition of the WHOQOL Group [86] is cited or mentioned in numerous literature:

> *"Quality of life is as individuals' perceptions of their position in life in context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns."* [87]

This definition highlights the entire life situation in a cultural, social and environmental context. The subjective quality of life is influenced by their physical and psychological health, their independence or autonomy, their social relationships and ecological environment [86, 88]. Thus, the concept of quality of life is specific to the concerned individual because its fundamental element is the relation to the subjective view of the individual, i.e., it is individuals who provide information about their health and life situation [85]. Basically, the assessment of quality of life is applied to one single person [81].

Beside the subjective view on individuals' state of health, the ability to cope with the everyday life and to integrate socially plays a more and more significant role in the medical context. The change of quality of life may be influenced by several relevant factors, such as various coping styles or strategies, expectations, optimism, self-concept [82]. Büchi & Buddeberg [89] observed as well the existence of an association between quality of life and *coping strategies* and described quality of life as an essential parameter for the effectiveness of copings strategies. Furthermore, the concept *social support* may be an influence factor to sustain an individual's health condition and to cope with psychological and physical issues as well as with the consequences of diseases [89].

In general, influence factors should be included once quality of life is investigated in order to determine the real rate of the explained variance of quality of life [82]. Therefore, the factors *coping* and *social support* as influence variables are included into the theoretical framework and described afterwards.

COPING AND SOCIAL SUPPORT

Stressfully experienced situations demand efforts to react and to cope with them, i.e., coping is considered as a reaction to burdensome circumstances perceived as stress [90]. On the basis of the evidently close linkage of stress and coping, the theoretical perspective of stress will be illustrated at first. Stress is associated with physical and psychological disorders. The susceptibility to stress differs from individual to individual and can be influenced by factors like coping and social support [91]. For this reason, these two constructs embedded as central components in the salutogenetic model of health are expounded in the following section as well.

Stress

In the language of everyday life the term *stress* is used as an umbrella term denoting strains, demands and potential overextensions. However, these characterizations are not feasible to define stress in a scientific sense. On the basis of differences in the terminology of stress in the last decades, no general accepted definition exists. Therefore, the most used or famous definitions in research literature are presented in the following.

The first popular definition was provided by Selye [92] who contributed fundamentally to the justification of stress research [56]. He defined stress as a physical reaction (i.e., physiological and endocrinologic changes) to stimuli having a negative impact on the human organism (physiological changes) [56, 93]. Stress is, therefore, related to reactions in the organism (internal situation). There is a second version of stress definition which refers to the external situation, i.e., stress is characterized as all kinds of objective demands from the environment. Stimuli of situations associated with threat and jeopardy can also be perceived as stress. These strains can be seen via emotional, verbal and behavioral reactions of the person.

Both definitions of stress are determined independently from how individuals perceive the stimuli, also called stressors, and from the organism's capacity of reacting to them. These issues are considered as limitations. In more detail, in the first reaction-related stress definition it is expected that the pattern of reaction characterized as stress is similar to all stimuli or stressors. In the second situation-related stress definition, the assumption is that the same kind of stress situation has the same anticipated impact on each individual.

Thus, the reaction-related as well as the situation-related definition of stress do not respect the different inter-individual experiences of stress [56]. These definitions fail to specify the mechanisms that describe the transformation of objective events into a subjective fact of experience. In addition, the detailed illustration of the dynamic of coping with stress in general is ignored. Due to the critique of both definitions because they cannot be supported by empirical evidence the interactionistic or psychological stress theory was developed by Lazarus [94, 95].

> *"The definition of stress here emphasizes the relationship between person and environment, which takes into account characteristics of the person on the one hand, and the nature of the environmental event on the other. (…) There is no way to predict psychological stress as a reaction without reference to properties of the person. Psychological stress, therefore, is a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being." (p. 21) [96]*

Lazarus considered stress as a specific form of transaction between individual and environment. According to him, transaction is a dynamic interaction between both of these systems [56]. In his transactionistic theory, two processes play a crucial role within the relationship between individual and environment: cognitive appraisal and coping. Cognitive appraisal is essential since it explains the inter-individual differences in terms of type, intensity and duration of stress situations among similar environmental conditions for various individuals. Lazarus distinguished three types of appraisals with different functions respectively: primary appraisal, secondary appraisal and reappraisal [95].

Within the scope of primary appraisal, individuals estimate their situation and as a consequence thereof its internal and external demands on themselves. The individuals decide whether they view or appraise the situation as harm or loss (e.g., occurred impairment), threat (e.g., anticipated impairment) or challenge (i.e., dealing with a stressful situation with the chance of a positive outcome for the person concerned) [95, 97]. The secondary appraisal comprises the assessment of the accessible resources and possibilities as being helpful and leading to a positive ending of the conflict. Both types of appraisal occur parallel, are entangled and have an influence on coping [95]. Therefore, there is a close relationship between coping and primary as well as secondary appraisal. The coping efforts or the analysis of the environment and the potentially modified situational conditions are mostly reappraised during the phase of coping or after. In the context of reappraisal, the gained experiences are examined and if they are considered as untenable one's (coping) behavior will be revised, modified or adjusted. In this concept of cognitive appraisal the assessments of the situations do not solely show if and to what extent the situation is perceived as stress, but the persons concerned also decide on how to deal with this situation (ways of coping) [97].

Stress with the potential of threat and strain is provoked by different types of stressors, e.g., objects, situations, events in the environment or in the organism. Stressors identified as negative could be for example [93, 98, 99]:

- physical and physiological stressors (e.g., noise, time pressure, dash, extreme heat, extreme cold, injury, pain, disability),
- stressors of effort and social stressors (e.g., mental underload and overload, concurrence, isolation, interpersonal conflicts),
- chronic strains (e.g., long-term diseases, role conflict in family or in job).

Evidently, the origin of stressors can be internal or external. In addition, stressors are perceived inter-individually differently, so that the influence on the human organism, on homeostasis or on the physical, psychological and social well-being varies as well [100, 101]. Perrez, Laireiter & Baumann [101] distinguished stressors according to the duration of and the quality of impact on life events, traumatic events and stress, daily hassles and chronic stressors:

- *Life events* are subjectively meaningful changes or events (more or less abrupt) in the life of individuals [56]. Life events or changes could be negative like divorce, loss of job, and positive like a pregnancy, wedding, vacation, first day at school or retirement. These life events need to comply with at least one of following three criteria: (1) being temporary, (2) demanding a qualitative restructuring and (3) the reactions based on life events are not short-term but sustained emotions.
- *Traumatic events* as unforeseen events are also life events concerning an individual directly or indirectly, e.g., death, threat of death, severe injury or death of loved ones. In addition, being a witness of a severe threat, injury or killing could trigger a trauma. Other traumatic events are natural disasters, technical catastrophes, etc. In this case, tangible goods will be lost and thus the personal and social existence of the victim is threatened in particular. Life events are highly intense, barely manageable and unforeseeable [101]. Traumatic life events

respectively sometimes demand a longer time to adapt as well as higher efforts to assimilate compared with daily hassles. Due to life events individuals need to change their life in order to be able to assimilate and will perceive it more and more as stress the more changes are needed [102, 103].

- *Daily hassles* are considered as rather short incidences in everyday life meaning annoyance or frustration, e.g., certain household duties or defect equipment [56]. Other daily hassles could be problems with the bodyweight, health problems of family members requiring care on a daily basis, financial problems, too much work, time pressure, conflicts, double role as housewife and employee, etc. These troublesome and frustrating issues affect individuals' well-being and health [104]. Lazarus [105] stated that recurrent irritating and upsetting daily hassles are even more important factors in negative health outcomes compared with major life events. The daily annoyances can impair morale, social functioning and health. However, major life events and daily hassles are associated because major life events can be new sources of daily hassles, e.g., death and divorce affecting morale, social functioning, and health by disrupting and changing the course of everyday life. Thus, individuals have to cope with new demands and issues and struggle with new stressful conditions, such as loneliness, management of money, dating and so forth [105].
- *Chronic stress* is defined by the duration of the strain. Life events or daily hassles are dated events in everyday life in terms of their occurrence whereas chronic stress endures over a longer time period. Thus, chronic stressors are long-term strains appearing because of the individual's social role or living conditions [56], e.g., stress in the family as chronic strain or lasting consequences of short-term events like divorce [101]. According to Lazarus [105], chronic stress "arises from harmful or threatening, but stable conditions of life, and from the stressful roles people fulfill at work and in the family.". Chronic sources of stress could also be heart disease or arthritis and these are long-term irreversible ailments the individuals have to live with and manage [105].

Age-related hearing loss is an irreversible sensory impairment as well. Dugan [106] argued in her book "Living with Hearing Loss" that hearing loss is barely perceived as a life-threatening situation, however, the consequences of hearing loss may lead to a life in an unhealthy state of chronic stress. "Hard of hearing people are constantly faced with the fear of misunderstanding and misinterpreting incoming information. Fear can lead to chronic worry and anxiety" [106]. This quotation emphasizes the feeling of a constant threat in the everyday life of hearing impaired individuals.

The reactions or consequences of stress vary; therefore, they are localized at different levels. At the subjective or cognitive-emotional level the reactions can be, e.g., fear, anger, insecurity, depression, nightmares, increased concentration, improved cognitive performance [103, 107], bad temper, uneasiness, helplessness, concentration disorders. There are also behavioral reactions such as aggression, increased consumption of drugs, hasty behavior. Physical reactions of stress can be, e.g., hyperventilation, increased muscle tension, increased ability of blood clotting, increased heart beat [93], back pain, nervous gestures, gnashing of teeth, tension headache, weak knees, dizziness, fatigue. At the social level, possible stress reactions are, e.g., conflicts, withdrawal, isolation, need of proximity or closeness, loss of sexual interest [107].

Stress reactions can be functional/adaptive or dysfunctional. A functional reaction can reduce the stress or strain whereas a dysfunctional reaction can lead to a massive intensification [107] and cause psychological and physical changes assessed as symptoms of a disease [56]. Thus, the prevalence or duration of stress as well as its ineffective control and excessive demands of physical resources may lead to health problems [90, 108] like psychological disorders such as depression or fear and/or somatic dysfunctions as, e.g., cancer or infections [107].

Coping

Coping is defined as a reaction to strains in accordance with the transactionistic theory. Once the situation is experienced as stressful, efforts to react and to cope are demanded [90]. According to Lazarus & Folkman [96], coping is specified as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resource of the person.“ In this definition, the processual and dynamic approach of coping displays a central characteristic, i.e., individuals use different kinds of coping strategies simultaneously and appraise again and again if the stress is still present. If so, new possible options or strategies to cope with stressful conditions are evaluated [109]. Both, demands and appraisals, can change perpetually, therefore, also the appropriated or related attempts of coping should be changeable [95].

The processual character becomes visible by the interaction between situational conditions and coping mechanisms. In this relationship, traits referring to stable properties of a person can have an influence on the way of coping as, e.g., stress-reducing protective factors. However, traits can only be effective in the context of states dealing with transient reactions that change with circumstances [90, 96, 110]. In general, coping aims at achieving a good balance between maintenance of the individual's capacity to act and the personal perception of satisfaction, well-being and a stable identity [93, 111].

Cohen & Lazarus [112] specified the primary duties of coping relating to emotions and social as well as situational factors. In more detail, one aim is to reduce the influence of environmental harm and to enhance the outlook of recovery. Additionally, tolerating negative circumstances and adjusting the human body to these conditions as well as maintaining a positive self-concept are counted as primary duties. Further two essential aims of coping are to ensure the emotional balance and to continue satisfying and keep intact relationships with other people [95].

By reading various literature on coping different taxonomies of coping came up. This means that no general model of coping within the research of coping could be identified. Several coping models were developed in order to answer the question how the strain as a discrepancy between the current and the desired condition can be handled, solved and permanently eliminated: Problem- versus emotion-focused coping put forward by Lazarus & Launier [113], assimilative and accommodative coping developed by Rothermund & Brandstädter [114] and the coping model elaborated by Perrez & Reicherts [100]:

Emotion- versus problem-focused coping. Lazarus & Launier [113] distinguished two functions of coping: problem- versus emotion-focused coping [93]. Once the individual tries to deal directly with the situation or condition being responsible for the harm, treath or challenge, coping is considered as problem-focused (instrumental) [95]. Hence, attempts of coping address the change of the relationship between individual and environment, e.g., in case of very high requirements at work this means reducing them by talking about this problem with the superior [56]. Emotion-focused (palliative) strategies are efforts related initially to control emotions and problems [95]. These attempts of coping address triggered emotions by regulating negative emotions, e.g., compensating the fear released by the excessive demands at work by consuming drugs or alcohol. This example makes clear that compensation must not necessarily be positive but that it can also lead to behavior being risky for health [56].

The coping model of Lazarus & Launier [113] implies four ways of coping within each function of coping outlined above: search for information, direct action, failure to act and intra-psychic coping. Changing the meaning of the situation as a coping strategy can have an instrumental (to settle the conflict) as well as a palliative (to reduce emotions) function [95].

This model is subject to critique because it focuses on short-term processes and ignores long-term processes of coping. However, regarding coping also as a long-term process is particularly important with respect to chronic stressors or strains [56].

Two-process model. This model created by Rothermund & Brandstädter [114] comprises assimilative and accommodative coping behaviors and indicates two starting points to cope with the discrepancy between current and desired condition. On the one hand, there is the option to change the current situation with strategies including behaviors resolving actively the strain or problem, i.e., to assimilate the environment to the personal needs (assimilation). On the other hand, the desired condition can be handled by changing individual aims, appraisals, attitudes, needs, wishes and imaginations (accommodation). Assimilative coping behaviors require processes of planning and performance. Examples of assimilative strategies are, e.g., looking for the causes of the problems, for solutions, acquisition of new skills, searching for help in the social network or in professional systems [93]. Accommodative coping behaviors are characterized as flexible modifications of goals and standards. They are considered as neutralization and less as an active solution of the problem [115]. Examples of accommodative activities are withdrawal of attention from the blocked goal, acceptance of irreversible losses, change of resources of action guided towards new goals and mechanisms to dissolve barren commitments [116].

These two processes for coping, assimilation and accommodation, can only be applied once the discrepancy is perceived. Thus, this statement points out that the perception of the difference is the required preliminary stage, i.e., the individual is only able to cope with the problems they perceive. The fact that an individual does not perceive a given problem, e.g., avoidance, is not included in this coping model and is, therefore, an issue to be criticized [93].

Stress-coping model of Perrez & Reicherts [100]. Perrez and Reicherts modified the taxonomy of Lazarus's psychologic theory. They extended it by distinguishing not only the subjective but also the objective dimensions of a given stressful situation. In their stress-coping model, stress is defined as an interference of homeostasis and it appears once the stressors are perceived as harming or affecting. This model looks at the process of perceiving the above-mentioned objective dimensions of situation subjectively at first and of responding to this perception subsequently. The consequences of the responses are the outcome of this process. The objective dimensions relate to the type of stressors, distinguished into loss and punishment (Table 1), and to further dimensions of situations experienced as stressful, described as valence, controllability, changeability, ambiguity and reoccurrence of a given situation (Table 2). In this case, valence, controllability, changeability, ambiguity, reoccurrence, familiarity are also considered with respect to their subjective dimensions (Table 2) [100]. The authors emphasize that it is important to perceive subjectively the characteristics of the event during its course because „stressful situations can change their objective psychological features as a function of coping attempts or may remain stable despite the invested efforts. They also may change by their own dynamics" [100].

Table 1. Objective distinctive characteristics of stress.

Objective distinctive characteristics of stress	
Loss	The removal of a desired source of reward or positive reinforcement (e.g., loss of a relationship)
Punishment	The occurrence of an aversive situation (e.g., an attack, road accident)

(p. 19) [100]

Table 2. Objective and subjective dimensions of situations.

Dimensions of situations		
	Objective	**Subjective**
Valence	The inherent stressfulness of a situation	The subjective meaning of a situation/event that contributes to its stressfulness, but is individually determined
Controllability	The inherent opportunities for control within a situation	The subjective appraisal of personal ability to control the stressful situation
Changeability	The probability that the situation will change by itself; that is via its own dynamics (e.g., the weather)	The subjective appraisal that the stressful event will change itself, that is without the person any action
Ambiguity	The degree to which a situation is inherently lacking in sufficient information to enable clear meaning of the situation to be ascertained	The subjective appraisal of ambiguity and uncertainty of the situation
Reoccurrence	The inherent likelihood of reoccurrence of the stressful situation	The subjective appraisal of the reoccurrence of the stressful situation
Familiarity		The extent of personal experience with such a situation

(p. 19-24) [100]

In this stress-coping model, coping operations are situation-oriented, representation-oriented and evaluation-oriented. Situation-oriented coping behavior encloses an active influence on the situation (active type), escape as well as withdrawal as an evasive type and hesitation or waiting as passive types. These coping operations can concern the persons' environment (e.g., standing up to a demanding boss) or can refer to the individuals themselves (e.g., to a negative cognition) [100]. Changing goals or giving meaning to a situation and re-evaluating a situation are classified with evaluation-oriented coping that can change the attitude to the stressor. The representation-oriented responses to stress such as searching for information or suppression of information change the cognitive representation of the stressors or situation [101].

The evaluation of the stressors and the closely associated attempts of coping enable individuals to recognize tendencies of behavior allowing recommending courses of action subsequently. In order to use these recommended actions the individuals needs to have the ability to appraise realistically the relevant features of the stressors. An example of recommended action is the active influence on the stressors in situations that are controllable, barely changeable, negatively valent. It is possible to cause a reduction of the stressor and consequently to restore the homeostasis [101]. These short-term or long-term adoptions to stressful situations can have an effect on physical, psychological and social well-being. In this context, Perrez & Reicherts [100] advised researchers to be clear on the effectiveness of these coping strategies on health dimensions.

Social Support

Various authors define social support as subjectively perceived result of social interactions and their appraisal by the recipient and/or by the giver. Characteristics of the social network, social interaction as well as of the concerned individual flow in the process of appraisal [117-120]. It is assumed that social support moderates between the negative effects of stressful events and the physical and psychological features of health, i.e., that the positive experienced social support goes along with reduction of symptoms on the psychological and somatic level [91]. Thus, individuals are rather able to cope with daily hassles and stressful events once they evaluate their experienced social support as satisfying [120]. Schwarzer & Leppin [121] regard this interactive effect between stress and social support as a puffer effect [91].

Social support includes components being distinguished into emotional support (e.g., empathy, closeness, trust), problem-solving support (e.g., talking about a problem, encouragement, feedback), practical and material support and social integration (belonging to social network, agreement in terms of values) [120, 122, 123].

Sources of social support are individuals or groups of persons giving social support or enabling support on the social level. These individuals are in particular (marriage) partners, parents and children, relatives, friends, colleagues, neighbors, superiors and inferiors. Individuals concerned rather prefer social support from the loved ones such as family, neighbors and friends than from self-help groups, mediators or professional help [124].

In the process of coping, different kinds of social resources (e.g., social support, social network) or personal resources (e.g., self-efficacy, realistic self-esteem and locus of control) play a significant role. Appropriate or successful coping strategies are much more likely to be developed if these resources are available to the individual. In terms of social resources, individuals name primarily social relationships of which they make use during coping with stress situations. Due to positive and meaningful perceived social support in the process of coping, harming or impairing effects of stressful events and chronic stress may be relieved and a sense of belonging may develop [56, 98].

Coping behaviors and social support are considered as important influence factors in the relationship of stress and quality of life, but also *gender* as a personal factor may be a control factor in this context [89]. On this account, the next section deals with the gender aspect which also plays a significant role in this dissertation because of its possible influence on perception of hearing handicap and social support, use of coping strategies and quality of life.

GENDER

Gender is a socio-cultural construct; it is different from the biological sex emphasizing anatomical differences between women and men. Gender encompasses characteristics of personality, emotions, values and actions and these factors are attributed to the female or male sex by a given society [125]. Thus, differences between women and men are anticipated because of and correspond to the current gender roles in a specific society [126].

Gender can also have an impact on coping behavior [89] and on quality of life [127, 128]. However, opinions differ strongly with regard to the impact of gender. A number of authors claims for there to be no or merely a low impact of gender on quality of life [82, 129, 130]. Either way, it is indispensable to include a gender perspective in research settings concerned with health due to the assumption that health needs, perception of the body and physical feeling as well as health belief and awareness are articulated differently among women and men [131]. Since their behavior in terms of physical and psychological health is diverse, they develop specific patterns of health behavior which are in turn being influenced by the individual's biography and life world [132]. It is important to consider health and disease profiles gender-specifically in order to be able to offer programs and initiatives (sociopolitical and in terms of health policy) meeting the needs of both sexes [131, 132]. Evidently, the gender perspective implies a procedure defined succinctly but adequately by the WHO [133] which refers to the subject health in the following way:

> *"A gender approach to health begins with the recognition of these differences and promotes the integration of gender as a social determinant of health into policy development, research, health services, resource allocation and project and programme planning, monitoring and implementation."* [133]

These aims can be achieved by pursuing the following steps: 1) use of sex-disaggregated data collected with scientific methods (quantitative and qualitative), 2) understanding the differences between women and men and analyzing gender differences, and 3) development of programs, initiatives, interventions and policies according to these gender-specific results [133]. In the last years, the construct gender became increasingly popular and was or is adopted in literature of social sciences, psychology and medicine [126] but investigations of gender and health with scientific methods providing evidence-based knowledge for planning and assessing programs, policies and health services are still scarce [134].

WORKING MODEL FOR THIS STUDY

The description of the concepts *disability and handicap*, *quality of life*, *coping* and *social support*, their underlying models – bio-psychosocial model (disability, handicap and quality of life), stress theory, Antonovsky's salutogenetic model (coping and social support) – and the gender perspective shows how these concepts are interrelated theoretically. On this basis, a working model was created. It illustrates the interaction of the concepts and aims at guiding this current study (Figure 4).

The central idea of this working model is to take into account the hearing disability and handicap as strains caused by hearing loss. In addition, coping strategies and social support are included and interrelated with respective dimensions of quality of life. Furthermore, the relevant personal factor *gender* is also taken into account in this model because of its assumed influence on the associations of the concepts.

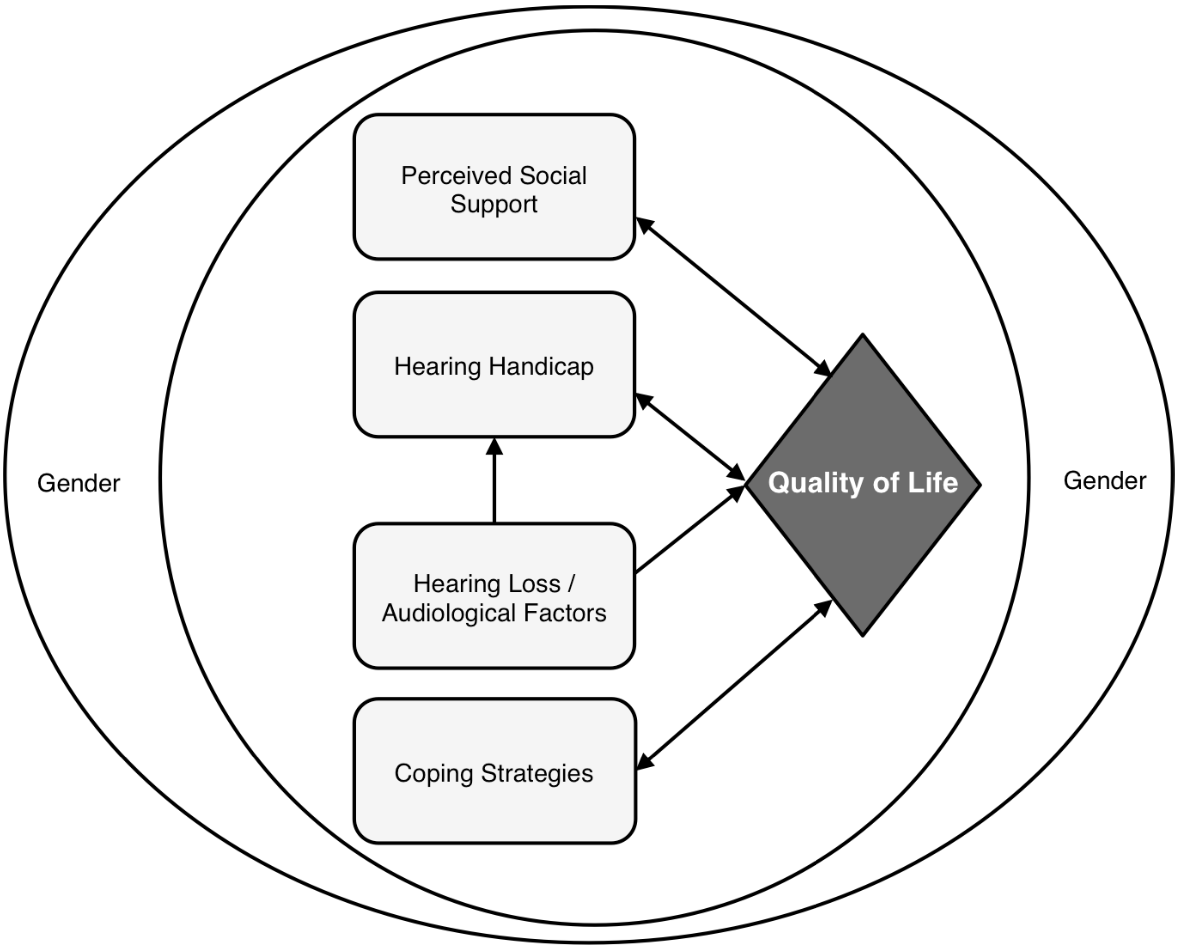

Figure 4. Working model.

Based on this working model and the concepts included, research literature in the subsequent literature review was included in order to give an overview about the current state of research on *hearing disability and handicap*, *quality of life*, *coping strategies* and *social support* and their relationships (see next chapter).

LITERATURE REVIEW AND RESEARCH AIMS

Since age-related hearing loss has became a large concern in health sciences because of its current high as well as increasing prevalence in the population and its experienced bio-psychosocial consequences in everyday life [135], it has been a research focus of numerous studies (e.g., Singh, Lau & Pichora-Fuller [136]; Bennion & Forshaw [25]; Gopinath et al [54]; Hallberg, Hallberg & Kramer [137]; Chia et al [138]; Dalton et al [34]; Tesch-Römer [4]). Several studies published in the last 15 years could be identified in the course of a comprehensive literature search in various databases (Cinahl, Medline, PsycInfo, Web of Science) by using following search terms: presbycusis, age-related hearing loss, hearing loss, hearing disorders, older, aged, aged 80 and over, elderly, coping, coping strategies, stress, quality of life, social support. In addition to search in databases, reference lists from relevant research articles were searched. The identified articles were appraised in terms of their title at first. Then, the abstract of the selected articles were evaluated in terms of relevance. The remaining relevant research articles were reviewed. Articles were excluded because of the design (intervention studies), methods (screening, intervention, validation of hearing specific measures), choice of participants (deaf persons; people with dual sensory loss, otitis media, tinnitus, morbus menière and cochlea implants; spouses), subject of investigation (prevalence, risk factors, family history, genetic) and questionable performance of the studies.

The current state of research in medical, audiologic and gerontologic or geriatric fields dealing with the concepts *hearing handicap*, *quality of life*, *coping strategies* and/or *social support* among older women and men with age-related hearing loss, are presented in the next sections. Primarily, research results about objectively measured hearing loss and self-assessed hearing problems by affected persons and the relationships between those variables are portrayed, followed by studies on self-assessment of quality of life and the association between quality of life and hearing data (objective and subjective assessment). Subsequently, an overview of all identified research data in terms of coping behavior as well as social support is given, followed by results from model analyses revealing impacts of different independent variables, e.g., hearing loss, hearing handicap, gender etc., on a dependent variable such as well-being or anxiety. At the end of this chapter, the summary and conclusion or appraisal of the entire literature review disclose the research gap and, therefore, lay the basis for the research aims corresponding to the created working model.

HEARING DIFFICULTIES AMONG ELDERLY

Several authors were engaged with the examination of age-related hearing loss and its consequences on the social and emotional or mental level in everyday life using various research designs (qualitative, quantitative, mixed methods). Their research results included data about hearing problems subjectively assessed by persons concerned as well as about the relationship between hearing loss and hearing handicap.

Subjectively reported hearing problems

In their studies, both Bennion & Forshaw [25] and Tesch-Römer [4] asked older people to talk about their experiences of living with hearing impairment. The interviewees mostly reported that they had major difficulties in talking or participating in noisy crowds and groups and perceived this situation as a barrier to communication – also when using hearing aids. Additionally, the research participants reported problems with watching TV because of the difficulties with hearing speech. Theatres, operas and cinemas were also frequently avoided because of the difficulties with speech understanding [4, 25]. Some of the interviewed individuals experienced hearing difficulties in social situations such as conversations in groups where the intelligibility of speech is limited due to ambient noises [4]. Other imparted problems in speech understanding arose when other people did not talk clearly or had an accent. According to Bennion & Forshaw the research participants experienced these communication difficulties as frustrating and embarrassing. Due to communication problems they also did not want to participate in social activities or in one-to-one conversations and in many cases spent their time at home [25].

In general, these study results correspond with the data from the cross-sectional studies conducted by Gopinath et al [54] and Morgan, Hickson & Worrall [55] who used the long or short version of the standardized questionnaire Hearing Handicap Inventory for the

Elderly (HHIE; Ventry & Weinstein [65]; HHIE-S; Weinstein & Ventry [139]) for measuring hearing handicap. Besides the difficulties of attending noisy events or encounters and listening to TV or radio, most participants reported major problems in understanding whispers [54, 55], followed by the feeling of being handicapped due to the hearing problem [54].

Wong & Cheng [140] also used the HHIE-S to gain information about how elderly in China assess their hearing difficulties and differentiated their data by severity of hearing loss; elderly with no more than 40 dB HL across four frequencies (i.e., with no to mild hearing loss) and elderly with more than 40 dB HL (i.e., with moderate to severe hearing loss). Participants with moderate to severe hearing loss rated their hearing handicap significantly higher than those adults with no to mild hearing loss [140].

The gender perspective on self-assessment of hearing problem was taken into consideration in the two following studies. Dittmar [141] investigated gender differences among older adults living in Germany by using the HHIE-S. Basically, in this study men reported a higher hearing handicap than woman, however, this result was not significant [141]. The gender perspective was also incorporated in the study of Hallberg, Hallberg & Kramer [137]. With the questionnaire Amsterdam Inventory for Auditory Disability and Handicap (AIADH; Kramer et al [142]) the authors explored aspects of hearing such as Distinction of Sounds, Auditory Localization, Intelligibility in Noise, Intelligibility in Quiet and Detection of Sounds. A gender difference could be detected in the dimension Auditory Localization. Men had significantly less problems in localizing sounds in comparison to women.

Interestingly, the published research results show that hearing loss causes social / situational and emotional problems among elderly with age-related hearing loss. Conversely, there is evidence that a low to mid-size proportion of older adults suffering from age-related hearing loss reported hearing handicap, 14.6% to 66.7% [54, 138, 143]. This suggests that some older adults perceived no hearing handicap despite being diagnosed with hearing loss. Dalton et al [34] found that almost the half of the participants with moderate to severe (44%) and 78% with a mild hearing loss did not report having a hearing handicap. Thus, they did not perceive or acknowledge the consequences in everyday life. These results show on the one hand that severity of hearing loss was significantly associated with having a hearing handicap but on the other hand that there is also a discrepancy between objectively measured hearing loss and subjectively assessed hearing handicap.

Association of functional hearing loss and perceived hearing handicap

Significant associations between hearing ability assessed by audiologic measures and hearing handicap determined by using self-report questionnaires could be identified in several studies. The correlation coefficient of hearing handicap measured by HHIE and hearing impairment (PTA in dB HL) ranged between r = .46 to r = .69 [4, 55, 140, 144, 145]. In Wong & Cheng [140], significant correlations also existed after controlling for the confounding variables age, gender and a number of coexisting medical problems.

Dalton et al [34], furthermore, confirmed the trend the severe the hearing loss the severe the perception of hearing handicap. In Pugh & Crandell [145], the existing relationship between hearing loss and its psychosocial consequences was even stronger when the hearing loss was moderate or worse.

A moderately high correlation between these two variables also existed when using other self-report measures as in Espmark-Karlsson et al [146] who used the modified version of Hearing Measurement Scale (HMS). Their finding indicates once more a relationship but also a discrepancy between hearing loss and the perception of its consequences on the psychological and social level (corresponding with results of, e.g., Dalton et al [34]; Chia et al [138]; Wong & Cheng [140]).

A significant positive relationship could be identified between hearing impairment and the dimension Distinction of Sounds (e.g., ability to distinguish between male and female voices or between different musical instruments or to hear cars passing by) in the study from Hallberg, Hallberg & Kramer [137]. Distinction of sounds is one of five dimensions (Auditory localization, Intelligibility in noise, Intelligibility in quiet, Detection of sounds) measured by the AIADH assessing auditory disability and handicap. They also conducted the analysis with respect to gender-specific issues and found that women reported more frequently of hearing difficulties compared to men the more severe their hearing loss was.

Authors of two different studies additionally calculated regression models in order to investigate whether hearing handicap can be predicted by hearing loss. The models explained 19% [55] or 30% [4] of variance in hearing handicap (independent variable). This result indicates that the severity of hearing loss is a significant predictor of psychosocial problems, i.e., the more severe the hearing loss is the stronger are the hearing problems in everyday life [4]. Age as a confounding variable was included in the calculation but eventually turned out to bear no potential influence on this relationship [55].

QUALITY OF LIFE OF HEARING IMPAIRED ELDERLY INDIVIDUALS

Self-reported hearing problems in everyday life come along with hearing loss. Hence, it was of interest to find research literature dealing with how participants with age-related hearing loss rated their quality of life and how hearing loss as well as self-perceived hearing problems were associated with and consequently impacted their quality of life.

A great number of quantitative cross-sectional studies give attention to self-reported quality of life among elderly with acquired hearing loss.

Self-assessment of quality of life

In comparison to older participants with normal hearing ability, hearing impaired elderly evaluated Mental Health, Vitality, Social Functioning, Role Emotional, Role Physical, and Physical Functioning measured by quality of life questionnaire SF-36 slightly lower. Interestingly, General Health and Bodily Pain was rated higher compared to elderly with normal hearing ability [55].

Wong & Cheng [140] investigated the quality of life with the same measure SF-36 and compared the scores between elderly with mild hearing loss and elderly with moderate to severe hearing loss. The better hearing group had significantly better ratings on the Physical Functioning Scale and Vitality Scale [140]. In the study of Ribeiro Teixeira et al [129], also a significant lower Physical Quality of Life (WHOQOL-BREF questionnaire) among elderly with more severe hearing loss could be found (items related to sleep, pain, daily activities, dependence on medication and/or treatment and labor capacity).

In two studies, the data about quality of life were analyzed gender-specifically [129, 137]. Hallberg, Hallberg & Kramer [137] pointed out that among the hearing impaired elderly men scored their Psychological Well-Being measured by Psychological General Well-Being Index (PGWB) significantly higher than women, i.e., these women rather experienced feelings of depression than men. This outcome could, however, not be validated by Ribeiro Teixeira et al [129] since their results did not show significant gender differences in any domain of the WHOQOL-BREF (physical, psychological, social and environmental domain).

Several studies were engaged in analyzing the difference of quality of life among older adults with and without self-reported hearing handicap. Elderly with perceived hearing difficulties had a significantly lower rated quality of life on the physical and mental level compared to those without self-reported hearing problems but with objectively measured hearing loss [138, 147]. Hogan et al [143] compared participants with mild handicap and those with moderate handicap and obtained similar results as Gopinath et al [147], i.e., the quality of life was better in case of lower rated hearing handicap.

Evidently, the quality of life of elderly with age-related hearing loss and self-perceived hearing handicap was significantly lower on physical and mental level compared to persons with normal hearing ability or hearing impaired elderly with no self-assessed hearing handicap. This fact is insofar remarkable as the subjects' scores on the generic quality of life questionnaires did barely reflect difficulties with social functioning or role functioning despite their reported hearing problems on the hearing handicap scales.

Associations of hearing loss or hearing handicap and quality of life

Since the data showed significantly reduced quality of life among elderly with hearing loss, it was of interest to find research data about the relationship between objectively or subjectively measured hearing status and quality of life.

Chia et al [138] and Pugh & Crandell [145] determined a significant negative correlation between bilateral hearing impairment and health-related quality of life (SF-36) among elderly with age-related hearing loss. A significant negative correlation was also identified between hearing loss and Mental Health (SF-36), i.e., the more severe the hearing loss, the lower participants rated their mental health, also after controlling the confounding variables [55, 147]. Apart from the lower scores on Mental Health, significant negative relationships between further five domains of SF-36 and severity of hearing loss were reported in Dalton et al [34]: Vitality, Social Functioning, Role Emotional, Role Physical, and Physical Functioning. Wong & Cheng [140] stated as well that Vitality was found to be poorer once the hearing loss became more severe after controlling the confounding variables, including age, gender and number of coexisting medical problems [140].

Interestingly, no correlations between severity of hearing loss and domains of quality of life measured by WHOQOL-BREF existed in Ribeiro Teixeira et al [129]. Likewise, in Harada et al [148] there were no relationships in terms of hearing ability and self-perceived health status as well as reduced Functional Activity (measured by Tokyo Metropolitan Institute of Gerontology Index of Competence). These authors also investigated gender differences, but no association between hearing loss and quality of life (health status and functional activity) among men and women was observed [148].

In three further studies, Physical Functioning was evaluated by using a questionnaire which assesses the Instrumental Activities of Daily Living (IADL). The authors observed that moderate or severe hearing impairment was associated with more limitations in IADL and in physical performance disabilities [4, 147, 149]. However, in Tesch-Römer [4], hearing loss did not significantly relate to scores of IADL scale after controlling the influence variables age, sex, education, income, and health.

Some studies also investigated correlations between self-rated hearing handicap and quality of life. According to Morgan, Hickson & Worrall [55], the psychosocial consequences of hearing loss related significantly to three domains of SF-36. The more severe the hearing handicap was perceived the lower scores on Mental Health Scale and Physical Functioning and the higher scores on bodily pain were found [55].

All domains of SF-36 can be summarized as Physical Component Score (PCS) and Mental Component Score and (MCS). The results of correlation analyses including PCS as well as MCS and hearing handicap show that the severity of hearing loss and/or self-reported hearing problems were associated with poorer PCS and MCS [34, 138, 147, 150].

In addition, the presence of depressive symptoms as a further indicator of reduced mental health was associated with self-perceived hearing handicap, i.e., the more communication or hearing problems were perceived the more symptoms of depression or lower psychological well-being were observed (Gopinath [147] used the Mental Health Index, MHI; Tesch-Römer [4] used the Geriatric Depression Scale, GDS; Kramer et al [151] and Hallberg, Hallberg & Kramer [137] used the Psychological General Well-Being Index, PGWB).

In general, the results in this section emphasize that the magnitude of the impact on quality of life is related to the severity of hearing impairment. Even stronger is the association between quality of life and the subjective perception of severe hearing handicap. Given that hearing handicap questionnaires measure emotional distress, social and communication or other auditory difficulties (e.g., localizing or detecting sounds) of hearing impaired persons, the independent association between self-reported hearing problems and poorer quality of life on mental and physical level was not surprising.

In the study of Hogan et al [143], study participants rated hearing impairment as the third most problematic condition, preceded by chronic pain and restrictions in physical activity. According to Tesch-Römer [4], elderly perceived their age-related hearing loss as a negative or stressful situation mostly because of the associated communication problems. Evidently, age-related hearing loss and its consequences in everyday life can be seen as a burden, which raises the question how elderly with age-related hearing loss cope with these chronic stressors and whether social support can facilitate their difficult hearing situations.

COPING AND SOCIAL SUPPORT

Several authors investigated coping strategies established by elderly with acquired hearing loss by using either qualitative (e.g., Wänström et al [152]) or quantitative methods (e.g., Hallberg, Hallberg & Kramer [137]) or mixed methods (Tesch-Römer [4]). Interestingly, the most recent publications included data gained by qualitative interviews, in particular by narratives of participants. In this regard, Andersson & Willibrand [110] advised about coping research in audiology that it would be appropriate to observe more process-oriented coping behaviors of hearing impaired elderly by rather using qualitative methods, e.g., open-ended questions, than quantitative methods.

Coping

Wänström et al [152] concentrated on the coping process – from the avoidance of the hearing loss to its acceptance. This transformation from avoidance to recognition and acceptance of age-related hearing loss was observed as a slow transformation and it happened unconscious or conscious. Becoming aware of one's hearing loss, in particular the psychological acceptance of this condition was fostered by participants perceiving and experiencing themselves the consequences of hearing loss. The authors found facilitators and barriers to the process of acceptance. Facilitators were among other things other peoples' observations and comments (i.e., research participants were alerted and made aware of their hearing loss by their significant others), other people's positive experience with hearing impairment (i.e., peers talking about their own experiences with hearing aids seemed to be trustworthy), accessibility of help-seeking and routine health assessments. Additionally, adaptive coping mechanisms were reported as factors that support the research participants on their path towards acceptance of their hearing loss. Acceptance is seen as to involve a more assertive demeanor regarding communication needs, changing habits in everyday life, speech-reading or lip-reading to follow conversations. Wanström et al further determined barriers as maladaptive coping mechanism preventing acceptance, e.g., stopping to engage actively in conversations, withdrawing from social life, pretending to hear, feeling discomfort when placing oneself very close to the communication partner in order to understand better.

Hearing impairment was also experienced as stigma and thus as barrier to the process of acceptance because it is regarded as synonymous with becoming old. This association is also reported in Bennion & Forschaw [25] and Wallhagen [153]. Having to wear hearing aids was considered as a stigma, as it would reveal one's hearing disability (as a perceived marker of old age and, thus, as a facilitator of ageism) to the outside world, ultimately leading to attempts of hiding one's disability [152].

In Wallhagen's [153] qualitative study perceived stigma was strongly related to the interactive effects of ageism as discrimination due to age (and age-related disability) and a society focused on youth and appearance. Thus, hearing loss and hearing aids as stigmatizing issues were observed to be influenced by external societal forces, such as health and hearing professionals, media and advertisements. Wallhagen's data support the pervasiveness of a perceived stigma and these perceptions can impede the acceptance of hearing loss among persons concerned.

Maladaptive and adaptive coping behaviors were investigated in Hallberg, Hallberg & Kramer [137] by making use of the disease-specific coping questionnaire Communication Strategies Scale (CSS; Demorest and Erdman [154]). Adaptive coping strategies, which are able to enhance communication or minimize the effects of hearing loss, were measured by the subscales Verbal Strategies and Nonverbal Strategies. Behaviors like distraction from or inhibition of the communication process, e.g., pretending to understand and/or avoiding interaction with others, were considered as Maladaptive Behaviors measured by the third subscale of CSS. Hallberg, Hallberg & Kramer observed a more frequent use of Verbal Strategies, thus, rather adaptive strategies than Maladaptive Behaviors. By analyzing their data from a gender-specific stand, the authors learnt that women used significantly more Nonverbal Strategies (adaptive strategies) compared to men. Gender perspective was also considered in a further quantitative study conducted by Andersson & Hägnebo [155] who used the generic coping questionnaire Ways of Coping Questionnaire (WOCQ; Folkman & Lazarus [156]) including the following subscales: Confrontive Coping, Distancing, Self-Controlling, Seeking Social Support, Accepting Responsibility, Escape/Avoidance, Planful Problem Solving, and Positive Reappraisal. Their findings indicate that Planful Problem Solving and Self-Controlling were the most frequently used coping strategies among the hearing impaired elderly, and Escape/Avoidance were less frequently used. In terms of gender, no differences could be identified in use of coping strategies.

In their qualitative study, Bennion & Forshaw [25] concentrated on a variety of active and passive coping strategies used by older adults with age-related hearing loss. The authors determined the acceptance of the situation and the acknowledgment of the irreversible hearing loss as passive coping strategies. They also identified barriers which are identical with those reported in Wänström et al [152]: withdrawal, doing nothing at all and not taking part in activities. Bennion & Forhaw [25] also detected active coping strategies like speaking out and explaining that an utterance was not understood well. Additionally, lip reading and positioning or choosing a good place in order to facilitate the understanding of speech were also considered as active coping mechanisms. In general, elderly with acquired hearing loss used various coping strategies. Thus, the authors concluded that no singular way of coping with hearing loss for all cases existed and explained this accurately with the following words:

> *"However, there appeared to be no set method of coping with HI [hearing impairment], which applied across all cases, some participants seemed hugely impacted by the isolating effects of their HI, while others were active and outspoken in attempts to take control of the impact of HI on their lives."* [25]

Another coping approach was studied by Karlsson-Espmark & Schermann [157] who looked at strategies of maintaining one's identity and existence of hearing impaired older adults. Based on participants' narrations about their experiences and ways to manage their hearing loss, the authors realized that conversation can both take away and maintain identity, i.e., talking to unknown people or to familiar people is perceived as two different settings. In the presence of strangers, hearing impaired persons are rather reluctant to reveal their hearing problems in conversations. In dialogues with familiar people they, however, rather dare to participate and also ask for repetition. As regards the latter, asking for repetition is not considered as a threat to their identity.

Karlsson-Espmark & Schermann ascertained that their interviewees kept continuity in daily life in spite of their hearing loss. They considered this behavior as the maintenance of identity. The interviewees circumvented their hearing problems in order to minimize their effect, e.g., by putting an emphasis on activities where hearing is not important, using various everyday tricks to compensate for poor hearing or giving up entirely those activities which require good hearing. The authors considered identity as established once the hearing impaired elderly decided for themselves that not everything needed to be understood, especially when the content of speech appeared uninteresting or seemed not to make any sense.

These researchers also observed ways of managing hearing loss among the hearing impaired elderly which they associated with the participants becoming aware of their very own existence. The authors saw the necessity of being able to hear and distinguish various sounds as providing the research participants with the feeling or evidence of being alive. This is also supported by the fact that good hearing is fundamental for keeping oneself informed in order to be able to remain socially active and integrated. Moreover, being able to aurally discern everything in private conversations was seen as essential in order to experience a feeling of togetherness.

In summary, the subjects with age-related hearing loss protected their identity and existence in various ways, „but above all by blaming their poor hearing on old age, and managing it with simple everyday strategies that did not break the feeling of continuity in everyday life“. The findings also indicate that hearing was not only essential for participation in social life, but it was also regarded as an affirmation of life [157].

In the context of life experiences, Eisenwort, Schlatnitz & Niederkrotenthaler [158] were engaged to investigate factors that led to positive experiences among older adults with hearing loss. For the data collection, the authors used a German translation of a questionnaire designed by Stephens & Kerr [159] which measured quantitatively positive experiences in life with acquired hearing impairment. According to their findings, it was rather successful communication behaviors that led to positive experiences significantly more frequently than other strategies like cognitive changes to self-perception, using hearing impairment to self-advantage, resignation, and technical facilitators of communication. The authors' justification was based on the fact that communication with people with normal hearing ability is in general a major problem for older people with acquired hearing loss. Therefore, the affected persons would have the most positive life experiences during good and enjoyable conversations, by being an important interaction partner for family and for significant friends as well as by meeting different professionals in health care institutions [158].

Social support

In audiologic, medical or gerontologic literature, findings referring to the concept of social support among elderly with age-related hearing loss could barely be found. Exclusively Gomez & Madey [160], Lockey, Jennings & Shaw [161], Tesch-Römer [4] and Singh, Lau & Pichora-Fuller [136] dealt with the issue of social support.

Tesch-Römer [4] identified no correlation between objectively diagnosed hearing loss and social integration (social network size, received emotional support and satisfaction with social support), whereas he observed an association between satisfaction with social support and self-assessed hearing handicap. The more severe the participants perceived their hearing handicap the less satisfied the affected persons were with the received social support. He also investigated their social integration and identified a poor correlation between hearing impairment and social integration [4].

Lockey, Jennings & Shaw [161] collected data about social support by interviewing four hearing impaired women. According to the interviewees, their family members and friends acted as motivators and supporters of hearing aid use and were, thus, seen to provide social support. Family members made sure their mothers had their hearing aid on regularly so that they would realize the benefits and participate with the people they love. The interviewees reported that hearing aids improved their social participation in their everyday life, thus, a meaningful participation was facilitated. Social support had a positive effect for the interviewees, which is also the reason why they provided other people with hearing loss with social support as well. Their aim was to help others to abandon the idea of hearing aids as stigma and to show them the relevance of hearing for participation in social life (meeting and talking to others) [161].

Simply put, the qualitative study of Lockey, Jennings & Shaw establishes an association between social support and hearing aid use. In two other studies, both published in Singh, Lau & Pichora-Fuller [136], the researchers aimed to determine a relationship between perceived social support and hearing aid satisfaction and found significant associations among older adults. They also investigated the influence of hearing aid satisfaction on perceived social support by calculating regression models. They concluded that perceived social support was a significant predictor of satisfaction with hearing aids.

In summary, the research literature suggests the complexity of coping behaviors. Each presented study had a different focus on coping mechanisms. Qualitative studies emphasized on the one hand on coping as a process, e.g., from avoidance to acceptance influenced by factors like peers, stigma and social support, or on the other hand on coping strategies which have an impact on the identity or existence of persons with age-related hearing loss. Two specific coping styles (adaptive or maladaptive) were mainly determined in quantitative studies. The findings in quantitative studies highlighted a more frequent use of adaptive rather than maladaptive strategies measured by either generic or disease-specific coping questionnaires.

VARIOUS MODELS INCLUDING THE VARIABLES OF INTEREST

The final aim within the scope of this literature review is to give an account of literature dealing with the calculation and analysis of different models including the variables relating to *coping strategies*, *social support*, *age-related hearing loss*, *self-perceived hearing handicap*, and/or *self-rated quality of life* of hearing impaired elderly.

In the course of this literature search, four scientific articles (Andersson & Hägnebo [155]; Gomez & Madey [160]; Hallberg, Hallberg & Kramer [137]; Tesch-Römer [4]) were found in which the authors called attention to models showing associations between a dependent variable, e.g., Maldadaptive Coping Behavior or Psychological Well-Being and various independent variables, e.g., Hearing Loss, Hearing Handicap, Gender, Age, etc.

Models with coping strategies as dependent variables

Gomez & Madey [160] investigated models which explain to what extent hearing loss, hearing ability, perceived effectiveness of coping strategies and other determined independent factors had an influence on the use of different coping strategies (dependent variables). In the first model, the use of adaptive strategies (Verbal and Nonverbal Strategies measured by the Communication Strategies Scale, CSS) were significantly influenced by the perceived effectiveness of coping strategies, i.e., people tended to use verbal or nonverbal communication strategies more frequently if they perceived these coping strategies as effective. Hearing loss and self-reported hearing handicap as independent variables made no significant contribution to this model. Gomez & Madey conducted a second model analysis to predict the use of maladaptive strategies. The results showed the association of a greater use of maladaptive strategies with perceived strategy effectiveness and poorer adjustment to hearing loss. In both models, other psychosocial independent variables, such as Anxiety of Ageing, Personal Adjustment and Perceived Social Support did not make a unique contribution.

Coping with strains caused by hearing loss was a central research topic in Tesch-Römer's [4] study who designed a longitudinal research using mixed methods. Participants were asked to take part at a survey twice (quantitative) and to keep a diary (qualitative) in which the elderly with age-related hearing loss noted how they cope with situative strains and which factors influence the use of Invasive or Evasive Communication Strategies. He defined Invasive Communication Strategies as, e.g., being active and asking for repetition of what was said, advising others of their hearing impairment. Examples for Evasive Communication Strategies are being passive and smiling, nodding or pretending to hear or understand, withdrawing inwardly while nevertheless participating in social interactions. His participants used Invasive Communications Strategies if / once they were familiar with their communication partner and when the communicative situation lasted long. The use of Evasive Communication Strategies depended on the well-being and mood of the hearing impaired participants. While the use of Invasive Strategies differed depending on the situational context, the use of Evasive Strategies was influenced by personal characteristics. None of these Communication Strategies led to increased satisfaction in terms of an (positive) effectiveness of the communication. On the contrary, the use of Evasive Communication Strategies had a negative effect on satisfaction.

This literature overview clearly leads to the conclusion that it is difficult to determine a specific pattern of how elderly cope with hearing loss or to understand which particular strategies are beneficial to improve their understanding of speech and their social inclusion.

Models with psychosocial well-being as dependent variables

With the acquired quantitative data, Tesch-Römer [4] analyzed the influence of generic coping strategies as moderators on the association between hearing loss and hearing handicap (dependent variable) as well as between hearing handicap and depression (dependent variable). For this purpose, he used the two-process coping model developed by Rothermund & Brandstädter [114] focusing on Accommodation and Assimilation which are considered as two possibilities to react to stress situations, functional hearing impairment or self-perceived hearing problems in this case.

His results reveal no significant impact of both coping styles on the relationship between hearing handicap and depression, i.e., they did neither intensify nor reduce the feelings of depression among older adults. Tesch-Römer also found that Assimilative Coping Mechanisms had no influence on the association between functional hearing loss and perceived hearing and communication problems, whereas Accommodative Coping Behavior did. The latter finding shows that participants disclosing a higher degree of flexible modification of goals were more vulnerable to perceive problems with hearing and understanding. Thus, Accommodative instead of Assimilative Coping Behavior had a moderator effect on these associations between functional hearing impairment and self-perceived hearing problems. As a conclusion, the author stated that coping maybe not only depends solely on individual reactions from the affected persons but also on the (communication) behaviors of the communication partners [4].

Andersson & Hägnebo [155] and Hallberg, Hallberg & Kramer [137] defined psychosocial consequences as dependent variables and examined which coping mechanisms and other factors such as hearing handicap and disability, gender affected these psychosocial variables. The result of the regression model presented in Hallberg, Hallberg & Kramer indicates that a significantly poorer psychological well-being among older adults with hearing loss corresponded to more frequent use of maladaptive coping strategies and more perceived hearing difficulties in silent environments (intelligibility in quiet). Neither objectively assessed hearing loss nor gender were statistically significant in the regression analysis, thus, these variables made no unique contribution in the variance of psychological well-being.

Andersson & Hägnebo [155] used the Ways of Coping Questionnaire (WOCQ) to assess the coping behaviors in their study. The use of a generic coping questionnaire was justified by the argument that most coping studies regarded communications strategies as coping strategies. They further argue that disease-specific measures would not capture the full range of potential coping mechanisms. In their study, all subscales of WOCQ were included as independent variables in the regression model. They accounted for 46%

($R^2=0.46$) in the Anxiety scale (dependent variable). One coping strategy, namely Escape/Avoidance, had the significantly strongest influence on feelings of anxiety but the authors were reluctant to relate this issue (feelings on anxiety due the Escape/Avoidance) to auditory situations, i.e., to the hearing situation.

In summary, the influence of psychosocial factors (e.g., social support, adjustment to hearing, anxiety about ageing), hearing loss and/or self-reported hearing problems on the use of either maladaptive or adaptive coping strategies was investigated. Infrequent use of maladaptive coping strategies and frequent use of adaptive ways of coping had a positive effect on well-being, whereas more frequent use of maladaptive coping strategies and more severe perceived hearing loss led to lower psychological wellbeing. In this context, quality of life was, however, limited to a psychological level. Physical, social and environmental domains of quality of life were not considered.

SUMMARY AND CONCLUSION OF THE LITERATURE REVIEW

The aim of this literature review was to demonstrate the extent to which existing research results consider and discuss components of the dissertation's theoretical framework, namely hearing loss, hearing handicap, quality of life, coping strategies and social support, as well as the relationships between them. Before delineating the main findings and pointing out the research gaps, it is noteworthy that a comparison of the reviewed studies was impeded by methodological issues. The authors of the presented research results based their studies on a broad range of methods and various standardized self-report questionnaires for assessing the concepts like hearing handicap, quality life or coping strategies. Moreover, the sample sizes of quantitative studies varied from small to quite large samples (n=51 to n=46,233); additionally, their constitutions differed from each other, i.e., elderly with and without hearing impairment or only hearing impaired elderly built the samples. In terms of hearing loss and hearing handicap, in some studies solely either data of objective hearing assessment (via audiometry), of self-reported hearing loss, or of self-assessed hearing handicap were available. Other published studies, on the contrary, included both kinds of data, the objective hearing data as well as subjectively perceived social and emotional consequences in everyday life due to hearing loss.

Further limitations were caused by different calculations of pure-tone average (PTA) in order to classify hearing loss. Some authors used the PTA across three or four frequencies (Dalton et al [34]; Tesch-Römer [4]; Chia et al [138]) or determined PTA at low frequencies and at high frequencies separately (e.g., Hallberg, Hallberg & Kramer, [137]). In addition, in many studies mainly the PTA of the better ear was used for further analysis.

Tesch-Römer [4] used the following unusual calculation: He determined hearing impairment in the case of a loss of more than 30 dB HL at least at one frequency in the better ear or at least at two frequencies in the worse ear. In other studies, no information was published whether the PTA in the better ear or the binaural PTA was used. It is, however, necessary to use the binaurally pure-tone average because one hears or listens with both ears and not only with the better ear.

Despite the difficulty of comparing the identified studies, the following quintessence of their findings becomes evident. Hearing loss comes along with difficulties in communication and interaction and is related to emotional as well as social/situational consequences that are in many cases also perceived as stressful. Hearing handicap primarily depends rather on the self-perception of the elderly with age-related hearing loss than on the severity of the objectively measured hearing loss. Self-reported hearing handicap was found to have a stronger negative impact on quality of life than objectively measured hearing loss. These conclusions are supported by several studies. However, investigations of quality of life as well as hearing handicap with a gender perspective barely existed. Furthermore, the issue of how elderly with age-related hearing loss cope with this chronic condition was investigated in studies with different research designs (qualitative and quantitative) and diverse disease-specific (communication-related) or generic measures or questionnaires. In these studies, mainly disease-specific coping questionnaires were used although using a generic coping questionnaire would allow to capture the full range of potential coping mechanisms according to Andersson & Hägnebo [155]. These authors were the only ones applying a generic questionnaire, the Ways of Coping Questionnaire. However, they explored the impact of coping mechanism on anxiety but not on quality of life. In general, coping studies focused on prediction of using passive or maladaptive as well as active or adaptive coping behaviors and of psychological well-being. Nevertheless, the associations between different coping strategies and quality of life as a holistic concept that includes physical, psychological, social and environmental domains was not explored. Finally yet importantly, the concept of *social support* was mostly examined in terms of hearing aid use or hearing aid satisfaction. However, in investigations of coping and quality of life among older women and men with age-related hearing loss the influence of social support on quality of life was not included.

RESEARCH AIMS

Based on the above outlined research gap and in correspondence with the working model research aims were enunciated. In the following, the determined objectives are to be found.

A primary aim of this study was to explore separately the constructs *hearing loss*, *self-perceived hearing handicap*, *coping strategies*, *social support* and *quality of life* measured with psychometrically tested questionnaires. In order to fulfill this objective, analyses of the differences between older adults with age-related hearing loss and elderly without any impaired hearing ability were carried out. Another aim was to compare these variables according to the WHO classification of hearing loss [162] because the differences were anticipated to be greater the more severe the hearing loss was. WHO defined the following degrees of this sensory impairment: no hearing loss (0 to 24 dB HL), mild (25 to 40 dB HL), moderate (41 to 60 dB HL), severe (61 to 80 dB HL) and profound hearing loss (81 dB HL and more).

The second central objective was to investigate the association between objectively measured hearing loss by air-conducted pure-tone audiometry and self-reported hearing handicap. Based on the literature review, the assumption was that the severity of the hearing handicap was related to the severity of age-related hearing loss in this study sample.

Another purpose of this study was to explore the prediction of *quality of life* by the variables related to the constructs *hearing handicap, coping strategies and social support*, based on the elaborated working model. Herewith it is to be shown which predictor variables promote or reduce quality of life among older adults with and without hearing loss.

Furthermore, this study aimed at uncovering narratives, self-perceptions and experiences of concerned elderly in order to gain a deeper understanding of consequences and influences of acquired hearing loss on everyday life as well as on coping with such a chronic, sensory condition.

Another very important aspect was to figure out whether and inhowfar the introduction of gender as a variable brings about results indicating divergent coping behaviors, self-perceptions of quality of life, self-assessments of hearing loss, etc. between elderly men and women. The assumption was that women and men perceive their hearing disability as well as their quality of life differently and have differing attitudes, positions and expectations in terms of their hearing problems. In addition, they assumedly choose different strategies to cope with their hearing difficulties.

These study aims required the application of both quantitative and qualitative methods (mixed methods). Detailed information about the methodical realization of these aims are provided in the next chapter.

METHODS AND MATERIALS

Since various methods are in demand in order to accomplish the defined research aims, the implementation of *mixed methods* was essential for this study. Whereas the use of mono-methodical designs tend to generate deficient or incomplete sociological explanations, mixed methods research facilitates a comprehension of social processes and structures [163]. This multi-methodical approach pursues the objective to conceive the research theme or the investigated phenomenon more broadly and prefers typically (but not necessarily) the collection and analysis of qualitative and quantitative data within a study. There are different procedures to perform mixed methods research; they are defined by the sequence of the qualitative and quantitative data collection (sequential, concurrent and transformative) and by the emphasis of the type of surveys (balanced or superordinate).

In the present study, quantitative data were gathered concurrently with qualitative data according to the "convergent parallel mixed method". A stronger emphasis has been put on quantitative data [164].

> *"Convergent parallel mixed methods is a form of mixed methods design in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. In this design, the investigator typically collects both forms of data at roughly the same time and then integrates the information in the interpretation of the overall results. Contradictions or incongruent findings are explained or further probed in this design"* [165].

The qualitative and quantitative research results achieved by mixed methods can converge, contradict or complement each other [165]. This approach often provides information which enables us to explain surprising and incomprehensible findings gained by the respective other method or supports the correction of deficient interpretations of findings [163].

This chapter starts with the description of the participants and the inclusion as well as exclusion criteria, followed by the specification of the quantitative and qualitative techniques and materials used. In addition, the recruitment process as well as the procedure for data collection and analysis in the quantitative and qualitative part of this work are delineated separately. This chapter ends with the description of the ethically relevant criteria which were respected and strictly adhered to in the course of this cross-sectional study.

SAMPLING

The sample for the quantitative part of the study consisted of 65 older adults with age-related hearing loss and 73 elderly with normal hearing living in Vorarlberg and Styria, Austria. Sixteen additional hearing impaired elderly (they did not participate in the quantitative survey) formed the sample for the qualitative study conducted in Vorarlberg.

Participants with hearing loss needed to meet the following inclusion criteria: Women and men at the age of 55 years and older and affected by a bilateral age-related hearing loss with a loss of 25 dB or more (binaural mean thresholds across four frequencies: 500, 1000, 2000, and 4000 Hertz). They also had to be able to communicate and master the German language. Older adults with a manageable hearing loss through surgeries or medication were excluded. Another exclusion criteria were preexisting severe diseases, dementia or cognitive impairments.

For elderly with normal hearing, the inclusion and exclusion criteria were almost identical. Thus, the items of the questionnaire in terms of hearing loss were ignored because these factors had no relevance in the comparison group. The intention to include healthy persons, i.e., older adults with normal hearing, was to make causal inferences about the association between hearing problems and subjectively perceived quality of life. The identification of quality of life solely among persons with chronic diseases (e.g., hearing impaired elderly) would not have provided any clear findings [78].

QUANTITATIVE PHASE OF THE STUDY

With the aid of a paper-and-pencil survey, a quantitative research technique, the operationalized concepts *hearing handicap*, *coping strategies*, *social support* and *quality of life* were measured. This approach enables us to determine trends, attitudes or opinions of a population by investigating a selected sample from this population. These objective findings can, thus, be applied to the entire population:

> *„A survey design provides a quantitative or numeric description of trends, attitudes or opinions of a population by studying the sample of that population. It includes cross-sectional and longitudinal studies using questionnaires or structured interviews for data collection – with the intent of generalizing from a sample to a population.“ [165]*

Materials

The quantitative data collection was accomplished by obtaining pure-tone audiograms of the hearing impaired elderly and by performing the paper-and-pencil interview in the entire sample. The first part of the survey asked for socio-demographic characteristics (age, gender, marital status, educational status and living form) and diseases, disorders or impairments to define the number of diseases (multi-morbidity). In the course of the data analysis, these variables were included as confounding factors (social and medical) in order to control them as they bear a potential influence on the investigated concepts.

The survey also consisted of the following selected psychometrically tested questionnaires in order to gather information about *self-reported hearing handicap*, *quality of life*, *generic coping strategies* and *perceived social support*: Hearing Handicap Inventory for the Elderly (HHIE), World Health Organization Quality of Life (WHO QOL BREF), Assessment of Stress and Coping (FLB) und Short Form of Social Support Questionnaire (F-SozU-14).

Hearing impaired participants were also asked to provide information about when they were diagnosed with hearing loss and when they received their first hearing aids. Furthermore, they were asked how often they wore their hearing aids.

Audiological data

The pure-tone audiogram of each participant displayed the decibel loss (dB) at frequencies from 0.25 to 8 kHz. The severity of bilateral hearing loss was determined by calculating the mean of four frequency pure-tone averages (PTA in dB HL) of the right and left ear (at following frequencies: 0.5, 1, 2 and 4 kHz) [21]. The classification of hearing loss corresponded to the WHO classification of hearing loss [162]. For data analysis, the last two categories – severe and profound hearing loss – were combined. Otherwise, the sample size in each original category of WHO classification of hearing loss would have been too small.

Hearing Handicap Inventory for the Elderly (HHIE)

The determination of hearing difficulties by audiometric measures is insufficient in order to identify the manifold consequences of hearing loss. Therefore, it is essential to capture subjectively perceived hearing problems or handicaps [166] and for this purpose the questionnaire “Hearing Handicap Inventory for the Elderly” (HHIE; Ventry & Weinstein [65]) showed to be appropriate. This questionnaire was developed particularly for older adults and is characterized by its short and simple administration. It consists of 25 items, whereof 13 items explore emotional consequences (emotional subscale). The remaining 12 items measure social and situational effects of hearing loss (social subscale) [66, 139]. Response options to each item were „yes“ (4 points), „sometimes“ (2 points) and „no“ (0 points). The total score can range from 0 to 100 points and indicates the severity of perceived hearing handicap, i.e., the higher the total score the more severe is the self-reported hearing handicap. Based on the total score, the hearing handicap can be classified as follow: no hearing handicap (0 to 16 points), mild hearing handicap (17 to 42 points) and moderate to severe perceived consequences (more than 42 points). Internal consistency reliability of the total scale (Cronbach’s Alpha: $\alpha = 0.95$) as well as the subscales (emotional subscale: $\alpha = 0.93$; social subscale: $\alpha = 0.88$) is considered as excellent. Data could be identified stating adequate content validity [65]. Moreover, the test-retest reliability was high for using both paper-and-pencil as well as face-to-face administration of HHIE ($\alpha \geq 0.79$ and $\alpha \geq 0.92$ respectively). The original HHIE in English language was translated into German. The reliability of the German version was also proven according to Bertoli, Probst und Jordan [66].

World Health Organization Quality of Life (WHOQOL-BREF)

The concept of quality of life was assessed with the generic questionnaire WHOQOL-BREF, which is an abbreviated version of the WHOQOL-100 developed by the WHOQOL Group in 1994 in 15 international field centers simultaneously. It was aimed to provide an assessment instrument with a holistic approach including medical and humanistic elements [167]. The WHOQOL group determined facets of life being important in the assessment of quality of life. Subsequently, the relevant facet definitions were operationalized.

Since this detailed assessment is not feasible in terms of conducting studies because of its length being associated with a high expenditure of time (30-45 minutes), the WHOQOL Group developed a short version called WHOQOL-BREF [168]. The WHOQOL-BREF captures four domains of quality of life: Physical Health, Psychological Health, Social Relationships and Environment with 24 items. Furthermore, two items – Overall Quality of

Life and General Health – have been included in order to build the score for overall quality of life [77]. Altogether, the WHOQOL-BREF contains 26 items with a five-point Likert scale with different types of responses: “not at all” to “extremely” (intensity), “not at all” to “completely” (capacity), “very satisfied” to “very dissatisfied” (evaluation), “never” to “always” (frequency) and “not important” to “extremely important”.

WHOQOL-BREF is a paper-pencil method and takes approximately 5 to 12 minutes to be completed. For the data analysis in the present study, the raw domain was transformed into a 0-100 scale [167, 168].

The reliability of the German version of WHOQOL-BREF is acceptable. Cronbach’s alpha values for each of the four domains range from $\alpha = 0.57$ to $\alpha = 0.88$ and demonstrate on average an acceptable internal consistency (reliability). Content validity is ensured and the construct validity in total is high [168]. Von Steinbüchel et al [77] investigated the appropriateness of WHOQOL-BREF among elderly and stated this instrument to be practicable for this population, since the time for responding is adequate. Additionally, the items are easy to understand. The reliability of the German version was also tested among older adults. The Cronbach’s alpha values with a range of $\alpha = 0.59$ to $\alpha = 0.82$ indicate a questionable to good internal consistency [77].

Assessment for Coping and Stress (FLB)

For the clarification of coping strategies the generic coping questionnaire (FLB) developed by Laireiter [169] was chosen. FLB is theoretically based on the coping model of Perrez & Reicherts [100]. At the first step, this inventory captures life events and the intensity of these strains experienced in the last two years. Nevertheless, this section of the FLB was not included in the present research study. I exclusively used the coping scale measuring the individual coping with stressful experienced situations or life events [170]. Consequences of hearing loss can be considered as strains in everyday life or chronic life events, hence this scale appeared to be appropriate for the survey. It encompasses 42 items with a 5-point Likert scale (very hard, hard, moderate, little, not at all) and enables the construction of seven subscales (based on Cohen [171]): Active Problem-Solving and Self-Motivation, Escape and Avoidance, Self-Distraction, Resistance, Cognitive Appraisal, Positive Reinterpretation and Search for Meaning, Seeking Social Support. FLB is psychometrically tested and study results prove acceptable reliability and validity [170]. It takes approximately 10 to 15 minutes to finish this questionnaire, which is regarded as acceptable for older adults.

Social Support Questionnaire – Short Version (F-SozU-14)

The perceived social support was measured by the short version of Social Support Questionnaire (F-SozU-14; Fydrich et al [172]). This short version can be used for research and psychotherapy, as far as no differentiated inquiry of social support is required.

Thus, F-Soz-U-14 operationalizes one-dimensionally perceived social support and has a 5-point Likert scale (strongly agree to strongly disagree). The contents of this version of the Social Support Questionnaire are emotional support, practical support, availability of a confidential person and satisfaction with social support. On the basis of a representative sample, the psychometric criteria reliability and validity were tested and the findings stated excellent reliability ($\alpha = 0.94$; test-retest reliability: $\alpha = 0.96$) and validity of this questionnaire. Due to the shortness, F-Soz-U-14 is an adequate assessment instrument for adults (approximately 2 to 3 minutes) [173].

Procedures of recruitment and data collection

A consent form and standardized survey form (see Appendix I and Appendix III) were distributed to potential participants in an Ear Nose Throat (ENT) practice in Styria and in a Department of Audiology in Vorarlberg from Fall 2015 to Spring 2016. In addition, participants also received a post-paid envelope so that those who responded to the questionnaire could send the forms back free of charge. The ENT doctor and the audiologist tacked the document with the current pure-tone audiogram to this package. The non-representative selection of hearing impaired participants was executed consecutively by date of the visit. Thus, patients with age-related hearing loss who came to see the ENT doctor or the audiologist were informed about the study and were asked to participate.

Potential participants with normal hearing received this package (see Appendix II and Appendix III) from the ENT doctor and doctoral candidate. In the course of the snowball sampling persons from the personal and professional environment were addressed and asked to talk to other persons who approached others etc. in order to find eligible interviewees [174]. The decision for snowball sampling was made because older adults with normal hearing function were difficult to access in the ENT practice and Department of Audiology. Patients and / or clients of these institutions did not discern the relevance to take part in this study. In addition, it was not feasible to invest much time to explain the significance of this study in more detail because both institutions had a demanding daily schedule. In order to achieve a sufficient sample size, the method of snowball sampling was chosen, being aware of the risk to have no objective evidence of participant's normal hearing function (no pure-tone audiogram was available). Potential participants were asked whether they feel they have a normal hearing. In addition, the Hearing Handicap Inventory for the Elderly (HHIE) was used to assess the hearing function as it provided an opportunity to self-report the existence of no hearing problems. Ventry & Weinstein [65] and other authors support a significant positive relationship between objectively measured hearing loss and subjectively perceived hearing problems. Hence, persons with normal hearing function should have a total score on the HHIE lower than 17 points which indicates that they have no hearing difficulties. The single question or self-assessment of hearing handicap by participants with normal hearing ability may be a methodical weakness in this study. Nonetheless, this approach is deemed to be a helpful measure to sufficiently define normal hearing ability.

Analysis of quantitative data

The statistical program „Statistical Package for Social Sciences“ (SPSS, Version 22) was used for all quantitative data analyses: reliability and descriptive analysis, group comparisons, correlations and hierarchical multiple regression analysis.

Reliability analysis

The standardized questionnaires or scales were tested in terms of their reliability in order to determine their degree of measurement accuracy [175]. For testing the internal consistency reliability, the Cronbach’s alpha test was used. Cronbach’s alpha (α) values between 0.6 and 0.7 indicate a questionable reliability, between 0.7 and 0.8 an acceptable, between 0.8 and 0.9 a good and greater than 0.9 an excellent reliability [176]. However, Cronbach’s alpha values should not be higher than 0.95 because they may reflect unnecessary redundancy of content across items [177]. Among scales with less than four items a Cronbach’s alpha of minimum 0.4 is tolerable [178]. Reliability analysis also point out whether missing values are tolerable in terms of calculating total scores.

Univariate and bivariate analysis

For the description of sample characteristics, descriptive statistics were used to calculate mean, median, standard deviation as well as range. For distribution frequency, cross tables and executed chi-square tests were created. In terms of the latter test, 80% of the cells of the cross table should have an expected count greater than 5. If this precondition was not met, the characteristic categories of the variable were reduced (with a minimum of three attributes) as far as the combination of categories made sense with regards to content.

Group comparisons

The t-test for approximately normally distributed variables was used to identify differences between two independent groups. For calculating differences between more than two groups, the ANOVA (Analysis of Variance) was used. Once the result of ANOVA was significant, the Bonferroni post-hoc test for pairwise comparisons was performed. This posteriori test was able to identify significant differences between the groups.

Mann-Whitney U test was used to determine differences between two independent groups when the variables were not normally distributed. In order to test differences between more than two independent groups Kruskal Wallis test was performed. After receiving significant results from the latter non-parametric test, the Bonferroni correction as a post-hoc test for pairwise comparisons was used.

Even though the assumptions are violated (in terms of not normally distributed variables), corrected t-test for two independent samples and analysis of covariance of more than two samples were performed to partial out the effect of confounding variables Age, Multi-Morbidity and Educational Status as possible influencing factors of quality of life.

Correlational analysis

The Pearson product-moment coefficient (r) was calculated to determine a linear relationship between two metric variables. All correlation coefficient tests demonstrate the direction (positive or negative) and the strength (effect size) of the relationship between two variables. According to Cohen [179], the correlation coefficient of 0.10 indicates a small effect size, 0.30 a medium effect size and 0.50 a large effect size.

Hierarchical multiple regression analysis

Regression analysis method was used to determine the predictive power of a set of independent variables on a dependent variable. In the context of standard regression analyses, following significant parameters were calculated: Standardized Beta-coefficient (β), effect size R^2, p-value, F-statistic and Durbin-Watson coefficient. For hierarchical regression models, standardized Beta-coefficient (β), effect size R^2, R^2 change, p-value, F-statistic, Durbin-Watson coefficient, Tolerance value were determined.

In general, standardized β-coefficient indicates the strength and direction of the influence of predictors (independent variables). The coefficient of determination, denoted R^2, is interpreted as proportion of the variance in the dependent variable that is predictable from the independent variable. According to the classification of Cohen [179], $R^2=0.0196$ is considered as a small, $R^2=0.1300$ as a medium and $R^2=0.2600$ as a large effect size. R^2 change is rather interpreted in hierarchical multiple regression models than the R^2

because it presents the increase of R^2 when the predictor variables are added to the analysis. The F-statistic is used to calculate the *p*-value supporting how reliable the set of independent variables predicts the dependent variable.

For the calculation of hierarchical multiple regression models, four requirements were fulfilled in this study: 1. Dependent variables were interval variables and independent variables were interval and/or dichotomous variables (dummy variables were created where necessary). 2. The relationship between dependent variable and independent variables was linear. 3. By calculating the Durbin-Watson coefficient, it was possible to examine if there was no auto-correlation between residuals. The Durbin-Watson coefficient values may range from 0 to 4. A value of approximately 2 showed no auto-correlation of residuals, whereas values < 1 or > 3 indicated an auto-correlation [180]. 4. The presence of no multi-collinearity of variables was the fourth requirement, i.e., no independent variable correlated with another independent variable. Tolerance value served as an indicator for multi-collinearity. The stronger the linear relationship between independent variables the lower the tolerance value was, whereby a value lower than 0.2 was not valid [181].

Before conducting various regression analyses, I tested variables with regards to their outliers and removed them since these values would manipulate the findings. The exact procedure of how these regression analyses were performed is described in the chapter "results".

Significance level

A *p*-value of < .05 marks a statistical significance. In terms of group comparisons, the *p*-values are presented in tables. Significant results of correlation and regression analysis are marked with asterisks: *** for $p < .001$, ** for $p < .01$ and * for $p < .05$.

QUALITATIVE PHASE OF THE STUDY

Qualitative research tends to explore, describe and explain a phenomenon with words [182]. With the help of qualitative methods, the aspiration is to gain insight into manifold human behaviors, attitudes, beliefs as well as self-interpretations and to reproduce, explain and understand them. Moreover, the aim is to detect and portray paradoxes and contradictions. Knowledge generated by qualitative research is based on the analyses of participants' spoken or written words, photos or pictures. Qualitative research occupies a particular importance as experiences and perceptions of persons living with a health condition can be captured holistically. This may improve the delivery of health care [183].

Problem-centered interviews

Everyday theories, subjective truths or self-interpretation about the current object of investigation [182] *living and experiences with age-related hearing loss* were gathered by performing semi-structured, problem-centered interviews according to Witzel [184]. For the interviews, I used a guideline as a memory and orientation aid (see Appendix V). This guideline followed the principle: as open and flexible as possible and as structured as necessary based on the research interest [185]. It was created according to a schema developed by Helfferich [185] which involves four steps: 1. collecting questions, 2. scrutinizing the gathered questions and removing similar or redundant questions, 3. sorting the remaining questions, and 4. subsuming the types of questions.

The guided semi-structured interview provided a thematic frame due to its general open questions which should be inspiring and encourage participants to share their opinions, experiences and thoughts. In the course of the conversations, I asked participants intentionally interposed questions or had the flexibility to ask questions in accordance with participant's responses. Despite the thematic frame with pre-formulated questions, the interview guideline still enabled a high level of openness and the participants could frame the conversation as well as give utterance to their subjective perspectives [184].

In the problem-centered interviews, core topics such as communication, communication difficulties, dealing with hearing problems, quality of life or well-being and social support were approached. Furthermore, patients were queried about their experiences with and perception of hearing difficulties before the diagnosis, during the treatment as well as the first hearing aid fitting process. An additional retrospective (in the sense of biographical-narrative) part was included in the interview in order to provide an insight into how participants perceive challenging and emotionally demanding situations of hearing and communicating due to their hearing loss.

Research diary

During the field research, particularly after each conducted qualitative interview, I took notes in my research diary. The diary notes included my impressions, expectations, surprises and emotional reactions like joy, uncertainty, hopes, frustration and anger on the one hand. On the other hand, I registered what effect the intense engagement with the research topic provoked emotionally as well as mentally on me as a researcher and as a person with congenital bilateral severe hearing loss in everyday life and everyday research work.

According to Arantes [186], externalizing one's feelings, writing down the emotions, expectations, thoughts and their reflections enables us to detect blind spots and also helps identify associations and pattern. In addition, the research diary ensures a needful distance to the subject of investigation and thus the objectivity of the researcher by the high level of reflections of the researcher's role in the research and of the collected interview data in its respective context [186, 187].

The research diary played a relevant part during data collection and data analysis in this current study. However, the diary notes were not involved in the chapter "results" because the research questions referred exclusively to the participants but not to me, the researcher.

Analysis of the qualitative data

For the analysis of the verbatim-transcribed interview material, I decided to follow the method of thematic coding [188]. As the first step, a brief description of each case with relation to research aims and central topics surfacing in the interviews was created. Subsequently, the statements of the first interviews were coded according to the categories which were either predefined (interview guideline) or detected when the interview findings brought to light new relevant aspects. These categories of the first interviews were compared so that I could establish a thematic structure, which served as a basis for the analyses of the remaining interviews. This analytical approach helped to identify beliefs, subjective interpretive patterns, emotions or feelings and perceptions [188] of the older adults living with age-related hearing loss.

Procedures of recruitment and data collection

In the Department of Audiology in Vorarlberg, 16 older adults with age-related hearing loss were recruited for the qualitative interviews from Fall 2015 to Spring 2016. They were briefed about the study and asked if their contact details may be forwarded to me. Subsequently, I contacted them and provided more detailed information about the study and arranged an appointment. Before the interview started in the participant's residence, the participant was asked to sign the consent form (see Appendix IV). Furthermore, approval from him or her was sought to record the conversation with an audio device. I also asked them to conduct the interview in a bright room without any background noises in order to enable an undisturbed and easily understandable conversation. During the interview, I was considerate of the participants and took breaks if required. Altogether, the guided interviews took between 20 to 60 minutes.

ETHICAL ASPECTS

This study was approved by the Ethic Committee of the Medical University of Graz and was conducted adhering to ethical principles. The participants received detailed information about the aims and procedure of this present research study and decided themselves in terms of the voluntary study participation. Furthermore, they were informed to be able to cancel the interview at any time and assured that the collected data were processed anonymously as well as confidentially. The findings are not traceable to individuals since pseudonyms or codes were used. All of this information was presented in the consent form, which needed to be signed before starting the quantitative and qualitative surveys. With their signature, the participants also agreed to give access to their hearing data (pure-tone audiogram). The last relevant aspect to mention is, that neither the participants nor the ENT nor the audiologist did receive financial compensation for their participation, they cooperated gratuitously.

RESULTS

With respect to the application of mixed methods in this study, this chapter is divided into two central parts. The first comprehensive subchapter encompasses the findings of the quantitative paper-pencil survey. The results from the qualitative guided interviews analyzed by drawing on the method of thematic coding constitute the second part.

QUANTITATIVE FINDINGS

The first central subchapter starts with findings related to missing values of variables and reliability of the used measurement scales. It continues with the description of the socio-demographic data and multi-morbidity including all participants on the one hand and focusing on hearing ability (hearing loss versus no hearing loss) on the other hand. Subsequently, these data as well as audiometric and other relevant hearing information from the participants with age-related hearing are presented gender-specifically. Afterwards, the findings of group comparisons are shown with respect to hearing ability and severity of hearing loss. The data of the participating elderly with acquired hearing loss were analyzed by gender. This quantitative part finalizes with the results of correlation tests and regression analyses exploring the prediction of 1) hearing handicap by hearing loss and 2) quality of life by other variables included in the working model.

Missing values and Reliability

At the beginning of the data analysis, I conducted a missing value analysis and compiled the findings into a table, which can be found in the appendix (see Appendix VI). In the text, only the main results are displayed. In addition, I also calculated Cronbach's alpha values to test the reliability of the scales in order to determine how precise the scales measure the objects of investigation.

Missing values

In general, the item response rates was high, thus there were few missing values. Most missing values could be identified in the variables asking for the year when the hearing impaired participants received their diagnosis. In terms of demographic data, the variable Age had the highest number of missing values (n=4). The variables Gender, Hearing Loss (pure tone audiometry) as well as Use of Hearing Aid had no missing value.

With regard to the scales, HHIE had missing values but this could be considered as a 0, so in this case all missing values were replaced with a 0. All quality of life variables had at least one missing value; the number of missing values ranged from one to nine. The highest number of missing value relates to the question asking for satisfaction with sexual life (6.5%; n=9) and I assume that this item was too delicate or personal. Seven participants (5.1%) did not answer a second quality of life question: “To what extent do you feel that physical pain prevents you from doing what you need to do?” Apart from that, no item had more than 5% missing values. Overall, the non-response rate of quality of life items was lower than 10%.

All coping variables had 2 to 6 missing values. Nevertheless, the non-response rate in this case was also lower than 5%. The social support scale was not answered by four participants. Presumably, they overlooked them because these items were on the last page of the questionnaire (back site). This is the reason why all items of the social support scale had at least four missing values and five at the most.

The analysis of the missing values accounted for a rather high participation or sufficient response rate in terms of socio-demographic aspects and of all scales – Hearing Handicap Inventory for the Elderly (HHIE), questionnaire for the assessment of stress and coping (FLB), Short version of the WHO Quality of Life measure (WHOQOL-BREF) and the Social Support Questionnaire (F-SozÜ-14). Consequently, it was feasible to perform an informative data analysis with these collected data.

Reliability of the used scales

In Table 3, the number of items which build the sum of the scale, the number of participants (included) for the analysis, the missing values of the scales as well as the calculated Cronbach's Alpha (Cronbach's α) are demonstrated. In addition to Cronbach's α, I also ran the Item-scale-statistic test that specifies the change of Cronbach's α once one item is deleted. These tests were necessary for coping scales and social support scale because there were no manuals that described how to proceed with missing values as part of the calculation of the total scores of each scale. With respect to quality of life scales helpful manuals (e.g., WHO [167]; Angermeyer, Kilian & Matschinger [168]) were accessible so that no item-scale-statistic tests were required.

In terms of social support, one missing item per case was acceptable. The change of Cronbach's α was on a minimum and this value was still greater than .877 indicating a good reliability. No missing value was acceptable for calculating the cumulative values (total score) for three coping scales: Self-Distraction, Resistance and Seeking Social Support. For the other coping scales, a missing value per case was tolerable. If there were more than one missing values in a scale the total score of this scale was excluded.

Table 3. Reliability of all scales.

Scales	*Number of Items*	*n*	*Missing Values*	*Chronbach's α*
HHIE (Hearing Handicap)				
Total score	25	138	0	.959
WHOQOL-BREF (Quality of Life)				
Physical Health	7	127	11	.859
Psychological Health	6	130	8	.830
Social Relationships	3	129	9	.656
Environment	8	132	6	.810
Global Quality of Life	2	135	3	.838
FLB (Coping Strategies)				
Active Problem-Solving and Self-Motivation	9	129	9	.901
Escape and Avoidance	8	134	4	.730
Self-Distraction	4	134	4	.634
Resistance	5	133	5	.550
Cognitive Appraisal	5	130	8	.756
Positive Reinterpretation and Search for Meaning	7	133	5	.830
Seek Social Support	3	133	5	.491
F-SozU-14 (Perceived Social Support)	14	132	6	.890

Overall, the reliability of the HHIE total scale was excellent. Also the scales of the WHOQOL-BREF exhibited a predominantly good reliability and the coping scales showed a questionable to good reliability. Two coping scales, Resistance and Seeking Social Support, had a poor reliability as is shown in Table 3. According to Kuckartz, Rädiker, Ebert & Schehl [178] a lower reliability of a scale with four or less items is tolerable.

Despite questionable reliabilities of few coping scales, the entire survey with all scales measuring the constructs *hearing handicap, quality of life, coping strategies* and *perceived social support* in general showed a good and satisfying reliability.

Characteristics of participants

The socio-demographic characteristics of all participants are presented below. These data are additionally ordered by hearing ability and, subsequently, by gender (exclusively in the hearing impaired sample).

Table 4. Characteristics of the study sample in general and by hearing status.

		Total	*Hearing Loss*	*Normal Hearing*	*p-value*
Numbers of Participants	*n* (in %)	138 (100.0)	65 (47.1)	73 (52.9)	
Age (in years) [a] *(n=65/n=69)*	*Mean* (*SD*)	68.31 (8.40)	71.57 (8.39)	65.25 (7.21)	< .001
Gender [b] *(n=65/n=73)*					
Women	*n* (in %)	65 (47.1)	32 (49.2)	33 (45.2)	n.s.
Men	*n* (in %)	73 (52.9)	33 (50.8)	40 (54.8)	
Educational Status [c] *(n=64/n=71)*					
Compulsory School	*n* (in %)	31 (23.0)	22 (34.4)	9 (12.7)	< .01
Apprenticeship Training	*n* (in %)	43 (31.9)	23 (35.9)	20 (28.2)	
Secondary School without General Qualification	*n* (in %)	25 (18.5)	9 (14.1)	16 (22.5)	
Secondary School with General Qualification	*n* (in %)	12 (8.9)	5 (7.8)	7 (9.9)	
University	*n* (in %)	24 (17.8)	5 (7.8)	19 (26.8)	
Marital Status [b] *(n=64/n=73)*					
Single/Separated/Widowed/ Divorced	*n* (in %)	31 (22.6)	15 (23.4)	16 (21.9)	n.s.
Married/Partner	*n* (in %)	106 (77.4)	49 (76.6)	57 (78.1)	
Living [b] *(n=65/n=69)*					
Alone	*n* (in %)	20 (14.8)	11 (17.7)	9 (12.3)	n.s.
With one Person	*n* (in %)	99 (73.3)	43 (69.4)	56 (76.7)	
With more than one Person	*n* (in %)	16 (11.9)	8 (12.9)	8 (11.0)	
Multi-Morbidity *(n=64/n=71)* Number of Diseases [a]	*Mean* (*SD*)	1.80 (1.99)	2.58 (2.25)	1.10 (1.40)	< .001

[a] Mann-Whitney U test

[b] Pearson Chi square test

[c] Pearson Chi square test = 15.800 (df = 4)

Characteristics of participants by hearing ability

In this study, 138 elderly people (65 females, 73 males) agreed to provide their personal data. Among these participants, 65 elderly had been diagnosed with hearing loss, and 73 elderly had a normal hearing ability (comparison group). The characteristics of the entire sample as well as the two subgroups (by hearing ability) are shown in Table 4.

Age. The mean age of hearing impaired elderly was significantly higher than the mean age of elderly with normal hearing. The age variable was additionally transformed into a categorical variable to illustrate the distribution of the age group.

Figure 5 illustrates that the number of hearing impaired participants was lowest in the youngest age group (≤ 64 years), increased consistently and was highest in the oldest age group (≥ 75 years). The majority of elderly with normal hearing were significantly younger than those with age-related hearing loss ($p < .001$; Pearson Chi square test = 31.922; df = 2).

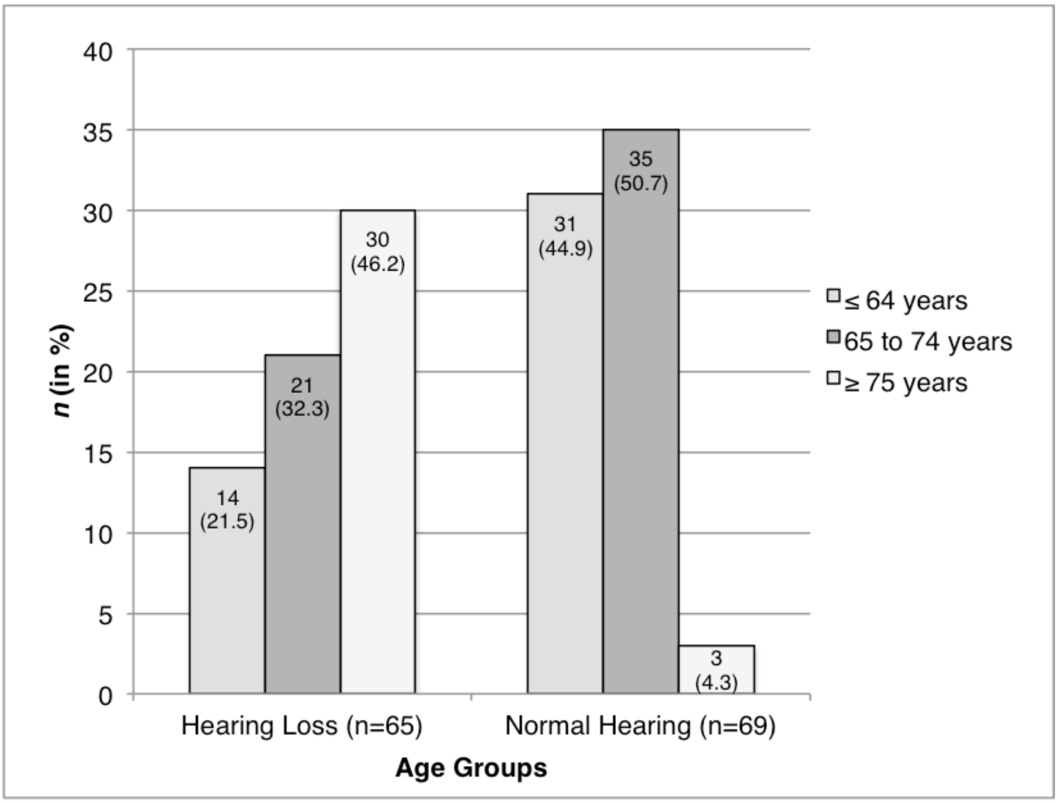

Figure 5. Age groups of participants by hearing status.

Education. The majority of the sample named the apprenticeship training as their highest educational level, followed by compulsory school, secondary school without general qualification for university entrance, university and secondary school with general qualification for university entrance. It is evident that more elderly with hearing loss attended compulsory school and accomplished an apprenticeship training than elderly without hearing loss. The latter group had significant higher education levels since more elderly with normal hearing attended secondary school with or without general qualification for university entrance and university (Table 4).

Multi-morbidity. Participants with age-related hearing loss had a significantly higher number of diseases than those participants with normal hearing ability (Table 4). In both groups, almost half of the sample reported suffering from one to three diseases (Figure 6).

Significantly more elderly without hearing loss had no diseases, whereas significantly more elderly with age-related hearing loss had four or more diseases ($p < .001$; Pearson Chi square test = 16.749; df = 2).

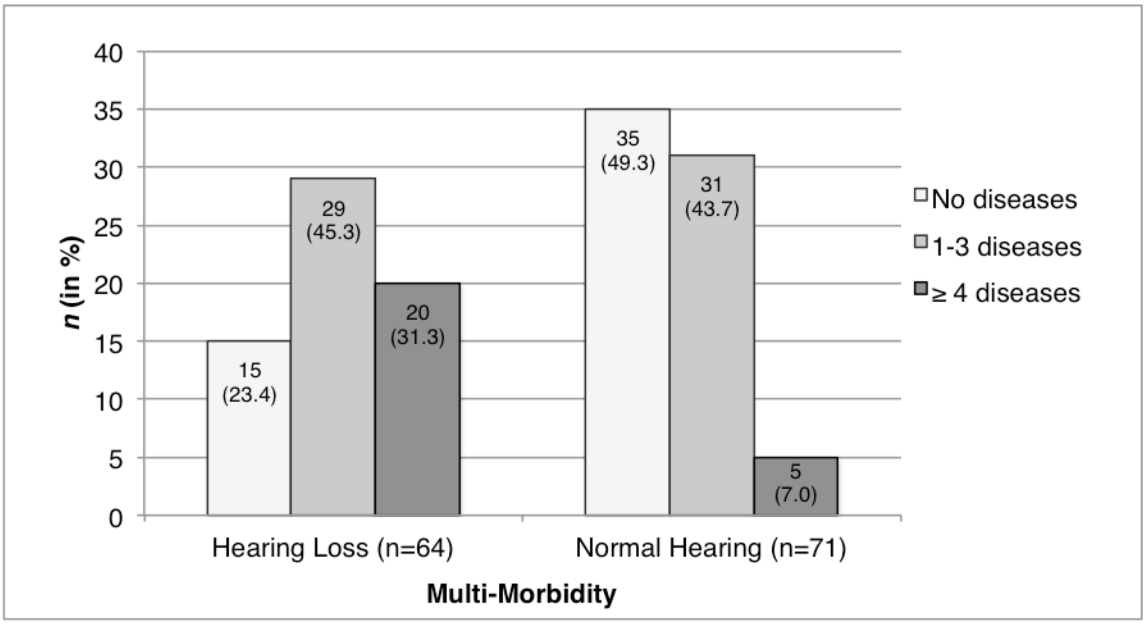

Figure 6. Multi-morbidity of participants by hearing status.

No group differences could be found in terms of gender, marital status and living form (living alone, with one or more persons) (Table 4). The majority of the sample was married or had a partner and thus lived with (at least) one person. The number or percentage of the participants who were either single, separated, widowed or divorced was rather small; therefore, these categories were merged into a combined category. The same procedure was undertaken with the categories married and having a partner, because the number of elderly who marked having a partner was quite low. Thus, the variable Marital Status was dichotomized and hence used for further analysis.

Characteristics of participants with age-related hearing loss

It was of interest to illustrate the socio-demographic and medical data as well as relevant information about hearing loss of women and men separately and to compare them to identify gender differences.

Socio-demographics and multi-morbidity. The results shown in Table 5 point out significant gender differences in terms of marital status, living form and level of education. Significantly more hearing impaired elderly men were married or had a partner than women. Thus, more women were single, separated, widowed or divorced. In addition, significantly more male participants lived with one or more persons in the household than female participants. In terms of education, the findings show that significantly more women completed compulsory school as their highest school level and more men passed an apprenticeship training than women. No gender significant differences could be identified with regard to age and multi-morbidity.

Table 5. Characteristics of hearing impaired older women and men.

		Total	*Women*	*Men*	*p-value*
Numbers of participants	*n* (in %)	65 (100.0)	32 (49.2)	33 (50.8)	
Age [a] *(n=32/n=33)*					
Age (in years)	*Mean* (*SD*)	71.57 (8.39)	72.63 (8.56)	70.55 (8.22)	n.s.
Age Groups [b]					
≤ 64 years	*n* (in %)	14 (20.9)	6 (18.2)	8 (23.5)	n.s.
65 to 74 years	*n* (in %)	22 (32.8)	9 (27.3)	13 (38.2)	
≥ 75 years	*n* (in %)	31 (46.3)	18 (54.5)	13 (38.2)	
Educational Status [c] *(n=32/n=32)*					
Compulsory School	*n* (in %)	22 (34.4)	16 (50.0)	6 (18.8)	< .05
Apprenticeship Training	*n* (in %)	23 (35.9)	6 (18.8)	17 (53.1)	
Secondary School without General Qualification	*n* (in %)	9 (14.1)	4 (12.5)	5 (15.6)	
Secondary School with General Qualification	*n* (in %)	5 (7.8)	4 (12.5)	1 (3.1)	
University	*n* (in %)	5 (7.8)	2 (6.3)	3 (9.4)	
Marital Status [d] *(n=32/n=32)*					
Single/Separated/Widowed/ Divorced	*n* (in %)	15 (23.4)	12 (37.5)	3 (9.4)	< .01
Married/Partner	*n* (in %)	49 (76.6)	20 (62.5)	29 (90.6)	
Living [e] *(n=32/n=30)*					
Alone	*n* (in %)	11 (17.7)	9 (28.1)	2 (6.7)	< .05
With one Person	*n* (in %)	43 (69.4)	17 (53.1)	26 (86.7)	
With more than one Person	*n* (in %)	8 (12.9)	6 (18.8)	2 (6.7)	
Multi-Morbidity [f] *(n=32/n=32)*					
Numbers of Diseases [a]	*Mean* (*SD*)	2.58 (2.25)	3.00 (2.48)	2.16 (1.95)	n.s.

[a] t-test

[b] Pearson Chi square test

[c] The characteristics values were reduced since less than 80% of the cells had an expected count greater than 5. Thus, following four characteristic values were used: 1) Compulsory School, 2) Apprenticeship Training, 3) Secondary Schools and 4) University: Chi square test = 10.292 (df = 3); There were still 2 cells with expected count less than 5.

[d] Pearson Chi square test = 7.053 (df = 1)

[e] The characteristics values were reduced since less than 80% of the cells had an expected count greater than 5. Thus, following two characteristic values were used: 1) Living with one or more Persons and 2) Living Alone. Pearson Chi square test = 4.885 (df = 1)

[f] Mann-Whitney U test

Audiometric data and other relevant hearing data. Four frequency pure-tone averages (PTA in dB HL) in each ear and bilateral (at the frequencies 0.5, 1, 2 and 4 kHz) are shown in Table 6. The mean bilateral thresholds increased continuously from the lowest frequency (0.5 kHz) to the highest frequency (4 kHz) and were slightly poorer among men.

Table 6. Mean pure-tone thresholds of participants with age-related hearing loss.

		Frequency in Hertz			
		500	*1000*	*2000*	*4000*
Women *(n=32)*					
Right Ear	*Mean* (*SD*)	38.28 (14.23)	37.97 (13.79)	49.22 (14.15)	64.22 (13.27)
Left Ear	*Mean* (*SD*)	40.63 (14.35)	39.37 (13.12)	52.34 (12.57)	66.41 (11.86)
Binaural	*Mean* (*SD*)	39.45 (13.53)	38.67 (13.03)	50.78 (12.24)	65.31 (11.10)
Men *(n=33)*					
Right Ear	*Mean* (*SD*)	41.36 (19.05)	42.42 (18.55)	54.55 (21.12)	68.33 (16.94)
Left Ear	*Mean* (*SD*)	40.30 (17.45)	41.36 (18.17)	56.64 (18.97)	73.48 (16.37)
Binaural	*Mean* (*SD*)	40.83 (17.67)	41.89 (17.44)	55.59 (19.10)	70.91 (15.93)
Total *(n=65)*					
Right Ear	*Mean* (*SD*)	39.85 (16.79)	40.23 (16.40)	51.92 (18.09)	66.31 (15.27)
Left Ear	*Mean* (*SD*)	40.46 (15.88)	40.39 (15.79)	54.52 (16.16)	70.00 (14.66)
Binaural	*Mean* (*SD*)	40.15 (15.66)	40.31 (15.40)	53.22 (16.15)	68.15 (13.95)

For determining the severity of hearing loss, the mean bilateral thresholds were used. The hearing loss (PTA in dB HL) was slightly but not significantly poorer among men than among women (Table 7).

Table 7. Audiological data of older women and men with age-related hearing loss.

Mean Pure-Tone Thresholds (in dB HL)		*Total*	*Women (n=32)*	*Men (n=33)*	*p-value*
Right Ear [a]	*Mean* (*SD*)	49.58 (15.29)	47.42 (12.29)	51.67 (17.66)	n.s.
Left Ear [a]	*Mean* (*SD*)	51.34 (14.56)	49.69 (12.05)	52.95 (16.66)	n.s.
Binaural [a]	*Mean* (*SD*)	50.46 (14.31)	48.55 (11.47)	52.31 (16.59)	n.s.

[a] Mann-Whitney U test

The majority of the participants had a moderate hearing loss. The distribution of the severity of hearing loss was almost equal among women and men (Figure 7).

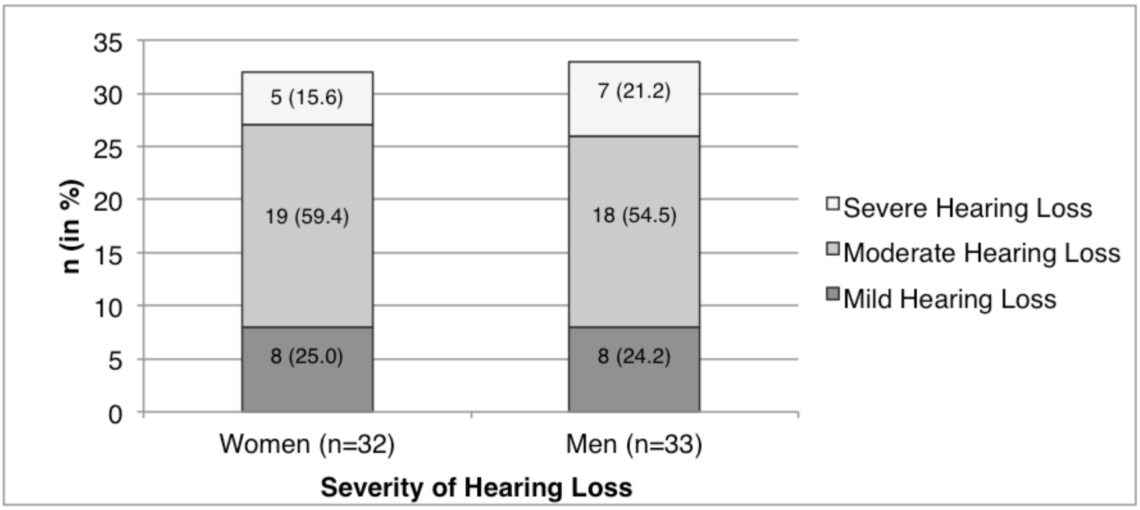

Figure 7. Severity of hearing loss by gender.

The participants were also asked about the year when their hearing loss was diagnosed. Men had been hearing impaired for a significantly longer time (p < .05) (*Median* = 9.50 years; *Range* = 2 to 35 years versus *Median* = 4.00 years; *Range* = 1 to 45 years)[1]. Furthermore, men were significantly younger at the time of the diagnosis than women (Table 8).

The survey also included the question whether they own hearing aids. At the time of the survey, the majority owned hearing aids and there was no gender difference (Table 8).

The participants were also asked about how long they had been aware of their hearing loss (i.e., when did they receive the diagnosis by their ENT doctors) or how long they waited to purchase their first hearing aids after they received the diagnosis of their hearing loss from their ENT doctors (Table 8). Men waited significantly more years (p < .05) to purchase their first hearing aids (*Median* = 2.00 years; *Range* = 0 to 24 years) than women (*Median* = 0.00; *Range* = 0 to 10 years)[1]. Patients (n=8; 5 missing values) who had no hearing aids at the time of the survey, had been aware of their hearing loss for 6.5 years on average (*Median* = 3.50; *SD* = 7.00; *Range* = 1 to 20 years)[1]. No gender-specific analysis could be conducted because of the small size of the group of hearing impaired participants without hearing aids.

Table 8. Other relevant data in terms of hearing loss.

		Total	*Women*	*Men*	*p-value*
Data about Hearing Loss					
Time of Diagnosis (in years) [a] *(n=27/n=26)*	*Mean* (*SD*)	10.15 (9.78)	8.00 (9.70)	12.39 (9.50)	< .05
Age at Time of Diagnosis (in years) [a] *(n=27/n=26)*	*Mean* (*SD*)	61.17 (12.86)	64.48 (11.87)	57.73 (13.16)	< .05
Time of getting the first Hearing Aids (in years) [a] *(n=28/n=22)*	*Mean* (*SD*)	6.56 (8.48)	6.75 (9.36)	6.32 (7.43)	n.s.
Age at purchasing first Hearing Aids (in years) [a] *(n=28/n=22)*	*Mean* (*SD*)	65.04 (11.12)	66.25 (11.64)	63.50 (10.50)	n.s.
Being aware of Hearing Loss before getting Hearing Aids [a] *(n=24/n=21)*	*Mean* (*SD*)	3.84 (6.37)	1.58 (2.47)	6.43 (8.32)	< .05
Owning Hearing Aids [b] *(n=32/n=33)*					
Yes	*n* (in %)	52 (80.0)	26 (81.3)	26 (78.8)	n.s.
No	*n* (in %)	13 (20.0)	6 (18.8)	7 (21.2)	
Wearing Hearing Aids [b] *(n=26/n=25)*					
Always	*n* (in %)	35 (68.6)	17 (65.4)	18 (72.0)	n.s.
Sporadically	*n* (in %)	14 (27.5)	7 (26.9)	7 (28.0)	
Never	*n* (in %)	2 (3.9)	2 (3.9)	0 (0.0)	

[a] Mann-Whitney U test

[b] Pearson Chi square test

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[1] For this analysis, the median was calculated in order to prevent the influence of outliers.

Group comparisons

Various group comparison tests were performed. For this purpose, the variables relating to constructs *hearing handicap, quality of life, coping strategies and social support* were used. In this context, they were discriminated between participants with hearing loss and normal hearing functions, between participants with normal, mild, moderate and severe hearing loss according to the WHO classification of hearing loss and between female and male hearing impaired participants.

Since there were significant differences in age, multi-morbidity and educational status between hearing impaired participants and participants with normal hearing ability corrected t-test for two independent samples and analyses of covariance for more than two independent samples were performed. The aim of the analyses of covariance is to control confounding variables or covariates (Age, Multi-Morbidity and Educational Status) in order to account for the effect on the dependent variables [189]. In the current study, these analyses were executed once there were significant group differences, although the assumptions for performing these tests were not met in each case.

Elderly with age-related hearing loss and without hearing loss

The aim was to explore the following hypothesis: *The variables related to hearing handicap, quality of life, coping strategies and social support differ between elderly with age-related hearing loss and elderly with normal hearing function.*

Hearing handicap. As is shown in Table 9, mean total score of the Hearing Handicap Inventory for the Elderly (HHIE) was significantly higher among elderly with age-related hearing loss compared to the elderly from the comparison group.

With the total score of HHIE, the severity of the hearing handicap could be determined: 0 to 16 points means no hearing handicap, 17 to 42 refers to a mild and more than 42 points to a moderate to severe hearing handicap. The previous finding hence indicates that in the hearing impaired group the participants had on average a mild to moderate hearing handicap. After controlling for covariates, the difference between the two groups was still significant (Table 10).

Table 9. Performance on hearing handicap scale by hearing status.

Hearing Handicap		***Total***	***Hearing Loss***	***Normal Hearing***	***p-value***
HHIE Total Score [a] *(n=65/n=73)*	*Mean* (*SD*)	15.15 (20.07)	29.02 (21.84)	2.80 (3.77)	< .001

[a] t-test

Table 10. Results of analysis of covariance – Hearing handicap by hearing ability in consideration of the variables Age Multi-Morbidity and Educational Status.

Hearing Handicap	***df***	***Sum of Squares***	***F***	***p-value***
Hearing Ability	1	14776.59	61.90	< .001
Age	1	192.01	0.80	n.s.
Multi-Morbidity	1	1290.69	5.41	< .05
Educational Status	1	67.32	0.28	n.s.
Error	126	30080.01		
Total	131	85664.00		

As is evident in Figure 8, all elderly with no hearing loss and one-third of the participants with hearing loss reported no hearing handicap whereas the remaining hearing impaired participants rated their hearing handicap as mild or moderate to severe respectively.

The following HHIE-items were mostly answered with a “yes”: 69.2% (n=45) of participants with hearing loss had difficulty with hearing when someone spoke in a whisper (social consequence). 40.0% of the hearing impaired participants (n=26) felt that their hearing problem caused difficulty when listening to TV or radio (social consequence;) and 24 hearing impaired participants (35.4%) perceived the hearing problem as a handicap (emotional consequence). 23.1% (n=15) reported that they used their phone less than they would like to (item no.1) and in each case more than two-fifth reported that their hearing problem came along with social consequences: when attending a party (20.0%; n=13) and attending religious services less often than they would like (20.0%; n=13).

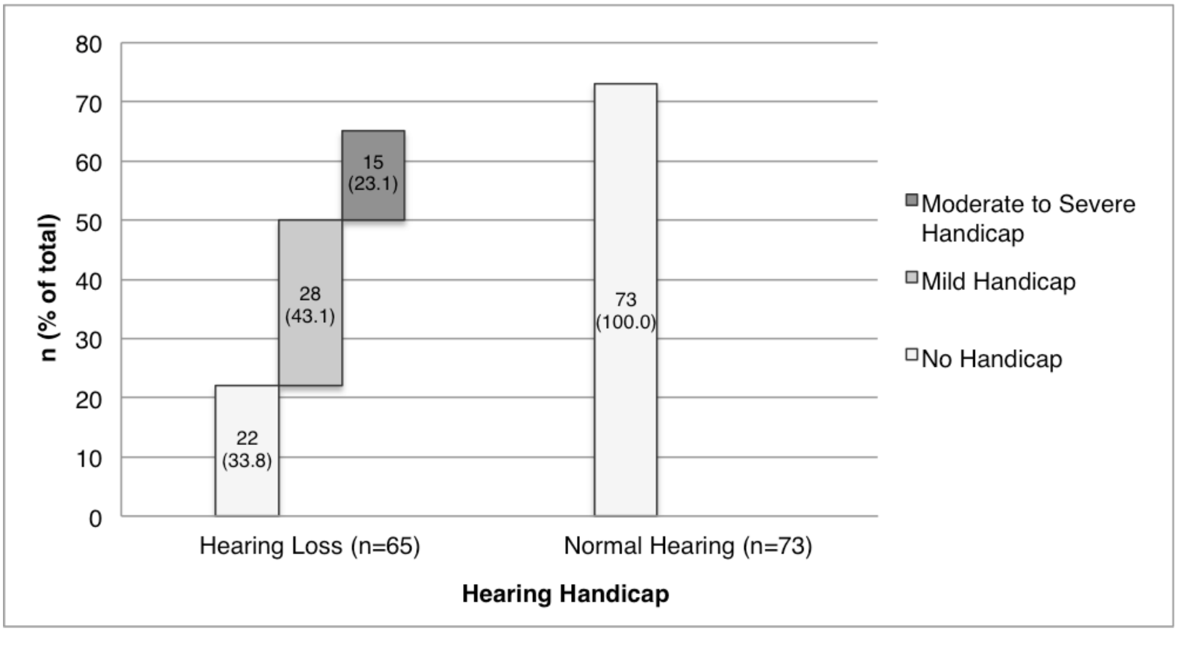

Figure 8. Classification of hearing handicap by hearing ability.

Quality of life. Participants with age-related hearing loss assessed their quality of life on physical as well as environmental level and their global level significantly poorer (lower mean scores) compared to participants with normal hearing function (Table 11). However, in all three cases, the required significance level of $p < .05$ could not be achieved after consideration of the covariates (Table 12).

Table 11. Mean scores on quality of life scales among elderly by hearing ability.

Quality of Life		***Total***	***Hearing Loss***	***Normal Hearing***	***p-value***
Physical Health [a] *(n=61/70)*	*Mean* (*SD*)	78.64 (17.54)	74.25 (19.61)	82.47 (14.61)	< .05
Psychological Health [b] *(n=62/70)*	*Mean* (*SD*)	77.11 (15.94)	75.54 (16.98)	78.51 (14.94)	n.s.
Social Relationships [b] *(n=65/70)*	*Mean* (*SD*)	75.93 (16.10)	73.97 (15.10)	77.74 (16.89)	n.s.
Environment [a] *(n=62/70)*	*Mean* (*SD*)	82.59 (12.51)	79.94 (12.80)	84.93 (11.86)	< .05
Global Quality of Life [a] *(n=64/71)*	*Mean* (*SD*)	76.67 (18.25)	70.12 (18.58)	82.57 (15.88)	< .001

[a] t-test

[b] Mann-Whitney U test

Table 12. Results of analysis of covariance – Quality of life by hearing ability in consideration of the variables Age, Multi-Morbidity and Educational Status.

Quality of Life	***df***	***Sum of Squares***	***F***	***p-value***
Physical Health				
Hearing Ability	1	286.52	1.98	n.s.
Age	1	518.31	3.58	n.s.
Multi-Morbidity	1	15702.68	108.50	< .001
Educational Status	1	128.93	0.89	n.s.
Error	122	17655.82		
Total	127	825577.52		
Environment				
Hearing Ability	1	7.56	0.07	n.s.
Age	1	111.62	1.01	n.s.
Multi-Morbidity	1	3882.16	34.96	< .001
Educational Status		208.91	1.88	n.s.
Error	123	13659.59		
Total	128	899018.26		
Global Quality of Life				
Hearing Ability	1	210.68	1.19	n.s.
Age	1	70.54	0.40	n.s.
Multi-Morbidity	1	14780.21	83.19	< .001
Educational Status	1	21.49	0.12	n.s.
Error	125	22208.80		
Total	130	807031.25		

Coping strategies and social support. In Table 13, the mean score of the coping strategies are shown for the hearing impaired group and for the comparison group. Overall, all participants used adaptive and maladaptive coping strategies from moderate to not at all (1=very hard, 2=hard, 3=moderate, 4=very little, 5=not at all). Both participants with hearing loss and those with normal hearing rather preferred adaptive than maladaptive strategies.

Table 13. Mean scores on coping and social support scales by hearing ability.

		Total	*Hearing Loss*	*Normal Hearing*	*p-value*
Coping Strategies					
Active Problem-Solving and Self-Motivation [a] *(n=63/71)*	*Mean* (*SD*)	2.91 (0.94)	3.00 (0.89)	2.84 (0.98)	n.s.
Escape and Avoidance [b] *(n=63/71)*	*Mean* (*SD*)	4.25 (0.59)	4.27 (0.60)	4.23 (0.59)	n.s.
Self-Distraction [b] *(n=63/71)*	*Mean* (*SD*)	3.80 (0.80)	3.87 (0.78)	3.74 (0.81)	n.s.
Resistance [a] *(n=63/70)*	*Mean* (*SD*)	3.89 (0.55)	3.79 (0.48)	3.98 (0.59)	< .05
Cognitive Appraisal [a] *(n=63/71)*	*Mean* (*SD*)	3.16 (0.89)	3.22 (0.87)	3.10 (0.90)	n.s.
Positive Reinterpretation and Search for Meaning [a] *(n=63/71)*	*Mean* (*SD*)	3.16 (0.86)	3.06 (0.83)	3.02 (0.89)	n.s.
Seek Social Support [b] *(n=63/70)*	*Mean* (*SD*)	4.18 (0.76)	4.32 (0.59)	4.06 (0.87)	n.s.
Perceived Social Support					
Total Score [b] *(n=62/72)*	*Mean* (*SD*)	4.61 (0.48)	4.61 (0.47)	4.62 (0.49)	n.s.

[a] t-test

[b] Mann-Whitney U test

In terms of group comparisons, the results indicate that there is one significant difference with respect to the use of coping strategies. Participants with hearing loss had a significantly lower mean score regarding the variable Resistance compared to participants with normal hearing ability, i.e., they used this coping behavior more intensively than the normal hearing participants. After controlling for covariates, this difference was not significant anymore (Table 14).

Participants were also asked to report their perception of social support from their family members, friends, colleagues, neighbors etc. The mean score was equally high in both groups (Table 13).

Table 14. Results of analysis of covariance – Coping strategies by hearing ability in consideration of the variables Age, Multi-Morbidity and Educational Status.

Coping Strategies	*df*	*Sum of Squares*	*F*	*p-value*
Resistance				
Hearing Ability	1	0.40	1.48	n.s.
Age	1	0.29	1.08	n.s.
Multi-Morbidity	1	0.07	0.26	n.s.
Educational Status	1	0.29	1.08	n.s.
Error	123	33.36		
Total	128	1996.68		

Comparison by the severity of hearing loss

The aim was to explore the following hypothesis: *The variables related to hearing handicap, quality of life, coping strategies and social support differ between elderly with no, mild, moderate and severe hearing loss.*

Hearing handicap. As is evident in Table 15, the mean score on HHIE total scale was significantly higher among participants with mild, moderate and severe hearing loss compared to the participants with no hearing loss. This result stayed significant after controlling for covariates (Table 16). Results of the pairwise comparisons remained significant with one exception: The HHIE scores between participants with mild hearing loss and those with moderate hearing loss did not differ significantly (Table 15).

Table 15. Performance on hearing handicap scale by severity of hearing loss.

Hearing Handicap		**Severity of Hearing Loss**				
		No	***Mild***	***Moderate***	***Severe***	***p-value***
HHIE Total Score [a] *(n=73/n=16/n=37/n=12)*	*Mean* (*SD*)	2.80 (3.77)	23.63 (20.50)	26.87 (20.87)	42.83 (22.59)	< .001

[a] One-way ANOVA; df = 3; participants with no hearing loss compared to those with mild (p < .001), moderate (p < .001) and severe (p < .001) hearing loss; participants with mild hearing loss compared to those with severe hearing loss (p < .01); participants with moderate hearing loss compared to those with severe hearing loss (p < .01)

Table 16. Results of analysis of covariance – Hearing handicap by severity of hearing loss in consideration of the variables Age, Multi-Morbidity and Educational Status.

Hearing Handicap	***df***	***Sum of Squares***	***F***	***p-value***
Severity of Hearing Loss	1	18713.96	29.59	< .001
Age	1	547.47	2.60	n.s.
Multi-Morbidity	1	2093.08	9.93	< .01
Educational Status	1	109.75	0.52	n.s.
Error	124	26142.70		
Total	131	85664.00		

Table 17. Classification of hearing handicap.

Classification of Hearing Handicap *(n=73/n=16/n=37/n=12)*		**Severity of Hearing Loss**			
		No	***Mild***	***Moderate***	***Severe***
No Handicap	*n* (in %)	73 (100.0)	7 (43.8)	14 (37.8)	1 (8.3)
Mild Handicap	*n* (in %)	0 (0.0)	6 (37.5)	16 (43.2)	6 (50.0)
Moderate to Severe Handicap	*n* (in %)	0 (0.0)	3 (18.8)	7 (18.9)	5 (41.7)

Strikingly, the results in terms of the classification of hearing handicap (Table 17) show that more than one-third of the participants (33.9) with a hearing loss had low total scores on HHIE, which indicates no perception of hearing difficulties in their everyday life. Thus, 43.1% of participants with age-related hearing loss reported a mild and 23.1% a moderate to severe hearing handicap, whereas the mean total score of almost all elderly with severe hearing loss (11 of 12) showed a mild to moderate/severe hearing handicap.

Quality of life. Participants with no hearing loss assessed their physical, environmental and global quality of life significantly better compared to the participants with mild hearing loss (Table 18). After consideration of covariates, there were no significant differences, neither in physical and environmental nor in global quality of life between hearing impaired group and the comparison group (Table 19).

Table 18. Performance on quality of life scales by severity of hearing loss.

		Severity of Hearing Loss				
Quality of Life		***No***	***Mild***	***Moderate***	***Severe***	***p-value***
Physical Health [a] *(n=70/n=14/n=36/n=11)*	*Mean* (*SD*)	82.47 (14.61)	65.82 (18.83)	76.01 (19.68)	79.22 (18.75)	< .01
Psychological Health [b] *(n=70/n=15/n=36/n=11)*	*Mean* (*SD*)	78.51 (14.94)	71.67 (15.53)	75.58 (18.10)	80.68 (14.94)	n.s.
Social Relationships [b] *(n=70/n=16/n=37/n=11)*	*Mean* (*SD*)	77.74 (16.89)	76.04 (13.74)	70.95 (14.78)	80.56 (16.41)	n.s.
Environment [a] *(n=70/n=15/n=36/n=11)*	*Mean* (*SD*)	84.93 (11.86)	73.96 (11.67)	81.16 (12.88)	84.09 (12.22)	< .05
Global Quality of Life [c] *(n=71/n=15/n=36/n=12)*	*Mean* (*SD*)	82.57 (15.88)	62.50 (15.81)	72.22 (20.51)	73.96 (13.55)	< .001

[a] One-way ANOVA; df = 3; participants with no hearing loss compared to those with mild hearing loss (p < .01)

[b] Kruskal-Wallis test

[c] One-way ANOVA; df = 3; participants with no hearing loss compared to those with mild hearing loss (p < .001) and moderate hearing loss (p < .05)

Table 19. Results of analysis of covariance – Quality of life by severity of hearing loss in consideration of the variables Age, Multi-Morbidity and Educational Status.

Quality of Life	***df***	***Sum of Squares***	***F***	***p-value***
Physical Health				
Severity of Hearing Loss	1	763.06	1.78	n.s.
Age	1	656.92	4.59	< .05
Multi-Morbidity	1	1411.22	98.57	< .001
Educational Status	1	173.12	1.21	n.s.
Error	120	17170.28		
Total	127	825577.52		
Environment				
Severity of Hearing Loss	1	505.64	1.55	n.s.
Age	1	212.13	1.95	n.s.
Multi-Morbidity	1	3263.24	30.00	< .001
Educational Status	1	253.05	2.33	n.s.
Error	121	13161.51		
Total	128	899018.26		
Global Quality of Life				
Severity of Hearing Loss	1	896.85	1.71	n.s.
Age	1	137.57	0.79	n.s.
Multi-Morbidity	1	13755.13	78.61	< .001
Educational Status	1	35.56	0.20	n.s.
Error	123	21522.63		
Total	130	807031.25		

Coping strategies and social support. As is evident in Table 20, no significant differences could be identified in terms of coping behaviors between participants with normal hearing and mild, moderate as well as severe hearing loss.

Table 20 also shows the findings relating to the perception of social support assessed by participants. In general, the mean scores of the variable Perceived Social Support were quite high in all four groups and did not differ significantly.

Table 20. Performance on coping and social support scales by severity of hearing loss.

		Severity of Hearing Loss				
		No	***Mild***	***Moderate***	***Severe***	***p-value***
Coping Strategies						
Active Problem-Solving and Self-Motivation [a] *(n=71/n=16/n=36/n=11)*	*Mean* (*SD*)	2.84 (0.98)	2.95 (0.73)	2.97 (0.89)	3.19 (1.13)	n.s.
Escape and Avoidance [b] *(n=71/n=16/n=36/n=11)*	*Mean* (*SD*)	4.23 (0.59)	4.27 (0.47)	4.29 (0.62)	4.23 (0.73)	n.s.
Self-Distraction [b] *(n=71/n=16/n=36/n=11)*	*Mean* (*SD*)	3.74 (0.81)	3.70 (0.56)	3.91 (0.81)	3.96 (0.99)	n.s.
Resistance [a] *(n=70/n=16/n=36/n=11)*	*Mean* (*SD*)	3.99 (0.59)	3.71 (0.33)	3.81 (0.57)	3.84 (0.39)	n.s.
Cognitive Appraisal [a] *(n=71/n=16/n=36/n=11)*	*Mean* (*SD*)	3.10 (0.90)	3.15 (0.94)	3.16 (0.82)	3.51 (0.96)	n.s.
Positive Reinterpretation and Search for Meaning [a] *(n=71/n=16/n=36/n=11)*	*Mean* (*SD*)	3.02 (0.89)	2.92 (0.75)	3.10 (0.88)	3.12 (0.85)	n.s.
Seek Social Support [b] *(n=70/n=16/n=36/n=11)*	*Mean* (*SD*)	4.06 (0.87)	4.40 (0.51)	4.31 (0.67)	4.24 (0.42)	n.s.
Perceived Social Support						
Total Score [b] *(n=72/n=15/n=35/n=12)*	*Mean* (*SD*)	4.62 (0.49)	4.41 (0.61)	4.63 (0.45)	4.78 (0.22)	n.s.

[a] One-way ANOVA; df = 3

[b] Kruskal-Wallis test

Gender differences: Older women and men with age-related hearing loss

The aim was to explore the following hypothesis: *The variables related to hearing handicap, quality of life, coping strategies and social support differ between older women and older men with age-related hearing loss.*

Hearing handicap. As is shown in Table 21, female participants with age-related hearing loss perceived their hearing problems as more severe compared to male participants. However, this difference was not significant.

Table 21. Mean score on hearing handicap scale of older women and men with hearing loss.

Hearing Handicap		***Women***	***Men***	***p-value***
HHIE Total Score [a] *(n=32/n=33)*	*Mean* (*SD*)	31.38 (22.51)	26.73 (21.27)	n.s.

[a] t-test

The severity of hearing handicap among women and men was also determined (Figure 9). The distribution of self-reported mild hearing handicap was equal among both genders. Slight gender differences existed in terms of the perception of no handicap and moderate to severe handicap. However, these differences were not significant (Pearson Chi square test).

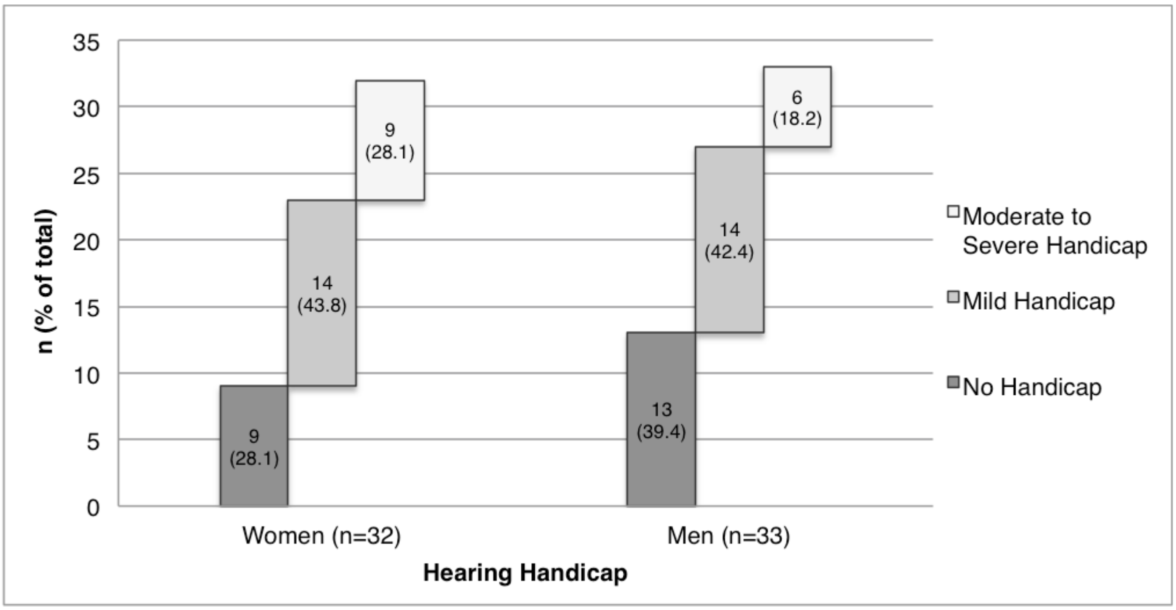

Figure 9. Classification of hearing handicap of hearing impaired participants by gender.

Quality of life. The mean scores on all quality of life scales were lower and hence poorer among female participants with age-related hearing loss compared to male participants, nonetheless significant gender differences only referred to the psychological and environmental domains of quality of life (Table 22). After controlling for effect of the covariates a significant gender difference could only be identified in the psychological domain (Table 23). Psychological quality of life includes data about, e.g., enjoying life, satisfaction with oneself and having negative feelings like depression, anxiety.

Table 22. Mean scores on quality of life scales among women and men with hearing loss.

Quality of Life		*Women*	*Men*	*p-value*
Physical Domain [b] *(n=30/n=31)*	*Mean* (*SD*)	72.14 (22.71)	76.29 (16.17)	n.s.
Psychological Domain [a] *(n=30/n=32)*	*Mean* (*SD*)	69.58 (19.15)	81.12 (12.57)	< .01
Social Domain [b] *(n=32/n=33)*	*Mean* (*SD*)	70.96 (15.79)	76.89 (14.02)	n.s.
Environmental Domain [a] *(n=30/n=32)*	*Mean* (*SD*)	76.04 (14.36)	83.59 (10.04)	< .05
Global Quality of Life [b] *(n=32/n=32)*	*Mean* (*SD*)	66.41 (20.93)	73.83 (15.35)	n.s.

[a] t-test

[b] Mann-Whitney U test

Table 23. Results of analysis of covariance – Quality of life by gender in consideration of the variables Age, Multi-Morbidity and Educational Status.

Quality of Life	*df*	*Sum of Squares*	*F*	*p-value*
Psychological Domain				
Sex	1	760.85	4.26	< .05
Age	1	16.84	0.09	n.s.
Multi-Morbidity	1	5208.41	29.15	< .001
Educational Status	1	1.29	0.01	n.s.
Error	57	10184.55		
Total	62	371354.17		
Environmental Domain				
Sex	1	330.60	3.01	n.s.
Age	1	36.70	0.33	n.s.
Multi-Morbidity	1	2336.43	21.26	< .001
Educational Status	1	172.49	1.57	n.s.
Error	58	6265.56		
Total	62	406191.41		

Coping strategies and social support. All findings in terms of coping strategies and perceived social support by gender are included in Table 24. Female and male participants with age-related hearing loss used both adaptive and maladaptive coping strategies rather moderately to rarely (1=very hard, 2=hard, 3=moderate, 4=very little, 5=not at all).

There were no significant gender differences. Both men and women preferred the following two coping strategies: Positive Reinterpretation / Search for Meaning and Active Problem-Solving / Self-Motivation (adaptive). Most rarely chosen coping strategies were Seek for Social Support (adaptive) and Escape/Avoidance (maladaptive) among female and male participants.

Table 24 also presents the findings related to the variable Perceived Social Support. The mean score is equally high among both genders; they evaluated the perceived social support from their family members, friends, colleagues etc. as almost very satisfying.

Table 24. Performance on coping and social support scale among women and men with hearing loss.

		Women	*Men*	*p-value*
Coping strategies				
Active problem-solving and Self-motivation [a] *(n=31/n=32)*	*Mean* (*SD*)	3.02 (0.86)	2.98 (0.94)	n.s.
Escape and Avoidance [b] *(n=31/n=32)*	*Mean* (*SD*)	4.15 (0.72)	4.38 (0.46)	n.s.
Self-distraction [b] *(n=31/n=32)*	*Mean* (*SD*)	3.78 (0.80)	3.95 (0.77)	n.s.
Resistance [a] *(n=31/n=32)*	*Mean* (*SD*)	3.76 (0.52)	3.82 (0.46)	n.s.
Cognitive Appraisal [a] *(n=31/n=32)*	*Mean* (*SD*)	3.21 (0.77)	3.23 (0.97)	n.s.
Positive Reinterpretation and Search for Meaning [a] *(n=31/n=32)*	*Mean* (*SD*)	2.97 (0.82)	3.14 (0.85)	n.s.
Seek social support [b] *(n=31/n=32)*	*Mean* (*SD*)	4.29 (0.62)	4.34 (0.57)	n.s.
Perceived social support				
Total score [b] *(n=31/n=31)*	*Mean* (*SD*)	4.52 (0.52)	4.69 (0.41)	n.s.

[a] t-test

[b] Mann-Whitney U test

Associations between the hearing loss and hearing handicap

In this section, the following research questions are addressed: *To what extent does (objectively measured) hearing loss correlate with subjectively assessed hearing handicap? To what extent does hearing loss affect the perceived hearing handicap without and with considering confounding variables (age, multi-morbidity, gender and educational status)?*

Relationship between hearing loss and hearing handicap

For testing the relationship between functional hearing loss defined by the PTA in dB HL and hearing handicap determined by the total score of the hearing handicap scale, the Pearson's correlation test was used. As is shown in Table 25, the correlation between hearing loss and a hearing handicap is significant with a medium effect size. This finding indicates that the more severe the hearing loss was, the more severe the participants experienced the hearing difficulties. This relationship was also analyzed gender-specifically within the hearing impaired group (Table 25). Significant positive relationships with a medium size effect existed solely among men.

Table 25. Relationship of hearing loss and hearing handicap (Pearson product-moment correlation coefficient).

	Hearing Loss (PTA in dB HL)		
Hearing Handicap	***Total***	***Women** (n=31)*	***Men** (n=30)*
HHIE Total Score	0.339 **	0.308	0.380 *

p-value : *** < .001, ** < .01, * < .05

Impact of hearing loss on hearing handicap

The extent of the impact of hearing loss on hearing handicap was calculated by using a linear regression analysis method. At first, the association between these entities without considering confounding variables having a possible influence on this relationship was investigated. The second step was to conduct a hierarchical multiple regression analysis in order to partial out the effects of gender, age, multi-morbidity and educational status. In general, the prevalence of comorbid diseases is high in the elderly population, increases by age and can have a strong influence on everyday life as well as on quality of life. Therefore, it is inevitable to consider the variables Age and Multi-Morbidity as possible influence factors in the current study. It was also of interest to observe if the variables Gender and Educational Status play a significant role in this relationship. Since outliers may lead to biased results, they were removed from the data set. Pairwise deletion method for handling missing data was used.

All tables including the findings of these multivariate analyses (also in the following section) show the significant standardized Beta-coefficient (*Beta*), R^2 value, F-value and its level of significance as well as Durbin Watson coefficient. Change of R^2 and Tolerance value are additional relevant indicators for hierarchical multiple regression models, which is why these values are also noted in the respective tables.

Table 26. Linear regression analysis of predictor variable hearing loss on hearing handicap.

Predictor of Hearing Handicap ***Hearing Loss*** *(n=61)*	
Variables	**Beta**
Hearing Loss	.339 **
Regression Model	
F-Statistic	7.676 **
R^2	0.115
Durbin-Watson	2.274

p-value : *** < .001, ** < .01, * < .05

As is shown in Table 26, hearing loss contributed significantly to explaining 11.5% of the variance in the perceived hearing handicap.

The predictive power (R^2) indicates almost a medium effect size and can be characterized as satisfying. The significant Beta-coefficient can be explained as follows: The predictor variable Hearing Loss had a medium effect on the dependent variable Hearing Handicap, i.e., the more severe the functional hearing loss was, the more severe consequences in everyday life were perceived by participants with age-related hearing loss.

A hierarchical multiple regression analysis for prediction of hearing handicap was the next step in order to test if confounding variables Age, Multi-Morbidity, Gender and Educational Status had an influence on the dependent variable Hearing Handicap. The assumption of the correlations between the dependent variable and the independent variables (confounding variables) was not met, hence they were not considered as potential influence factors. For this reason, no multiple regression analysis could be conducted.

Prediction of Quality of life

In this section, the aim was to answer following question: *How strong is the prediction power of the independent variables hearing handicap, coping strategies and social support on physical, psychological, social, environmental and global quality of life of the participants with age-related hearing loss and normal hearing ability respectively*?

Based on the created working model, I finally performed various hierarchical multiple regression models to predict quality of life on physical, psychological, social, environmental level and global quality of life. The calculation of the hierarchical multiple regression models was conducted separately for the group of participants with age-related hearing loss and the comparison group. Confounding variables as independent variables (age, gender, educational status, marital status[2] and multi-morbidity) were entered as the first level (first model) and the other independent variables (relating to constructs hearing handicap, coping strategies and perceived social support) were entered as the second level (second model). Outliers, which could manipulate the results, were eliminated. Pairwise deletion method for handling missing data was used.

For each criterion or dependent variable, all previously determined independent variables were incorporated for the analysis process. The rationale for this approach was the determination of independent variables with the strongest predictive power of quality of life (physical, psychological, social, environmental and global quality of life). The significant findings of simple correlation analysis showing the relationships between the independent variables and all dependent variables are mentioned in the text. In terms of independent variables, only the variables which correlated significantly with the criterion variables were finally entered in the hierarchical multiple regression models and these respective findings are included in tables.

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[2] Variable “living status” was not used because it highly correlated with the variable Marital Status.

Physical quality of life

There were significant correlations between the variable Physical Health and the variables Multi-Morbidity (r = -.732; p < .001) and Perceived Social Support (r = .360; p < .01) among participants with age-related hearing loss. Both independent variables made a unique contribution to the variance in the dependent variable Physical Health (Table 27).

The significant *Beta*-coefficients can be explained as follows: The quality of life on the physical level was poorer the more additional diseases or impairment participants with age-related hearing loss suffered from, and better the greater the extent of the perceived social support was.

This model explained 60.3% of the variance in the physical quality of life (*p* < .001). The predictive power (R^2) indicates a large effect size and can be considered as satisfying. The change of R^2 (6.7%) shows that the added predictive power by the addition of the variable Perceived Social Support (second model) was small but adding this independent variable increased the explained variance significantly (*p* < .01). The confounding variable Multi-Morbidity was however the strongest predictor variable on physical quality of life.

The findings show no auto-correlation (Durbin Watson coefficient) and no multi-collinearity (Tolerance value).

Table 27. Multiple regression analysis of predictor variables on physical quality of life.

	Predictors of Physical Health			
	Hearing Loss[a] *(n=53)*		***Normal Hearing***[a] *(n=63)*	
Variables	**Beta**	**Tolerance**	**Beta**	**Tolerance**
Age				
Gender				
Educational Status				
Marital Status			.129	.952
Multi-Morbidity	-.695 ***	.980	-.391 **	.970
Hearing Handicap				
Perceived Social Support	.261 **	.980		
Active Problem-Solving				
Escape and Avoidance				
Self-Distraction				
Resistance				
Cognitive Appraisal				
Positive Reinterpretation				
Seek Social Support			.171	.968

Regression Model		
F-Statistic	37.957 ***	6.031 **
R^2	0.603	0.235
Change in R^2	0.067	0.028
Durbin-Watson	1.839	2.135

p-value : *** < .001, ** < .01, * < .05

In the comparison group there were significant relationships between the variable Physical Health and the variables Marital Status (r = -.220; $p < .05$), Multi-Morbidity (r = -.427; $p < .001$) as well as the coping strategy Seek Social Support (r = .230; $p < .05$). Despite these significant associations, only the independent variable Multi-Morbidity made a unique contribution to the variance in the dependent variable Physical Health (Table 27). The explanation for the significant *Beta*-coefficient is as follows: The physical quality of life was poorer the more additional diseases or impairment participants with age-related hearing loss suffered from.

This model explained 23.5% of the variance in the physical quality of life ($p < .01$). This value of predictive power (R^2) indicates a medium effect size and can be considered as satisfying. The change of R^2 (2.8%) shows that the added predictive power by the addition of the variable Seek Social Support (second model) was small; adding this independent variable did not increase the explained variance significantly and was hence no predictor of physical quality of life in the comparison group.

The findings show no auto-correlation (Durbin Watson coefficient) and no multi-collinearity (Tolerance value).

Psychological quality of life

Significant relationships between the variable Psychological Health and the variables Gender (r = .233; p < .05), Multi-Morbidity (r = -.402; p < .01) and Perceived Social Support (r = .596; p < .001) among participants with hearing loss could be detected.

As is shown in Table 28, the independent variables Perceived Social Support and Multi-Morbidity made a unique contribution to the variance in the dependent variable Psychological Health.

The explanation for the significant *Beta*-coefficients is as follows: The psychological quality of life of hearing impaired participants was poorer the more additional diseases participants suffered from, and better the greater the extent of the perceived social support was.

This model explained 46.5% of the variance in the dependent variable Psychological Health ($p < .001$). This value predictive power (R^2) indicates a large effect size and can be considered as satisfying. The added predictive power (change of R^2 = 27.3%) was significantly large ($p < .001$), i.e., the added independent variable Perceived Social Support (second model) made a unique contribution to explaining variance in the psychological quality of life and was the strongest predictor.

The findings show no auto-correlation (Durbin Watson coefficient) and no multi-collinearity (Tolerance value).

Table 28. Multiple regression analysis of predictor variables on psychological quality of life.

	Predictors of Psychological Health			
	Hearing Loss^{a} *(n=54)*		***Normal Hearing***^{b} *(n=57)*	
Variables	**Beta**	**Tolerance**	**Beta**	**Tolerance**
Age				
Gender	.088	.951		
Educational Status			-.201	.782
Marital Status			.189	.886
Multi-Morbidity	-.312 **	.963	-.116	.902
Hearing Handicap				
Perceived Social Support	.535 ***	.953	.156	.777
Active Problem-Solving			-.586 ***	.486
Escape and Avoidance			-.022	.410
Self-Distraction				
Resistance				
Cognitive Appraisal			.420 *	.404
Positive Reinterpretation				
Seek Social Support			.149	.546

Regression Model		
F-Statistic	14.470 ***	5.003 ***
R^2	0.465	0.455
Change in R^2	0.273	0.272
Durbin-Watson	1.888	2.131

p-value : *** < .001, ** < .01, * < .05

In the comparison group, there were significant correlations between the psychological domain of quality of life and educational status (r = -.227; p < .05) marital status (r = .324; *p* < .01), multi-morbidity (r = -.275; *p* < .05), perceived social support (r = .383; *p* < .01) and following coping strategies Active Problem-Solving (r = -.231; *p* < .05), Escape and Avoidance (r = .357; *p* < .01), Cognitive Appraisal (r = .222; p < .05) and Seek Social Support (r = .239; *p* < .05). Despite the significant correlations, two independent variables – Active Problem-Solving and Cognitive Appraisal – made a unique contribution to the variance in the dependent variable Psychological Health (Table 28). The significant *Beta*-coefficients can be explained as follows: The assessment on psychological well-being was poorer the less intensively these participants solved problems in an active way, and better the less intensively they chose the coping strategy Cognitive Appraisal.

This model explained 45.5% of the variance in the dependent variable Psychological Health (*p* < .001). The R^2 indicates a large effect size and can be considered as satisfying. The added predictive power (change in R^2 = 27.2%) was significantly large (*p* < .01), i.e., the added independent variables Active Problem-Solving and Cognitive Appraisal (second model) made a unique contribution to explaining variance in the psychological quality of life.

The findings show no auto-correlation (Durbin Watson coefficient) and no multi-collinearity (Tolerance value).

Social quality of life

There were significant correlations between the criterion variable Social Relationships and the independent variables Multi-Morbidity (r = -.212; $p < .05$) and Perceived Social Support (r = .377; $p < .01$) among participants with age-related hearing loss.

The independent variable Perceived Social Support made a unique contribution to the variance in the dependent variable Social Relationships (Table 29).

The explanation for the significant *Beta*-coefficient is as follows: The social quality of life of hearing impaired participants was better the greater the extent of the perceived social support was.

This model explained 16.8% of the variance in the dependent variable Social Relationships ($p < .01$). This value predictive power (R^2) indicates a medium effect size and can be considered as satisfying. The added predictive power (change of $R^2 = 12.3\%$) was as almost medium, i.e., adding the independent variable Perceived Social Support (second model) increased the explained variance ($p < .01$). Perceived Social Support was the single significant predictor variable.

The findings show no auto-correlation (Durbin Watson coefficient) and no multi-collinearity (Tolerance value).

Table 29. Multiple regression analysis of predictor variables on social quality of life.

	Predictors of Social Relationships			
	Hearing Loss[a] *(n=57)*		*Normal Hearing*[b] *(n=62)*	
Variables	**Beta**	**Tolerance**	**Beta**	**Tolerance**
Age				
Gender			-.226	.850
Educational Status				
Marital Status				
Multi-Morbidity	-.162	.980	-.167	.941
Hearing Handicap				
Perceived Social Support	.354 **	.980	.322 *	.759
Active Problem-Solving				
Escape and Avoidance			.261 *	.774
Self-Distraction				
Resistance				
Cognitive Appraisal				
Positive Reinterpretation				
Seek Social Support				

Regression Model		
F-Statistic	5.454 **	7.148 ***
R^2	0.168	0.334
Change in R^2	0.123	0.221
Durbin-Watson	2.264	1.794

p-value : *** < .001, ** < .01, * < .05

In the comparison group, significant correlations were found between the variable Social Relationships and the variables Gender (r = -.212; $p < .05$), Multi-Morbidity (r = -.255; $p < .05$), Perceived Social Support (r = .491; $p < .001$) as well as Escape / Avoidance (r = .328; $p < .01$). Escape / Avoidance and Perceived Social Support were the independent variables making a unique contribution to the variance in the dependent variable Social Relationships (Table 29). The explanation for the significant *Beta*-coefficients is as follows: The social quality of life was better the less intensively participants with normal hearing function escaped from or avoided a stressful situation and the greater the extent of the perceived social support was.

This model explained 33.4% of the variance in the dependent variable Social Relationships ($p < .001$). This value of predictive power (R^2) indicates a large effect size and can be considered as satisfying. The added predictive power (change of R^2 = 22.1%) by the addition of the variables Escape / Avoidance and Perceived Social Support (second model) was significantly large ($p < .001$) and it was even larger than the R^2 from the first model. This means that these two new included predictor variables explained much more of the variance in the social domain of quality of life than the first model (including confounders).

The findings show no auto-correlation (Durbin Watson coefficient) and no multi-collinearity (Tolerance value).

Environmental quality of life

In the hearing impaired group there were significant correlations between the criterion variable Environment and the variables Gender (r = .269; $p < .05$), Multi-Morbidity (r = -.472; $p < .001$), Perceived Social Support (r = .423; $p < .01$) and the Active Problem-Solving (r = -.292; $p < .05$). The independent variables Multi-Morbidity, Active Problem-Solving and Perceived Social Support made a unique contribution to the variance in the dependent variable Environment (Table 30). The explanation for the significant *Beta*-coefficients is as follows: The environmental quality of life of hearing impaired participants was poorer the more additional diseases they reported as well as the less intensively they solved problems actively; the environmental quality of life was better the greater the extent of the perceived social support was.

This model explained 42.6% of the variance in the dependent variable Environment ($p < .001$). The R^2 indicates a large effect size and can be considered as satisfying. The added predictive power (change of R^2 = 16.2%) had a medium effect size. The increase of the explained variance was significant ($p < .01$). This finding means that the added significant predictor variables – Perceived Social support and Active Problem-Solving (second model) – also made a unique contribution to explaining variance in the environmental quality of life. Nevertheless, the confounding variable Multi-Morbidity was the strongest predictor variable on environmental quality of life.

The findings show no auto-correlation (Durbin Watson coefficient) and no multi-collinearity (Tolerance value).

Table 30. Multiple regression analysis of predictor variables on environmental quality of life.

Predictors of Environmental Quality of Life				
	Hearing Loss ^{a} *(n=55)*		***Normal Hearing*** ^{b} *(n=61)*	
Variables	**Beta**	**Tolerance**	**Beta**	**Tolerance**
Age				
Gender	.148	.951		
Educational Status				
Marital Status				
Multi-Morbidity	-.411 ***	.962	-.328 **	.947
Hearing Handicap				
Perceived Social Support	.290 *	.913	.163	.924
Active Problem-Solving	-.235 *	.957	-.218	.975
Escape and Avoidance				
Self-Distraction				
Resistance				
Cognitive Appraisal				
Positive Reinterpretation				
Seek Social Support				

Regression Model		
F-Statistic	9.258 ***	5.406 **
R^2	0.426	0.222
Change in R^2	0.162	0.083
Durbin-Watson	1.864	2.321

p-value : *** < .001, ** < .01, * < .05

In the comparison group, there were significant correlations between the criterion variable Environment and the variables Multi-Morbidity (r = -.372; p < .01), Perceived Social Support (r = .273; p < .05) and Active Problem-Solving (r = -.252; p < .05). Despite these significant associations, only the independent variable Multi-Morbidity made a unique contribution to the variance in the dependent variable Environment (Table 30). The explanation for the significant *Beta*-coefficient is as follows: The environmental quality of life was poorer the more additional diseases participants with age-related hearing loss suffered from.

This model explained 22.2% of the variance in the dependent variable Environment (*p* < .01). This value of predictive power (R^2) indicates a medium effect size and can be considered as satisfying. The change of R^2 (8.3%) shows that the added predictive power by the addition of the variables Active Problem-Solving and Perceived Social Support (second model) was small. The addition of these variables did not significantly increase the explained variance and these independent variables were no predictors of environmental quality of life in the comparison group.

The findings show no auto-correlation (Durbin Watson coefficient) and no multi-collinearity (Tolerance value).

Global quality of life

There were significant correlations between the criterion variable Global Quality of Life and the variables Multi-Morbidity (r = -.527; *p* < .001) as well as Perceived Social Support (r = .290; *p* < .05) in the group with hearing impaired participants.

Table 31. Multiple regression analysis of predictor variables on global quality of life.

Predictors of Global Quality of Life				
	Hearing Loss[a] *(n=48)*		*Normal Hearing*[b] *(n=60)*	
Variables	**Beta**	**Tolerance**	**Beta**	**Tolerance**
Age				
Gender				
Educational Status				
Marital Status				
Multi-Morbidity	-.496 ***	.980	-.567 ***	.932
Hearing Handicap				
Perceived Social Support	.219	.980	.196	.812
Active Problem-Solving				
Escape and Avoidance			.066	.460
Self-Distraction				
Resistance				
Cognitive Appraisal			.061	.646
Positive Reinterpretation				
Seek Social Support			0.83	.616

Regression Model		
F-Statistic	10.816 ***	10.115 ***
R^2	0.325	0.479
Change in R^2	0.047	0.081
Durbin-Watson	2.707	1.787

p-value : *** < .001, ** < .01, * < .05

The independent variable Multi-Morbidity was however the single significant predictor of the dependent variable Global Quality of Life (Table 31). The significant *Beta*-coefficient can be explained as follows: The global quality of life was poorer the more diseases or impairments the hearing impaired participants had.

This model explained 32.5% of the variance in the physical quality of life ($p < .05$). This value of predictive power (R^2) indicates a large effect size and can be considered as satisfying. The added predictive power (change of $R^2 = 4.7\%$) was rather small, therefore adding the independent variable Perceived Social Support (second model) did not increase the explained variance significantly. Thus, this variable was not a predictor of global quality of life.

The findings show no auto-correlation (Durbin Watson coefficient) and no multi-collinearity (Tolerance value).

In the comparison group, there were significant correlations between the criterion variable Global Quality of Life and the variables Multi-Morbidity (r = -.631; $p < .001$), Perceived Social Support (r = .368; $p < .01$), Escape / Avoidance (r = .260; $p < .05$), Cognitive Appraisal (r = .217; $p < .05$) and Seek Social Support (r = .227; $p < .05$). Despite these relationships, in this model only the independent variable Multi-Morbidity contributed significantly to explaining the variance in the dependent variable Global Quality of Life. The significant *Beta*-coefficient can be explained as follows: The global quality of life was poorer the more diseases or impairments the participants with normal hearing function had.

As is evident in Table 31, this model explained 47.9% of the variance in the global quality of life ($p < .001$). This value of predictive power (R^2) indicates a large effect size and can be considered as satisfying. The added predictive power (change of $R^2 = 8.1\%$) was small. The addition of new independent variables (second model) increased the explained variance significantly ($p < .01$). However, these variables did not make a unique contribution to explaining variance in the dependent variable Global Quality of Life.

The findings show no auto-correlation (Durbin Watson coefficient) and no multi-collinearity (Tolerance value).

QUALITATIVE FINDINGS

The second central part of this chapter deals with the major findings of qualitative guided interviews. In this context, older adults were asked to talk about their experiences of living with their hearing loss. This subchapter starts with a brief presentation of the demographic data, severity of hearing loss and other relevant hearing related data of the interviewed older adults. Finally, the crystallized central themes of the interviews are demonstrated in general as well as gender-specifically if gender turned out to play a significant role.

Description of Participants

A total of ten female and six male older adults who met the inclusion criteria volunteered to talk about living with hearing loss. The material of two male participants could not be included in the data analysis because the quality of the audiotape was poor and therefore a verbatim transcription was not feasible. The age of the fourteen participants ranged from 57 to 94 and less than half had a spouse or partner. All interviewees were retired, whereof six female participants were residents in nursing homes and the other eight elderly were living at their homes. Four interviewees had a mild, five a moderate four a severe and one a profound hearing loss. In order to get a picture of the participants, key socio-demographic data (age, marital status, living arrangement) and severity of loss hearing are noted in the footer.

All interviewees were cognitively intact and able to communicate expressively in German. The course of conversation was fluent in each single case, and the participants were able to respond to my questions appropriately. In order to protect their anonymity, I used pseudonyms for each interviewee. The utterances reproduced in the course of this chapter were translated by me (the German originals are to be found in Appendix VII).

Subjective truths about life and experiences with hearing loss

In the interviews, the participants broached various themes such as recognition of hearing loss, need, use of and experiences with hearing aids, various consequences of hearing loss, coping with challenging hearing related situations, the role of their family members or significant others with respect to social support as well as hearing loss as stigma.

The path towards recognizing hearing loss

Once the participants could not hear or understand others entirely anymore, they realized that something was wrong with their hearing ability. However, their reasons or motivations to go to the ENT doctor to check their hearing capacity differed. For some participants the time span between perceiving hearing difficulties and their first visit to the ENT doctor was only a few weeks. Christine [3], for example, a retired elementary teacher, realized how her hearing gradually got worse and identified her problems specifically in unpleasant and embarrassing moments.

> *"It gradually decreased more and more (…) I realized it especially at work as some of my colleagues shook their head and they kind of talked about me behind my back and this was an unpleasant situation (…). This is how I realized my hearing was getting worse and about ten years ago I finally went to the ENT doctor." (Christine)*

Another reason for going to the ENT doctor was the influence of spouses or colleagues making hearing impaired aware of their hearing problems.

> *„The hearing impairment appeared bit by bit, you know, and I probably should have done something earlier. However, you often realize it only when the hearing problem is acute or when your spouse says that your hearing is poor." (Samuel [4])*

Hearing loss made its way into the interviewees' life in a subtle manner, gradually increasing over the course of (many) years. At first, most participants noticed some problems with their hearing and understanding. However, they did not intervene because they did not perceive their hearing problems as severe and managed to pretend being able to hear in some situations. In some cases, a serious and acute deterioration forced participants to a hearing assessment due to which they recognized that a treatment for their hearing problems was needed.

> *„I heard what I needed and then suddenly I heard much less. All of a sudden! And then, two years ago, I saw one doctor after the other, one ENT doctor after the other." (Inge [5])*

Emma's [6] story is quite interesting in this regard. She did not recognize her hearing loss at first. Instead, she was of the mind that her spouse had hearing problems.

> *„Well, when I talked to my husband I always had the feeling that it was him who did not understand me but it actually was the other way around." (Emma)*

The path towards recognizing one's hearing loss and deciding to have one's hearing checked by a specialist doctor did not differ between female and male participants. Both women and men realized their gradually increasing hearing loss, but men waited longer to finally have their hearing ability tested than did women and their decision was mainly taken due to their spouse's urging.

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[3] *Christine* is 60 years old, married and is living at home together with her husband and grown-up children. She has a mild hearing loss (mean bilateral PTA: 30.0 dB HL).

[4] *Samuel* is 68 years old, married and is living at home together with his wife. He has a moderate hearing loss (mean bilateral PTA: 47.5 dB HL).

[5] *Inge* is 92 years old, widowed and a nursing home resident. She has a mild hearing loss (mean bilateral PTA: 38.2 dB HL).

[6] *Emma* is 78 years old, married and is living at home together with her husband. She has a moderate hearing loss (mean bilateral PTA: 56.3 dB HL).

What does it mean or feel like to be hearing impaired?

The consequences of hearing loss are perceived as a burden or disability by the majority of female interviewees. One main problem appears to be that hearing loss itself is invisible, i.e., (significant) others could not discern their impairment. Inge said she suffers from the fact that others have the impression she can hear and understand more than she admits although she repeatedly has to ask for repetition.

> *„When words are missing in one sentence or in a conversation, I can piece everything together on my own (…) and then others think 'she is able to hear more than she says'. They have a totally wrong idea and I do suffer from that." (Inge)*

Hearing loss is also considered as burdensome because significant others do not understand why participants are not able to understand better despite using hearing aids, hence there is a misconception of hearing disability and real features of hearing aids.

> *„My stepchildren always said: 'For God's sake, why do you wear hearing aids and are still not able to hear? Why not?' Then I answered: 'Because you either all talk to me at the same time, or whisper. Talk clearly and precisely, then, I will be able to follow what you say." (Mia [7])*

However, the previously implied invisibility of hearing loss was a chance for Adrian [8] to hide his hearing loss for (twenty!) years. The retired deputy of chief at an office of Chamber of Labor was aware of his hearing problem. Nonetheless, instead of using hearing aids which he perceived to bear a connotation of invalidity, he learnt to lip-read and adopted other strategies to get through the demands of his working life without colleagues noticing his hearing problems. He highlighted that his positive attitudes towards life helped him to master these challenging situations.

> *„Once you worked on hundreds of cases (note: at negotiations), everything somehow has a pattern or a scheme, and I worked intensively and effectively with this scheme." (Adrian)*

Being hearing impaired is also considered as strain in situations when the ability to hear is strongly relevant. Few participants mentioned in this context for example the need for functioning hearing for communication via phone in order to maintain social contacts or one's hobbies. Moreover, hearing loss was seen to lead to restricted participation, e.g., avoiding going to the theater because it is not pleasant anymore.

Being hearing impaired also requires strength and efforts in everyday life, causing mental fatigue which is characterized as a burden, according Elias [9].

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[7] *Mia* is 80 years old, widowed and is living in nursing home. She has a mild hearing loss (mean bilateral PTA: 38.8 dB HL).

[8] *Adrian* is 82 years old, married and is living at home together with his wife. He has a moderate to severe hearing loss (mean bilateral PTA: 58.1 dB HL).

[9] *Elias* is 73 years old, married and is living at home together with his wife. He has a severe hearing loss (mean bilateral PTA: 60.0 dB HL).

Although hearing difficulties influence the lives of these participants and although they sometimes perceive this condition as stressful, they emphasized their decision to accept it as it is instead of moaning or complaining about it. They are aware that hearing loss is irreversible and that they are not able to change this situation.

In summary, not every interviewee talked about their hearing problems as being burdensome. Interestingly, most of those who perceived hearing problems a stressful were older women who felt handicapped because of the consequences of hearing loss in their life.

In need of hearing aids

Once the interviewed elderly decided to visit an ENT doctor who recommended wearing hearing aids, most of them visited an audiologist for hearing aids soon. Almost all interviewees confirmed that there was a need of hearing aids because they could not manage their lives without them. All except for one decided to try hearing aids soon after the diagnosis. Emma could not understand why she could not hear well anymore and hoped that her normal hearing ability would return so that no devices would be necessary. She needed time to be convinced that she was hearing impaired and should use hearing aids. Finally, she took the step to try hearing aids and see what the benefits are (Emma). Another participant, Ruth[10], owns hearing aids, however, she does not wear them because they are uncomfortable. In her opinion, she is able to hear and understand well enough if the others talk loud enough.

Hearings aids were not recommended to all participants. Both Christine and Inge have a mild hearing loss. Their ENT doctors prescribed hearing aids but did not suggest to purchase them because they would not be beneficial for them. These two participants did react differently to the doctors' statements. Christine decided in favor of hearing aids because she had informed herself about hearing loss and felt she should start using hearing aids as early as possible in order to assimilate to these devices, although the ENT doctor did not really recommend it.

> *„I said: 'Okay, I will take the hearing aids now' because I heard that adjusting to hearing aids is difficult, so better get used to them sooner than later. The doctor confirmed that it would be easier to accustom to hearing aids when the hearing loss is not so severe yet and the accustoming would also be faster." (Christine)*

The other participant, Inge, followed the recommendation of her ENT doctors although she was frustrated because she perceived a severe hearing handicap.

> *„I said to him: 'I want a hearing aid so that I can better communicate with people.' Then he said: 'Well, I'll prescribe you hearing aids but don't allow others to persuade you.' And then I thought 'I will not allow them, I just would like to have hearing aids because with them I should be able to hear better'. He added: 'The devices cost a lot*

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[10] *Ruth* is 57 years old, married and a nursing home resident. She has a moderate hearing loss (mean bilateral PTA: 45.6 dB HL).

> *and don't help much, so don't be persuaded. Well, I thought: 'What should I do then?'" (Inge)*

Inge's son gathered information about other solutions or hearing devices so that she would be able to hear better and he finally found and brought her the Pocket-talker. She considers this device as great solace and has been using it ever since.

Usage of and experiences with hearing aids and assistive listening devices

Interviewees who own hearing aids use them regularly (except one female participant) because they rely on these devices even if using them is uncomfortable at times. The view dominated that using them only sporadically or seldom would not be beneficial. Within this scope, Adrian drew a parallel with wearing glasses:

> *„I always say, when somebody needs glasses in order to read, then s/he can't leave them at home or forget them because s/he would also not able to see, wouldn't s/he?!"*

Participants do not use their hearing aids during the night when they go to sleep. Some of them do not need them either when they watch television because they use other assistive listening devices which are produced specifically for consuming these media.

"Beloved and hated hearing aids", the devices are characterized by Barbara [11] whose hearing loss is severe, which is why she uses her hearing aids throughout the whole day. She knows that she is reliant on them. However, using these devices which amplify each and every sound can also be very stressful because of her sensitivity to noise. She and also many other participants regard them as helpful but they also make clear that hearing aids are not able to completely restore the hearing function to the level they were used to. Although dealing with and assimilating to hearing devices was exhausting for some participants because of the different sound quality and auditory sensation, it was clear for them that there was no way around it.

Receiving their first hearing aids was a memorable moment for male participants. They told me how euphoric they were and that they experienced a new quality of life and joy because they finally could hear and understand (again).

> *„When I used my first hearing aids, I walked down the street and stopped and I could hear the birds singing (…) You can't imagine what kind of feeling it was to be able to hear a bird singing again." (Albert [12])*

Hearing aids also made it possible to attend meetings or events and, e.g., to listen to music or to sing (again). In this context, two male interviewees recommended to test high-end or premium hearing aids and instead of the cheaper devices funded by health insurances because they did not have good experiences with basic hearing aids. They

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[11] *Barbara* is 60 years old, single and is living at home. She has a severe hearing loss (mean bilateral PTA: 63.8 dB HL)

[12] *Albert* is 88 years old, married and is living at home together with his wife. He has a severe hearing loss (mean bilateral PTA: 71.9 dB HL).

advised not to save on them because hearing aids with a good quality would have observable benefits. These are then associated with a good quality of life compared to those devices with acceptable quality which would lead to restricted participation and thus to isolation and reduced quality of life.

> *„This was a catastrophe (note: hearing aids paid by social insurance). I thought there has got to be something better. (…) As I said, at the beginning, I was happy but this happiness diminished quite soon. When somebody said something, I said 'yes' although I had not understood it, only had heard it distantly. I said to myself that this cannot be it (…), 'you cut yourself off, you marginalize yourself, you do not participate anymore, you simply walk away from the very issue." (Samuel)*

Hearing aids are worn frequently by both genders. However, only men strongly emphasized the quality of hearing aids as affecting quality of life deeply.

Perceived hearing problems and challenging hearing situations

During the interviews, a focus on difficulties in hearing and understanding in various situations, such as watching television, making phone calls, engaging in conversations in groups or crowds and restricted participation, was made. One strongly emerging aspect was that hearing is not the same as understanding.

Watching television. Participants who own a television reported that they have difficulties in following speech without using hearing aids. Hearing aids and assistive listening devices facilitate understanding speech but only if the talkers speak clearly, the lip movements are precise and there is no or only soft background noise / music.

> *„News presenters, I always understand them. However, in the movies there are passages where the people or actors only mumble." (Samuel)*

If Barbara has difficulties to understand the talkers acoustically when she is watching television she uses subtitles or closed captions.

> *„Watching TV is also a thing. If there is no background music, it is okay. Once there is music or something else, e.g., clapping or so in a Sitcom, that does not work. So, I use closed captions." (Barbara)*

Phone calls. Talking to others via phone is also considered as difficult, particularly without hearing aids. However, even when using these devices conversations over the phone would still be tricky especially when the communication partner talks inarticulately, softly, weakly or fast. Phone calls require a lot of concentration, which is why some participants do not like to make phone calls and rather let their significant others make them. Few interviewees added that it is possible to communicate via phone if the talkers speak loudly or the voices are familiar (e.g., family members, friends).

For Elias, it is burdensome that he is not able not make phone calls due to his hearing loss. Phone calls are essential for him in order to carry out his hobby where he constantly needs to clarify some issues.

> *„I have difficulties in talking via phone. It is my biggest problem, I would say, that I am not able to understand phone calls. From time to time, it works well, sometimes it works badly. It depends on how the counterpart talks. And that worries me most, that I am not able to make phone calls properly." (Elias)*

Hearing difficulties in crowds and groups. The majority of participants complained about difficulties in speech understanding in groups or crowds despite using hearing aids, particularly when (their significant) others talked at the same time, loud and / or fast. Some participants did not feel comfortable participating in groups because they could hear (their significant) others and see them talk but did not understand them. Moreover, these hearing situations sometimes caused misunderstandings.

Restricted (social) participation. Difficulties in hearing and speech understanding due to hearing loss prevent(ed) participants from going to church and / or from attending theater productions, presentations, courses (adult education) and concerts among others. Participating in these kinds of events does not make sense for them, as they would not be able to enjoy them (acoustically) even when using their hearing aids.

> *„Well, I decided I go to as few events as possible. I simply avoid them because I don't benefit from them at all." (Elias)*
>
> *„Back then, I liked to attend courses, e.g., a language course. I have not had the courage to attend courses anymore because I simply don't understand enough." (Emma)*

Listening to music. The sound of music was mentioned to be not the same anymore. Using hearing aids did not improve it either, hence a female and male participant decided not to listen to music anymore.

> *„[It bothers me] that I can't really hear music. When I listen to a CD, I know from the past it all sounds horrible in my ears. It does not sound the way I remember it. Going to a concert is not possible at all." (Barbara)*

On the street. Speech understanding out on the street is experienced as difficult because of the loud background noise. Moreover, Sonja[13] revealed having problems with sound localization on the street.

> *„When I am on the street and I hear a car, using my hearing aids I can't say which direction the sound comes from. So, I have to look. When somebody is calling me, I have to look where they are calling from! I have to take a 360 degrees look." (Sonja)*

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[13] *Sonja* is 80 years old, widowed and is living at home with her son and grandchildren. She has a profound hearing loss (mean bilateral PTA: 88.1 dB HL).

Doorbell. Hearing doorbells or hearing somebody knocking on the door was not possible for some participants even when using hearing aids.

> *„The doorbell, I also could not hear it." (Emma)*

Speech understanding and conversation is impeded when communication partners whisper, mumble, talk vaguely, unclear or sloppily (i.e., do not articulate words clearly or pronounce only half of the words), fast and soft. Not only background noise makes it difficult to understand. Speech understanding is equally challenging when communication partners do not talk directly to their face and instead speak from behind them or turn away from the hearing impaired.

> *„I could understand nothing anymore. I still have difficulty because they talk so sloppily (…). Not everybody but many. There are also adults, I realized it among my colleagues, they speak differently. Vowels disappear and then you can't understand anything anymore." (Samuel)*

> *„How the sounds come out plays a big role. When you hear if the language is clear or less clear. There is a big difference. And you realize it in particular when you are hearing impaired." (Christine)*

According to some participants hearing and communication difficulties embarrass them because they need to ask for repetition several times or they answer inadequately because they do not understand correctly what others say. Some are trying to make sense of an incompletely heard phrase by turning these into a phrase that seems to make sense to them in the context of the ongoing conversation. This is rather exhausting because high concentration is required especially when conversations take a long time.

> *„It is also difficult when I have a conversation which takes too long. I get tired because of paying attention. And then I am actually glad when the conversation is over." (Elias)*

Hearing and speech understanding may also depend on the daily condition or on the weather as described in Albert's quotation:

> *„From time to time I am able to hear well. I guess it is because of the weather (…), the same way you get a headache, this might also depend on the weather. Yes, it affects the ears sometimes." (Albert)*

Hearing is not the same as understanding. In the interviews, the majority of the participants emphasized that they are able to hear but not to understand. They wanted to make clear that their hearing aids are helpful and essential because they can amplify all sounds but they still experience difficulties in speech understanding (depending on the situation).

Various strategies to cope with hearing handicap

Hearing problems cause stressful situations; the participants use various coping strategies which can be characterized as adaptive and maladaptive coping strategies. Coping as a process, i.e., that some participants changed their coping behavior over time, was evident in some interviews.

Maladaptive coping strategies. The coping strategies mainly focus on communication problems caused by hearing problems. Main themes are passivity, resignation, withdrawal and avoidance when the participants cannot hear sounds or understand speech.

Almost all participants deal with difficulties in hearing and understanding in one or more maladaptive ways. On the one hand, they act passively by pretending to understand speech or by remaining silent because they do not want to ask for repetition again and again and to impose on communication partners by doing so.

> *„It is possible that I nod and I don't know at all what they are talking about." (Emma)*
>
> *„You are not able to understand everything and you can't ask for repetition all day. I feel ashamed and prefer to be silent." (Inge)*

Some participants told me that they got used to these situations in which they cannot understand everything. They resign themselves to their poor hearing. There were even a few who said that they realized it is not necessary to hear and understand everything because not everything is important for them to know.

> *„Sometimes it is quite alright not to be able to hear everything." (Adrian)*
>
> *„I ask for repetition or leave it. From time to time I think 'this was not really important anyway'." (Hannah [14])*

When participants can barely understand anything in groups because hearing aids amplify each and every sound the majority of participants leave the respective place.

Mia, for example, does not leave the group but she puts down the volume of her hearing aids or turns them off. She withdraws from the situation even if she is still present physically.

Some participants avoid going to events or try to attend as few as possible because they are not pleasant for them as they are not able to understand everything.

> *„Recently, I was on an event and it went quite well. I could understand the speaker on the microphone pretty well. But to be honest, I rather avoid events." (Barbara)*
>
> *„Sometimes there are events at the arts and leisure center in our town that I would like to attend but I also avoid them because I cannot enjoy them anymore and this makes me angry so I don't attend events at all." (Emma)*

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[14] *Hannah* is 75 years old, widowed and a nursing home resident. She has a moderate hearing loss (mean bilateral PTA: 48.8 dB HL).

Adaptive coping strategies. Participants adopted adaptive ways or skills to cope with difficulties in hearing and speech understanding: positioning, lip-reading, being active in terms of their needs, looking for information, ask for repetition or for writing down, acceptance. In this context, personal resources such as, e.g., optimism, humor are seen as facilitators in terms of adaptive coping with hearing problems among some participants. Participants try to position themselves close to the communication partner and to talk face-to-face so that they can hear and understand them better because sound and lips are directed to their face.

> *„In church I always take a seat in the first row because I have a clear view to the priest and I am able to lip-read." (Eva [15])*
>
> *„I need to look at people so that the sounds comes directly to me. Once they talk from aside it is considerably more difficult." (Christine)*

The face-to-face positioning is relevant as it enables lip-reading. Half of the participants reported that they automatically learnt to focus on lips and lip movements and emphasized that it is easier for them to lip-read once the communication partner talks and opens the mouth clearly. Barbara highlighted that she prefers to talk in a silent room without any background noises for a better understanding.

Another active or adaptive coping behavior is to ask for repetition or for writing down once participants cannot understand what was said.

> *„Talking a lot to each other is a little be difficult especially when people don't talk clearly. So I ask for repetition, for god's sake, if I did not understand something, or I ask for having it written down." (Samuel)*

They also ask the communication partner to talk clearly, loud and not too fast. Some of them do not have any problems or do not feel uncomfortable or embarrassed when asking for these things. Others perceive it as annoying, unpleasant or even boring.

> *„It can be really annoying but there is nothing we can do about it." (Tanja [16])*
>
> *„I say: 'Please talk louder because I don't hear everything'. I don't feel ashamed to ask." (Mia)*

The interview data showed that only women talked about how they feel when they need to ask for repetition when they do not understand their communication partners.

Few older adults revealed that they are clear on actively changing their situation influenced by hearing loss in order to be able to take part in social activities.

> *„When something is important to me I make it clear to these people and I don't have any problems with this. When something is not important, I don't mention it. This means it simply is not all that relevant for me." (Christine)*

The last quotation also indicates that being active in order to change a situation depends on the appraisal of the importance of the situation.

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[15] *Eva* is 91 years old, widowed and a nursing home resident. She has a severe hearing loss (mean bilateral PTA: 68.8 dB HL).

[16] *Tanja* is 84 years old, single and a nursing home resident. She has a mild hearing loss (mean bilateral PTA: 38.1 dB HL).

For few interviewees it is significant to look for information about hearing loss, hearing aids, communication strategies, or to keep themselves updated about technical improvements relating to hearing device techniques.

> *„I study everything which relates to 'hearing' (…). I have been interested in new things my entire life." (Adrian)*
>
> *„I once attended a course in which they explained what should be avoided and that some voices sound different because of the hearing aids, they have a different sound." (Barbara)*

During analyzing the interviews, acceptance of hearing problems as well as hearing aids and hearing loss as stigma became evident. The majority of female participants reported that they accept their hearing situation and using hearing aids and that they learnt how to cope with the consequences of this auditory impairment because they know that it is irreversible.

> *„One needs to live with it (note: hearing loss), there is no way around it. I need to learn to cope with it. There is no point in making a big fuss about it and do god knows what about it. What would that help?" (Tanja)*

Experiences of hearing loss among family members on the one hand, and significant others convincing participants about their hearing problems on the other hand, made it easier for them to accept their hearing problems.

> *„My father is hearing impaired. At the age of 60, he took early retirement because of his hearing loss (…). And this is why I already know what hearing loss is like (…). I could accept it easier because I knew what it would be like (…) and I don't have any big problems like others seem to have (…). I was not really shocked, nothing. It is the way it is." (Christine)*

Participants also accept hearing aids and are glad about them because they are aware of their benefits and that they would not be able to master their daily life without them.

> *„No, my god, I have hearing aids and I can live with that. On the upside, I can hear better with them. I need to accept all of this like glasses or any other device when you need it. We should be glad that these things exist." (Mia)*

The acceptance of hearing aids is also associated with appropriate counseling provided by audiologists. Some participants reported about the relevance of feeling to be in good hands with an empathetic audiologist. It is important for them to feel that audiologists try their best in order to provide appropriate, bespoke solutions (e.g., offering the possibility to try different types of hearing aids or different programs, making clear that a visit is possible whenever necessary, letting one know about the actual improvements hearing aids can provide, and telling the truth about the necessary time for assimilation to hearing aids).

The visibility of hearing aids does not bother some female interviewees, which is why they have no intention to hide them. Barbara even has hope that others will see her wearing hearing aids and hence change their communication behavior towards her.

> *„I honestly need to say, it does not bother me when they are visible. No. Because I think when people can see that I wear hearing aids maybe they rather make an effort. Well, I don't do it, I don't hide them." (Barbara)*

Hearing aids are barely considered as annoying devices because many participants appear not to be vain.

It came to light that a few participants have the impression that the perspective of society on hearing loss might have positively changed due to various respective promotions.

> *„There are more promotions from companies, Hansaton and the like and from famous older people and it seems to me that hearing loss is considered somehow as more normal than back then." (Christine)*

In Emma's mind, a lot has also been done for people with disabilities, i.e., they are more visible compared to back then and are more naturally seen as part of the society.

In terms of acceptance or non-acceptance of hearing loss and hearing aids there could not be detected any gender differences.

Coping as a process. Coping behavior of several participants has changed over the individuals' lifetime; beneficial but also poor progresses could be observed.

In the interviews of Elias and Tanja, the visibility of hearing aids was strongly related to their stigmatic character. Because of their vanity, some participants did not want to accept hearing aids at first. However, they learnt to accept them, especially when they realized that they needed these devices for a better hearing and understanding. Thus, they do not have any problems with the visibility of the hearing aids anymore. Their behavior has changed from denial to acceptance of hearing aids.

Emma could not cope with her hearing loss at the beginning because she was not able to accept the fact that she could not hear well anymore and that this condition could only be treated with hearing aids. She had to struggle with this situation and needed time to accept it. Her behavior changed from denial to acceptance of hearing loss and hearing aids.

> *„It took me one whole year until I told myself that I need hearing aids. I realized that there was no way around it and that I have to come to terms with it. (…) I could not accept that I suddenly was not able to hear anymore because I could hear everything well all along." (Emma)*

Another female interviewee, Barbara, changed her coping behavior from frustration to acceptance but in a maladaptive way. She could not stand (significant) others turning away from her while they were speaking although they knew how to talk effectively to her. Gradually, she accepted that the others do not always behave as needed and do not pay attention to use required communication strategies anymore. She resigned from asking for adequate communication behavior toward her as she realized they would not change their behavior.

Adrian revealed that he could not accept hearing aids during the last twenty years of his worklife. He never mentioned his hearing loss and never wore any hearing aids because he felt certain that he would not have been given the career opportunities he enjoyed. He assumed that society or his colleagues would not be able to deal with this situation.

> *„I would not have achieved all these positions if I had admitted that my hearing was poor. You can believe me, it would have been impossible. I knew beforehand that this is a problem (note: hearing loss) but we were able to manage it." (Adrian)*

Upon retiring, he accepted his hearing loss by deciding to compensate it with hearing aids as his elaborated communication and coping strategies did not work any longer. This example shows that hearing loss was not accepted due to (assumed) stigma or the fear that society would regard somebody with hearing loss as a 'malfunctioning' member of society and thus as not entitled to or not capable of pursuing specific career paths.

Satisfaction, Optimism and Humor. Others mentioned personal factors such as generally being satisfied, optimistic, humorous and / or having positive attitudes towards life that facilitate coping with consequences of hearing loss.

> *„If you are generally satisfied then everything works out. That is true." (Tanja)*
>
> *„When I am at the hairdresser and take off my hearing aids I always say: 'Now you can start bitching but once I use them again it's over." (Mia)*

Social support and its influence on hearing impaired individuals

Interviewees framed their experiences of social support in ambivalent ways. They referred to positive as well as negative experiences; some also mentioned providing social support to peers.

Poor or negative social support. Participants reported that (significant) others either do not attempt to talk loudly and clearly or they initially make an effort and then return rather fast to their usual pattern of communication, preventing speech understanding to a great extent.

> *„They say it once and they think he might remember it, I say or I hope it at least. But they eventually fall back into their old pattern." (Samuel)*

In this context, the perceived misconception about hearing and understanding with hearing aids among significant others (e.g., siblings, children, other home residents, colleagues) was revealed by some female participants. According to them, their significant others could not conceive why hearing impaired could not understand better despite using hearing aids.

> *„The women, they all mumble. I tell them they should talk normally so that I can follow but if they all whisper I can't follow. Then they look at me and wonder: 'Why do you not hear, although you have hearing aids'?" (Mia)*
>
> *„My sister, she hears well. She is two years older than me but she can't comprehend. She complains and simply doesn't get it. This is all part of this affliction." (Inge)*

In one case, the participant's spouse decided from time to time whether she needed to understand something or not when she asked him for repetition.

> *„When my husband and I go to church it happens that he says: 'Well, it does not matter, it is not so important that you understand everything." (Emma)*

The qualitative data about negative social support highlights that predominately older women talked about the negative behavior of their significant others due to misconception of hearing loss and hearing aids.

Positive social support. Participants also talked about situations where they perceived emotional or social support. In these cases, their significant others were aware of the kind of communication strategies that help the hearing impaired to have a successful conversation or effective communication.

If the participants do not react or give an answer, attentive (significant) others (instantly) realize that they should talk in a specific way so that the hearing impaired are able to understand them.

> *„Actually, it worked for the most part, yes, because I always asked for repetition and this is why they knew that they have to talk louder." (Barbara)*

Family members do not only support the persons concerned by using effective communication strategies but also by engaging in facilitating their everyday life. Inge reported that she receives social support from her son, who made great efforts so that she was able to hear and understand better. It was him who informed her about other options than hearing aids because the ENT doctors had not recommended her these devices.

Spouses particularly supported their hearing impaired partners by, e.g., taking over phone calls, putting the hearing aids into the ears or turning up and down the volume depending on the situation and rooms they were in.

> *„Putting on the hearing aids is still a little bit difficult, until I get the feeling for it. At the moment my wife still does it (…). In the event hall, I can soften the noise (…). My wife can do that. Once I tell her she presses the button (note: volume control) to put down the volume and when we leave the hall she does the same to turn up the volume." (Albert)*

The case example of Adrian, the male participant hiding his hearing loss over many years, is interesting in terms of social support. In the interview, he admitted that coping with intentionally untreated hearing loss was only possible because he received social support from his spouse and secretaries. His wife also supported him after retirement when he decided to use hearing aids and she still does. Sometimes other family members like his grandchildren help him by reminding him of using hearing aids when he forgets to wear them.

> *„Without my secretaries I would not have managed all this (note: cope with hearing loss in working life) (…) You can imagine, without my good wife it would not have been possible (…), she wrote notes at home (…), she took over the phone calls." (Adrian)*

In another case, a family member of Sonja drew significant others' attention to the use of effective communication strategies so Sonja would be enabled to understand better.

> *„Harald said once to Anika who mumbled a little bit: Listen, you know that mum can't hear well, so talk to her while looking at her. Don't say something behind her and don't mumble." (Sonja)*

Peer to Peer. Due to their positive experiences mainly males mentioned that they offer support to peers by informing them about hearing loss, the advantages and also real prospects of using hearing aids, by advising them to try out various hearing aids with good quality as well as by accompanying them to the audiologist's place. They also make clear that hearing aids are helpful devices which, however, do not restore hearing function entirely, and that one needs to learn to deal with hearing aids.

> *„Due to her poor hearing I told her: 'Go and try hearing aids' (…) and I tell them the advantages because I am glad I have them because I would not be able to go on the street otherwise." (Mia)*

Quality of Life

Participants spoke about feelings and other experiences in various hearing situations which can be assigned to psychological and life satisfaction.

Psychological Mood. Losing hearing function and the consequences of hearing loss can lower one's psychological mood because of, e.g., missing the normal hearing ability, not being able to understand speech in groups or feeling embarrassed to ask for repetition.

> *„It is weird that you can't understand it anymore. I miss it but I have to come to terms with it, I guess." (Tanja)*
>
> *„You feel embarrassed and then you prefer to be silent (note: instead of asking for repetition) and I think, well, I am glad if you (note: communication partner) leave again." (Inge)*

Inge also expressed ambivalent feelings that she has to struggle with. On the one hand, she is happy that somebody keeps her company but on the other hand, she is always glad when her communication partner leaves soon because it is difficult to follow them. Other female participants reported that they cannot enjoy events anymore because of the limited hearing functions and that they feel anger or frustration.

> *„It makes me angry then. If there is, e.g., a fun theater play and everybody laughs and the punch line would be really funny but I don't know what it is all about. And I don't like this, so I avoid it." (Emma)*

It is also frustrating and disappointing for a few female participants that (their significant) others cannot see their hearing loss and behave as if they could hear and understand.

Mainly male participants reported that they experience an enhanced psychological quality of life (euphoria, positive feeling) because of their hearing aids which enable them to hear sounds that they could not hear before as, e.g., birds singing. Another aspect is that they feel the wish to be socially active, also because of the great support from their spouses.

> *„I am lucky that I have a good wife who helps me. I have difficulties in making phone calls." (Elias)*

Summarized, women commented rather on negative impacts on psychological quality of life due to hearing loss while men talked about positive (sonic) experiences with and of wearing hearing aids.

Life satisfaction. The majority of participants is satisfied with their life because they still can get up every morning, perform some activities despite their (old) age, or because they use hearing aids which help them to hear and understand fairly or better.

> *„Yes, yes, well I am satisfied, since I have started to wear hearing aids." (Eva)*
>
> *„I am insofar satisfied that I can hear tolerably but not well I would say. (…) I simply need to be satisfied with what I have, with what works somewhat, okay. And what does not work I need to avoid." (Elias)*

DISCUSSION

Hearing loss as a public health issue is a common chronic condition among adults with an age of 55 years or older and its prevalence increases with age. It impedes the ability to hear sounds and in particular hampers speech understanding, thus interferes communication with others. Consequently, it limits elderly's participation as well as social role and can result among other things in, e.g., isolation, loneliness and depression. In light of these correlates, I asked myself how concerned or aware the elderly are about the consequences of hearing loss and their feelings in this context. Additionally, I wanted to know how they assess their quality of life and what kind of coping strategies they use in order to master their lives should they be impeded by hearing loss. I was also interested in observing if these strategies or social resources like social support had an influence on quality of life. With the aid of mixed methods, I gathered on the one hand quantitative data about hearing loss, self-rated hearing problems, various coping strategies, perceived social support and quality of life. On the other hand, I received information about experiences with living with hearing loss and its consequences by performing qualitative interviews in which elderly described in their own words how they see and perceive their life with their hearing impairment. The qualitative findings serve as subordinate but valuable information which helps to underscore, complement or contradict the quantitative findings.

In this final chapter, central findings of this study are presented and discussed. This step allows me to delineate the value of this dissertation and the novel findings which will hopefully contribute to our knowledge base. Subsequently, I reflect critically the methods of this study and complete this chapter with suggestions for further research.

CENTRAL FINDINGS OF THIS STUDY

At the beginning, findings about hearing-related information (duration of being aware of hearing loss, its detection and treatment) are presented, followed by a prominent discussion of qualitative and quantitative findings related to perceived hearing handicap, ways of coping, perceived social support and self-assessed quality of life.

Audiological and other hearing-related Data

Though statistically not significant, hearing loss defined by the pure-tone averages across four frequencies was slightly poorer among male participants compared to females. They were significantly younger at the time of the diagnosis than women. The onset of age-related hearing loss among these older men hence occurred earlier, and these results are in line with results of other studies [2, 33, 53, 190]. The earlier onset may probably be due to, e.g., working conditions with noise exposure at (the) former job(s), smoking, atherosclerosis or other potential risk factors [191] such as use of ototoxic medication, family history (genetic component) and industrial chemicals [192].

Despite the earlier onset of hearing loss, older men in the hearing impaired sample waited significantly more years to purchase their first hearing aids after receiving the diagnosis than did women. Hence, they also might have been aware of their hearing loss for any length of time before they received the diagnosis. This assumption is based on the qualitative results which bring out the path towards recognizing accepting hearing loss. Participants recognized their gradually increasing hearing loss but did not intervene by visiting the doctor for clarification since they felt they still could hear as well as understand sufficiently well and managed to pretend that everything was fine.

Their visit to the ENT doctor happened at a time when their hearing loss became much worse, or when their spouses or family members made them aware of their hearing loss. Other reasons for the slow process of acknowledgment were on the one hand their becoming accustomed to hearing and understanding sufficiently well or on the other hand a perceived and feared stigma (e.g., visibility of hearing aids, feeling that society would not see the hearing impaired as a normal person). Explanations for the (long) period between perceiving hearing problems and having the ears checked by an ENT doctor may be identical with the reasons for waiting a (long) time span to purchase hearing aids after the professional diagnosis. These findings are also consistent with those from other studies [153, 193, 194].

According to Kochkin [193], non-adopters with the intent to purchase hearing aids have been aware of their hearing loss for on average ten years whereas older adults in the quantitative part of this current study have known about their diagnosed hearing loss for on average four years. In Fischer et al [194] the 5-year and 10-year incidence of hearing aid acquisition was low (14% and 36% respectively). The most important factor that increases the probability of purchasing hearing aids could be insurance coverage for hearing aids [193]. In Austria, persons with hearing loss are eligible to receive basic hearing aids and for a binaural hearing aid fitting Austrian social insurances will pay 1.426,50 EUR [195]. In other countries, as in the United States, older patients need to pay the total amount of their hearing aids out of their own pocket, with the exception of veterans who are eligible if the hearing loss interferes with delivery of quality health care. This regulation differs between states; in New Hampshire, Rhode Island and Arkansas a portion of the cost of hearing aids is covered for adults [196]. The coverage enjoyed by Austrians with hearing loss might explain why the Austrian hearing impaired elderly decide to take action earlier and why in this sample 80.6% own hearing aids compared to elderly from other countries as, e.g., United States [193], where 40% of people with moderate-severe hearing loss have hearing aids compared to 9% of people with mild hearing loss.

Within this scope, I would like to discuss two significant cases from the qualitative interviews. Two older women received their diagnosis of a mild hearing loss including the recommendation that purchasing hearing aids would not be necessary as they are not beneficial. The first woman nevertheless decided to purchase hearing aids because she had information about hearing loss and hearing aids and was aware of what would work best for her. The other woman followed the suggestion and did not buy hearing aids although she wanted to use them since she perceived severe hearing problems. Tesch-Römer [4] and Fischer et al [194] investigated factors leading to the purchase of hearing aids and stated that severity of hearing loss but also self-rated hearing problems as well as self-perception of hearing quality are predictors of hearing aid use. These two demonstrated cases emphasize on the one hand the role of health literacy and on the other hand the significance of using subjective and objective measures of hearing loss. High health literacy supports making own decisions even if they are contrary to the recommendation of the (hearing) health professionals whereas low health literacy may lead to dissatisfaction and disappointment since the patients believe that there is no solution for their perceived severe hearing problem. In agreement with other studies [65, 66, 138], the findings from the latter case underline that audiologic measures, thus objective measures, do not provide a sufficient basis to determine individual's perceived hearing problems and to prescribe hearing aids. Therefore, an appropriate education of hearing health care providers (e.g., ENT doctors, audiologists) about the value of hearing assessments using subjective and objective measures is an important goal to pursue. An effective screening protocol would meet the psychosocial needs of the patients, facilitate the uptake of as well as the adherence to intervention services and finally improve the quality of care as well as patients' quality of life [15].

Hearing Handicap

In the quantitative survey, hearing impaired elderly mostly reported social consequences such as difficulty with hearing when someone speaks in a whisper, when listening to TV or radio, when attending a party, using the phone and attending religious services (resulting in attending less often than they would like). The feeling of being handicapped due to hearing loss was the most reported emotional consequence of hearing loss. These findings are congruent to those from other studies [4, 25, 55, 147] and to those gathered from the qualitative interviews. Almost all interviewees additionally spoke about severe problems in communicating in groups because of the difficulties in speech understanding. This limited intelligibility in noisy environments was the most reported hearing disability in Hallberg, Hallberg & Kramer [137].

Not being able to follow conversations in groups can lead to feelings like frustration and embarrassment especially when hearing impaired participants, particularly women, cannot participate in social activities as they would like to. This finding is consistent with the study of Bennion & Forshaw [25]. They rather prefer to have face-to-face conversations with one person, which is contrary to the findings of Bennion & Forshaw [25] who stated that their participants did not want to participate in one-to-one conversations and did spend their time at home most of their time. Talking face-to-face with one person may facilitate speech understanding since hearing impaired people may concentrate solely on the communication partner, see as well as follow his/her lip movements and the sounds can be directed towards them or to their ears. In these situations, it might also be easier to ask the communication partner to speak loudly and clearly.

In the context of communication, the interviewees made it very clear that hearing does not equal understanding. It was important to them to explain that they can hear sounds and the people talking. They can also see them talking but they have difficulties in speech understanding, i.e., they have trouble to understand and follow the conversations even with hearing aids. Huang & Tang [6] explained why elderly with age-related hearing loss experience difficulties in speech understanding. A loss within the frequencies 2 to 4 kHz affects the understanding of voiceless consonants (t, p, k, f, s, and ch) and of the vowels. Hearing aids have the ability to facilitate a hearing situation and to enhance speech understanding to some extent, thus improve the ability to communicate. However, the authors state that these devices do not restore hearing to the used normal level [6].

In many studies the focus is on communication difficulties in speech understanding which have effects on emotional and social levels (e.g., Gopinath et al [147]; Chia et al [138]; Dalton et al [34]; Morgan, Hickson & Worrall [55]). These findings are not surprising since these authors used the Hearing Handicap Inventory for the Elderly which concentrates on perception of emotional and social consequences of hearing loss. However, in accordance with Andersson & Hägnebö [155], hearing difficulties do also refer to limited feelings of safety. In the qualitative interviews, some elderly reported that they could not hear doorbells despite wearing hearing aids. This issue necessitates a follow up question namely: If they cannot hear doorbells, are they able to hear alerting signals, e.g., fire alarms, or car horns honking?

Another noteworthy aspect to mention is safety on the street. As came out clearly, sounds cannot be localized on the street, a problem also identified by Hallberg, Hallberg & Kramer [137]. This aspect of safety is insofar relevant because hearing impaired elderly are not able to localize sounds like, e.g., bells of a bicycle, beeping of a truck, approaching cars which are very silent (especially hybrids) these days in comparison with a few years or decades ago. These issues might be amplified by the elderly's stooped posture (head facing to the floor), impaired mobility and visual faculty as well as overall difficulties to react timely. Thus, it is not surprising that these situations can lead to frightening experiences and to fear of entering public space. In agreement with Andersson & Hägnebö [155], these difficulties are to be considered as good reasons to feel anxious, however, these aspects are barely addressed in research studies.

One defined hypothesis of this study was the assumption of gender differences in terms of perceived hearing problems. In this context, the investigations on gender are controversial [137, 141]. On the one hand, there is little comparative literature dealing with this matter and on the other hand, the existing findings do not provide a valid pattern because of the use of different measures. In the present study, no significant gender differences in terms of hearing handicap emerged.

However, it is noteworthy that despite comparable mean hearing levels, older female participants perceived their hearing handicap to be worse than did the males. Nonetheless, this shows that the perception of hearing problems differs slightly between these women and men and cannot be attributed to severity of hearing loss. Interestingly, the qualitative study results indicate in turn that women rather focus on emotional feelings as frustration and anger than do men although both reported similarly frequent social consequences. Comparing my findings to Dittmar's [141] whose results show in general a more severe hearing handicap among male participants, the spectrum of results on this matter is evident confirming once more the inconsistent pattern of perceived hearing handicap among older women and men.

Looking at the severity of hearing loss, it is not surprising that the perceived severity of hearing handicap increases with the severity of hearing loss. The differences between the three hearing impaired subgroups (mild, moderate and severe to profound hearing loss) were significant with the exception of difference between mild and moderate hearing loss (no significant effect of covariates could be accounted for).

Strikingly, almost one third of the hearing impaired participants, mainly with a mild and moderate hearing loss, did not perceive hearing problems. Thus, they might have been reluctant or unwilling to acknowledge the consequences in everyday life [137].

As noted above, this discrepancy between objectively measured hearing loss and subjectively assessed hearing handicap is also evident when considering the results of the correlation analysis. In this study, a significant positive relationship between functional hearing loss and perceived hearing handicap with a medium effect size was identified, i.e., the more severe the hearing loss is, the more severe the hearing problems on emotional and social levels are perceived. This finding indicates both the relationship but also the discrepancy between these two variables as is also reported in other studies (e.g., Dalton et al [34]; Chia et al [138]; Wong & Cheng [140]; Morgan, Hickson & Worrall [55]). It also underscores the importance of measuring impairment and handicap to gain insight into how a given hearing impairment affects daily life.

To the best of my knowledge, this is the first study in which a correlation analysis was conducted gender-specifically. The findings show a stronger and a statistically significant as well as positive relationship between functional hearing loss and hearing handicap among male participants but not among females. An explanation for the evident discrepancy among women would be that they rated their hearing problems poorer although their hearing ability was slightly better compared to men. In this case, older men assessing their hearing problems probably more exactly in correspondence with their hearing loss may be due to differences in the social support situation which was evident in the qualitative interviews. The male interviewees felt more socially supported than women; this could mean that more social support makes hearing impaired individuals less aware of their hearing loss as the hearing problems are perceived as not as severe.

Another research aim of this study was to determine if hearing loss is a significant predictor of hearing handicap. Hearing loss accounted for 11.5% of the variance in perceived hearing handicap and is hence a significant predictor of perceived hearing problems in daily life. This association remains significant after controlling for confounding variables Age, Gender, Multi-Morbidity and Educational Status; similar results are reported in Wong & Cheng [140] and Morgan, Hickson & Worrall [55].

These findings emphasize once more the significance of considering the self-assessed consequences of hearing loss in everyday life in addition to functional hearing loss in the course of hearing aid fitting. As stated in Weinstein & Ventry [65], hearing impairment is only one facet of hearing handicap which is a complex phenomenon and differs from individual to individual. It is evident that findings from audiologic measures are not sufficient to estimate hearing handicap. Therefore, it is necessary and beneficial to have hearing impaired patients describe their perceived hearing problems in order to offer an adequate rehabilitative management [65], [66].

Coping Strategies

In terms of the use of coping strategies, I postulated the assumptions that there are differences between older adults with and without hearing loss (mild, moderate and severe to profound hearing loss) and between both genders within the hearing loss group. Additionally, during the qualitative interviews participants were asked how they master situations specifically affected by hearing problems.

First, no significant gender differences within the group of hearing impaired female and male participants could be identified in the quantitative data. Within the hearing impaired group the mean scores did not vary significantly either. Comparing participants with age-related hearing loss to those with normal hearing function, one significant difference (after controlling for covariates) could be detected. The hearing impaired elderly used more intensively the coping strategy Resistance. However, this difference did not remain significant after controlling for covariates.

The coping strategy Seek Social Support was the least intensively used adaptive strategy among hearing impaired participants. In the review article of Knudsen et al [197] primary factors influencing help-seeking behaviors of elderly with untreated hearing loss were described, such as age of onset of hearing loss, self-reported hearing difficulties, hearing sensitivity, source of motivation, coping style, personality factors, acceptance of hearing loss, family attitudes and stress. For a better understanding of these behaviors among elderly with age-related hearing loss further research exploring the influence factors of support-seeking is required. Within this scope, Saunders, Chilson & Wallhagen [198] recommend to examine complex help-seeking behavior within the framework of a multifactorial model (e.g., Health Belief Model, Transtheoretical Stages of Change Model).

Qualitative findings of the current study suggest that hearing impaired elderly use different kind of coping strategies, adaptive and maladaptive ones. These ways of coping were mostly related to communication as reported in Hallberg, Hallberg & Kramer [137] who observed a more frequent use of verbal strategies, thus adaptive strategies.

In the interviews, older adults with age-related hearing loss explained that they either acted passively, with resignation or withdraw from, e.g., conversations, or avoid situations in which hearing ability is required once they cannot hear sounds or understand speech. However, they also adopted adaptive ways to cope with difficulties in hearing and speech understanding such as being active in terms of their needs, positioning themselves next to the communication partner, asking for repetition or for writing down and looking for relevant information about hearing aids, hearing loss, etc. The qualitative findings confirm quantitative findings that more elderly try to cope in an adaptive and active way to enhance the hearing and communication situation although they also use maladaptive coping behavior. However, it is noteworthy that the latter strategies are not necessarily seen as maladaptive ones by the older adults (consistent with Bennion & Forshaw [25]; Gomez & Madey [160]). The choice of coping strategies might depend on their mood, condition and / or appraisal of the momentous situations, e.g., they do not need to hear everything and / or pretend to hear. According to Gomez & Madey [160], the use of coping strategies also depends on the perception whether these strategies are effective.

The nonspecific pattern in terms of the use of coping behavior or the wide variety of coping strategies to deal with hearing loss is also suggested in Tesch-Römer [4] and Bennion & Forshaw [25]. In agreement with Bennion & Forshaw, there appears to be no set method of coping with hearing loss. Older adults try to maintain living their lives in the same way they did prior to their hearing loss by using ways of coping considered as appropriate. In this context, "*the process of adjusting to a hearing loss requires that the individual learns to make cognitive as well as behavioural and attitudinal changes to minimize hearing-related problems*" [137].

In some qualitative interviews, a change of coping behavior over time could be observed, e.g., the previous avoidance of hearing loss or hearing aids because of perceived stigma (visibility, vanity, perception of disability by society) changed into acceptance due the positive experiences with hearing aids because of their ability to enhance hearing-related situations or communication. This finding emphasizes the process of coping, i.e., behavior can gradually change over time. It was not possible to identify this procedural character of coping in the current quantitative data; it is, however, accounted for by the cross-sectional quantitative design in Andersson & Willibrand [110].

The theme ‘acceptance’ of hearing loss and hearing aids was a further subject of discussion in the qualitative interviews. Some interviewed older men and women had no difficulties to accept their hearing loss and hearing aids because they were aware of the fact that their severity of hearing loss necessitated a treatment. However, there were elderly who needed time to accept the hearing situation and to realize the need of hearing aids. Thus, the acceptance of hearing loss as well as hearing aids is more successful once the older adults recognized their hearing loss on their own or their spouses made them aware of their hearing loss. A slow and gradual process of acceptance was also observed in the study of Wänström et al [152] who brought forward that self-reported hearing disability, its severity and the comments of significant others on perceived increasing hearing difficulties or their own positive experiences with hearing aids are important factors for this process.

In this present study, the initial non-acceptance of hearing aids was associated with stigma among few older interviewees as was also reported in other studies [25, 153]. This can be explained insofar that hearing aids draw attention to the individual’s discredited identity [25, 199]. However, after some time, when they realized the need and benefits of hearing aids, these interviewed elderly had no problems with the visibility of hearing aids. The theme ‘stigma’ was addressed rarely; most of the interviewees did not perceive hearing aids or hearing loss as stigmatizing. In contrast, hope was expressed that others would change their communication behavior towards the hearing impaired persons once they see their hearing aids. Wallhagen [153] emphasized in her study the potential influence of media and advertisements displaying hearing loss and hearing aids as stigmatizing on the one hand and the perception of being disabled in the society on the other hand. Wallhagen’s findings are not entirely in line with the current study results because a few interviewed older adults have the impression that the perspective of society on hearing loss or hearing aids might have positively changed due to various respective promotions in the last years. Moreover, a lot has been done for people with disabilities in Austria, they are more visible in society compared to a few decades ago and are more naturally seen as part of society.

Social Support

Overall, participants with and without hearing loss, female and male, perceived high social support from their family members, significant others, friends, colleagues etc. Thus, the findings did not confirm the assumption that there would be differences in terms of the severity of hearing loss and gender. High social support leading to hearing aid satisfaction was identified in Singh & Pichora-Fuller [200] and Lockey, Jennings & Shaw [161].

Normally, this perceived social resource would not be rated as high as in this age group according to the creator of the questionnaire F-SozU-14 [173]. The assumption is that the socio-demography of the participants – most of them did not live alone at the time of the survey – can be considered as a possible reason for the highly rated perceived social support.

Due to the reduced comparative literature concerning social support among hearing impaired elderly, the quantitative findings cannot be discussed with other works. Instead, it can be complemented with qualitative findings.

Surprisingly, negative social support was evident in addition to positive social support. To the best of my knowledge, there are no studies in the audiological field dealing with negative social support, so this is a novel aspect of this study. Some interviewed older adults experience negative social support when their significant others react unfavorably when the hearing impaired persons cannot hear or understand despite using hearing aids on the one hand. On the other hand, negative social support is further evident when communication partners maintain their usual pattern of communication which prevents speech understanding although they know how they should speak in order to facilitate communication for the persons concerned. This behavior of individuals with normal hearing function may occur due to the misconception of hearing loss and real features and limitations of hearing aids. Thus, elderly with hearing loss do not experience understanding from others or efforts in communication behavior for them to be able to take part in successful communication. When an older female interviewee went to church with her husband once and could not understand everything she asked her husband for repetition. His answer was that she did not need to hear everything. She had the impression that he wanted to support her by saying that not everything needs to be heard or understood. However, this issue is not interpreted as a positive social support because this situation shows that he reduces her maturity and autonomy by taking over the decision regarding what she needs to hear or not. This could lead to discouragement and dependency.

Most participants perceived positive social support which helps them to cope with situations influenced by their hearing loss. Mainly family members take over phone calls, use effective and helpful communication strategies, support in hearing-related situations, make others aware of how they should speak to the hearing impaired persons or what the persons concerned need in order to facilitate hearing and speech understanding.

It was further evident that positive experiences with hearing aids are motivators for some hearing impaired participants for supporting others who are struggling with hearing loss and hearing aids in order to make them aware of the benefits of hearing aids or to help them gain satisfaction with hearing aids. The findings in terms of providing social support are in the line with Lockey, Jennings & Shaw [161].

Quality of Life

Elderly with age-related hearing loss had their poorest score on social quality of life compared to the other domains, physical, psychological, environmental and global. This finding is contrary to Ribeiro-Teixeira [129] who identified the highest score on social quality of life. However, the lower rated social quality of life in this current study is not surprising since distance to social life is common in this age group. Moreover, consequence of hearing loss can lead to restricted participation as reported in qualitative interviews. Thus, this might lead to limited social functioning and this would reflect the reported hearing difficulties on the social level. This conclusion is in contrast with the findings of Morgan, Hickson & Worrall [55] who did not detect limited social functioning among their participants with age-related hearing loss.

Before conducting the study, the assumption was that differences in self-reported quality of life between elderly with and without hearing loss and between men and women would be identified.

By comparing quality of life between the hearing impaired group and the normal hearing comparison group a significant lower quality of life in the physical, environmental and global domain could be found among elderly with age-related hearing loss. After controlling for the effects of the covariates Age, Multi-Morbidity and Educational Status the results of group comparisons did not remain significant. The same change of significance level by considering confounding variables could also be observed in group comparisons by the severity of hearing loss (no, mild, moderate and severe hearing loss). Empirically, no significantly lower quality of life of hearing impaired participants compared to normal hearing participants could be demonstrated and these findings do match those from Ribeiro Teixera [129] but not from Morgan, Hickson & Worrall [55] and Dalton et al [34]. According to Morgan, Hickson & Worrall [55] there may be factors such as age or comorbid diseases which may have a more significant effect on quality of life than hearing impairment. In the current sample the hearing impaired elderly were significantly older (as in Morgan, Hickson & Worral [55] and Gopinath et al [54]) and had significantly more additional diseases compared to the normal hearing elderly in the comparison group. This study found that multi-morbidity was a larger contributing factor to perceived reduced quality of life. Morgan, Hickson & Worrall (2002) highlighted in their study that generic quality of life measures might not be sufficiently sensitive enough to appraise the hearing impaired persons' perception of consequences of hearing loss in social / situational and emotional quality of life domains. In this context, disease-specific quality of life instruments have the capacity to assess adverse psychosocial effects caused by hearing loss. Nonetheless, they recommend to use both type of measurements.

I previously assumed gender differences between older hearing impaired female and male participants. This study shows lower quality of life in all domains among women. Significant differences could be found for psychological quality of life also after controlling for covariates Age and Multi-Morbidity. Poorer psychological well-being among female participants compared to males could also be observed in Hallberg, Hallberg & Kramer [137]. The quantitative results on gender related to psychological quality of life are also reflected in the qualitative findings. In the interviews, solely women complained that being hearing impaired could be annoying, frustrating as well as embarrassing and that hearing difficulties could lead to other feelings like anger, whereas older men rather talked about positive experiences with good quality hearing aids, i.e., enhanced sound quality and auditory sensation, which improved their quality of life.

Predictors of Quality of Life

The investigation of significant predictors of physical, psychological, social, environmental and global quality of life among elderly with and without age-related hearing loss was the last defined research aim for this study.

It is noteworthy that the results of the hierarchical multiple regression analyses could only be interpreted with caution since audiological research studies investigating the influence of predictive variables on physical, social, environmental and global quality of life barely exist.

In this regard, the triangulation with the findings of the qualitative interviews offered additional views on interpretation of the quantitative findings with respect to the hearing impaired participants, confirming as well as complementing the quantitative results.

The confounding variables Age, Educational Status, Marital Status and Gender did not have any influence on quality of life domains among participants with and without age-related hearing loss. Multi-Morbidity made a unique contribution to explaining variance in quality of life, i.e., the physical, psychological, environmental and global quality of life was lower the more diseases the hearing impaired older adults suffered from. In this sample, Multi-Morbidity was the single predictor variable which contributed significantly to explaining the variance in the criterion variable Global Quality of Life. Among the normal hearing participants, the variable Multi-Morbidity was the single and strong predictor of physical, environmental and global quality of life.

Interestingly, hearing handicap was not associated with the domains of quality of life, hence this variable was not included in the regression models. In Hallberg, Hallberg & Kramer [137] only the variable Intelligibility in Quiet (1 of 5 variables relating to hearing handicap and disability) was a predictor of psychological well-being in addition to the strongest predictor Maladaptive Behaviors. The authors concluded that the variable Intelligibility in Quiet seemed not to be the most important factor for quality of life among elderly with age-related hearing loss.

In the current study, the strongest influence on physical quality of life of the participants with age-related hearing loss could be credited with the confounding variable Multi-Morbidity. The independent variable Perceived Social Support was another predictor variable of physical quality of life, however, it was not as strong as the confounding variable.

The psychological quality of life could be predicted by the variables Multi-Morbidity and Perceived Social Support. In this model, perceived social support did contribute more strongly to explaining the variance in the quality of life on the psychological level. In the sample of participants with normal hearing, the coping strategies Active Problem-Solving (strongest predictor) and Cognitive Appraisal made a significant contribution to explaining the variance in this dependent variable.

In terms of social quality of life, the extent of the perceived social support was the single significant predictor of the social domain of quality of life. In this context, Perceived Social Support was the strongest predictor variable in the comparison group. In addition, the variable Escape/Avoidance played a significant role.

As regards the environmental quality of life as the criterion variable, the confounding variable (strongest predictor) as well as the variables Perceived Social Support and Active Problem-Solving (second and third strongest predictor) contributed significantly to explaining the variance in the environmental domain of quality of life.

In general, no maladaptive coping strategies appeared to be associated with the domains of quality of life whereas in other research maladaptive behaviors such as pretending to hear, guessing what was said and escaping / avoiding interactions were significant predictors of psychological well-being [137, 155]. These findings are consistent with the qualitative results of this study indicating that the utilization of the above mentioned maladaptive strategies as well as other strategies such as avoiding theaters, concerts or other events leads to, e.g., anger, frustration.

Physical, psychological and environmental quality of life could not be predicted from multimorbidity alone. The predictor variable Perceived Social Support has to be focused on because it made a unique contribution to explaining variance in quality of life, i.e., the physical, psychological and environmental as well as social quality of life of hearing impaired elderly was better the greater the extent of perceived social support was.
So far no quantitative study investigated perceived social support as a potential predictor on quality of life in this population but approximating research results could be found showing associations between social support and satisfaction with hearing aid use [136, 161]. The gained quantitative results were confirmed by the qualitative findings. Perceived social support – i.e., existing understanding about hearing impaired's particular situation, being able to rely on family members, friends, colleagues who try to facilitate their everyday life by making efforts in communication or giving support in dealing with hearing aids – can have a positive influence on quality of life. According to Singh & Lau [136] this social resource improves satisfaction with hearing aids. However, the current qualitative results also show that perceived negative social support reduces quality of life, in particular when a misconception of hearing loss and function of hearing aids among persons normal hearing exists. Overall, this study confirms the importance of perceived social support in the everyday lives of older adults with age-related hearing loss.

LIMITATIONS AND STRENGTHS OF THE STUDY

At any phase of research study biases can occur [201] and not all biases can be controlled or eliminated [202]. In the following, I discuss possible biases and strategies used to avoid some of them.

Sources of pre-trial biases include errors in study design and in patient recruitment [201]. In the run-up to the data collection, I defined inclusion and exclusion criteria for the identification of the study population in order to avoid *recruitment biases*. One of the inclusion criteria was the determination of hearing ability by audiometry. Objective hearing data of elderly with age-related hearing loss was available. Since a consecutive recruitment of normal hearing elderly at the ENT practice and Center for Hearing Impaired was not successful (reason is explained on p. 58), I decided to use the non-representative snowball-sampling method in order to recruit elderly with normal hearing to participate.

Using this method, no objective hearing data could be received. Consequently, they were asked whether the feel they have a normal hearing. In case of the answer “yes” they were asked to participate in the current study. I additionally used Hearing Handicap Inventory for Elderly (HHIE) as it can also be used as a screening instrument to determine the non-existence of a hearing handicap. Thus, individuals in the hearing impaired group were included based on objective (audiometric) data, whereas participants in the normal hearing group were included based on subjectively rated good hearing. Due to self-report of hearing status, it is possible that few participants did not admit their hearing problems. On grounds of this difference in selecting and recruiting, comparability between these groups is limited or questionable.

Moreover, a *sample bias* may exist by recruiting disease-free volunteers without hearing loss for the comparison group. This may result in overestimation of impact of hearing ability on quality of life [202]. Due to the used method of snowball sampling in the professional and personal sphere it is likely that elderly with a better health agreed to participate compared to the hearing impaired elderly being recruited at practices of (hearing) health care providers. The elderly in the comparison group had indeed on average significantly less comorbid diseases but they were not all healthy.

The participants for the qualitative study were volunteers as well, thus rather motivated elderly decided to take part. Older individuals who did not participate could be more isolated, thus this study would have missed this perspective. In general, it is questionable if the results are generalizable or valid for the population since the sample of the qualitative but also of the quantitative study did rather not reflect the population as a whole.

In addition, more women than men agreed to participate in qualitative interviews, therefore it was difficult to detect gender differences in the qualitative data. In the quantitative part of the study, exclusively older individuals who lived at home volunteered to participate. Therefore, the interpretation of these study results for nursing home residents or other institutionalized elderly should be made with some cautions.

A discrepancy in measurement obtained with non-validated questionnaires indicates a *measurement bias* in studies [202, 203]. I used self-report measures and on this basis, overestimation or underestimation depending on contextual factors is likely. Nonetheless, reliable, valid and well-documented self-reported questionnaires were used.

Another bias, *attention bias*, can occur by using self-report measures and also by performing qualitative interviews, i.e., individuals who participate are usually aware of their involvement [203]. The participants in this study were informed about the study's intent, thus their attention could be drawn and this may result in a socially desirable or favorable responding which could euphemize the results.

During the qualitative interviews patients were asked to talk about experiences in the past. The retrospective thinking may have effected a *recall bias*. Thus, it could be possible that some relevant information about certain events is missed because it was omitted, e.g., stigma-related experiences, negative or no change of coping behavior (e.g., still in denial) since it is easier to report positive experiences than recalled events bringing about emotional or inconvenient feelings. In addition, the duration of qualitative interviews varied between 20 and 60 minutes, thus some of them were rather short indicating their data were less rich.

In epidemiologic and particularly in observational studies *confounding* is another type of bias. Confounding variables are considered as additional factors which are associated with both exposure and disease status [202], in this case with hearing problems and quality of life. I could not match participants for age and gender due to the different recruitment processes of elderly with and without hearing loss, however the survey included items about their socio-demography. The variable Age, Multi-Morbidity and also Educational Status differed significantly between the investigation group and comparison group. Consequently, these confounding variables were used to counteract in statistical analysis.

Before I ran different statistical tests, I examined the internal validity of the used self-report measures by calculating Cronbach's alpha values in order to determine the accuracy of the study results (Cronbach's alpha) [201]. In the course of the statistical analysis, I also handled *outliers* by using tests being robust against outliers or by removing them (in particular for regression analyses). It is relevant to consider and handle outliers because they would otherwise bias the results.

Finally, there are some concerns with the design of the study since I conducted a cross-sectional study providing a "snapshot" of the current condition or outcome and its characteristics. It is, thus, not possible to make causal inferences from observed associations. Notwithstanding the latter, a significant strength of this study is the triangulation of different data sources, qualitative and quantitative data which complement, contradict or confirm each other.

CONCLUSION AND OUTLOOK

In summary, this study documents the consequences of hearing loss affecting the everyday life of older women and men. Hearing loss hinders communication or following conversations because of the difficulties in hearing and speech understanding and impairs the ability to localize sounds. The recognition of hearing loss and perception of hearing problems varies from person to person, i.e., having the same degree of hearing loss does not mean to experience the same severity of hearing handicap. It is a process to accept the new hearing situation, for some older adults it is easier to accept the situation, for others it takes time. The way of coping differs as well; there appears to be no set method of coping strategies. The use of coping strategies depends on how the elderly with age-related hearing loss appraise the momentous situation. Hearing loss may reduce their quality of life, indicated by their lower self-assessment on each domain compared to normal hearing persons. Their quality of life may be influenced by perceived social support, both positively and negatively.

As a conclusion, (hearing) health care providers should be aware of the negative impact of age-related hearing loss on the lives of elderly. These negative outcomes could be counteracted by appropriate interventions. In the following section, some suggestions which could be helpful or beneficial in (hearing) health care practices and hence enhance quality of life and satisfaction among hearing impaired patients are made.

IMPLICATIONS FOR PRACTICE

In (hearing) health care practice, it is considered as gold standard to test hearing capacity with the aid of audiologic examinations, including pure-tone assessment and speech audiometry. However, these objective measures do not assess the impact of hearing loss on the everyday life of persons concerned [144]. Convery et al [204] emphasized that (hearing) health care providers should consider *"the whole person, not just ears"*.
Consequently, Taylor & Weinstein [205] suggest to move from a product-centered to a patient-centered care meeting audiological and psychosocial needs because this will lead to satisfaction, patient experience and adherence and enhanced quality of life [206].
Another recommendation is to include auditory training and counseling in addition to compensation of hearing loss in the treatment of hearing impaired persons [207].

In the first instance, it would be beneficial to combine objective (audiometry) and subjective measures [65, 66]. Subjective measures, e.g., the widely used and psychometrically tested Hearing Handicap Inventory for the Elderly (HHIE; Ventry & Weinstein [65]) or its short version (HHIE-S; Weinstein, Spitzer & Ventry [139]) may be an appropriate, easy-to-administer and helpful instrument to gather information about the perceived consequences of hearing loss in an individual's daily life.

Within the scope of patient-centered care, comprehensive counseling may have a positive impact on quality of life and address psychosocial needs. This may be achieved by providing education or information about the nature of hearing loss, the use of hearing aids, the real benefits of hearing aids and assistive listening devices and by teaching a skill set of coping and particularly of communication strategies [34, 54, 138, 140].
The quality of patient-centered care and well-being of hearing impaired could be additionally enhanced by actively involving family members, relatives, friends etc. [54, 137, 200] in the adjustment process. Moreover, the close social environment might also be included in teaching a set of techniques that facilitate communication with and the daily life of hearing impaired persons [137]. Since the results of this study show an influence of social support on quality of life, this course of action may help to clear misconceptions of hearing loss and hearing aids and hence bring sensitization in the normal hearing community.

In terms of delivery of information, Taylor & Weinstein [205] advise to consider the health literacy level of the patient because (hearing) health care providers assume a higher level of health literacy from older adults although this is often not the case [25]. Therefore, it is important to apply plain, concrete language and in addition to include visual aids [205]. These strategies may ensure the understanding of diagnosis, treatment, information about other hearing-related issues etc. to prevent misunderstandings and confusion [25].

Health literacy or patient's comprehension of hearing health information can be improved or ensured by using a 'teach-back' method, commonly used in geriatric medicine. Considered a feedback loop, the patients will be asked to explain the information being provided to them. It is a sign for (hearing) health care providers to reteach the information if the patient or client was not able to reproduce it and therefore did not understand it at first [208].

The collaborative participation is central in shared-decision making which is an essential component of patient-centric care [206]. Shared-decision making is a process of exchanging information, incorporating patient's preferences of intervention options and shared evaluation of solution [209]. Participatory care includes an adequate knowledge transfer to the patient as well as patient engagement. These components can be facilitated with the use of decision aids with the objective of educating patients in terms of treatment and management options [205]. This visual tool displaying a set of options may facilitate conversation with patients, allow (hearing) health care providers to guide them and help patients to make decisions on a treatment plan [205, 210].

In my opinion, not only the provision of information but also the empowerment of patients is essential. Some older adults use strategies such as being passive, withdrawing or pretending and some of them experience feelings such as embarrassment, anger, annoyance when, e.g., asking for repetition. I would advise to empower the patients insofar that their actions will not cause such feelings, that they act proactively and articulate what they need in order to cope with their daily life or to experience an effective communication, and that they advocate for their hearing loss.

FURTHER RESEARCH

The findings about social support are novel, thus further research should focus on this concept. The effect of social support on quality of life could be determined by the performance of a longitudinal study design or an intervention study testing an aural rehabilitation program with the inclusion of hearing impaired elderly and their significant others.

Moreover, the used generic social support questionnaire does not refer to hearing-related situations. Research should focus on the development of a disease-specific social support questionnaire that could help identify areas of need for clients. In addition, this disease-specific questionnaire could also be used as an outcome measure since it enables us to observe the success of an intervention, e.g., a counseling program. In this context, it could be of interest to investigate the perspective of normal hearing persons since this focus could also lead to better outcomes in their as well as the lives of the hearing impaired persons.

Another suggestion for further investigation is to also use a questionnaire concentrating on negative social support since the qualitative study results also indicate an impact of negative social support on quality of life. According to Laireiter, Fuchs & Pichler [211], well-being could increase with positive social support in stressful and sensitive situations but it could also be reduced by disappointments or frustrations due to negative social support. Therefore, it is recommended to investigate the effect of both, positive and negative social support.

Despite the evidence of a diffuse pattern of the use of coping strategies among older elderly, the data of this study also clearly show a change or process of coping behavior over time. Andersson & Willibrand [110] recommend reflecting the coping process by performing repeated measurements, hence a longitudinal study. One research aim could be to identify and monitor coping behavior before and after the first hearing aid fitting in order to be able to offer an appropriate individualized rehabilitation program.

On a final note, a development and thus scientific examination of an evidence-based aural rehabilitation program which incorporates both approaches, patient-centered care and shared-decision making (including the counseling of hearing impaired and their family members or significant others, use of teach-back method, visual aids and decision aids) could be another focus in future research.

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APPENDIX

APPENDIX I. PATIENT INFORMATION AND CONSENT FORM FOR SURVEY (HEARING IMPAIRED ELDERLY)

Einverständniserklärung

Medizinische Universität Graz

Sehr geehrte Studienteilnehmerin!
Sehr geehrter Studienteilnehmer!

Der Einfluss des Hörvermögens auf das eigene Wohlbefinden und auf die Kommunikation mit der persönlichen und sozialen Umwelt ist ein noch wenig erforschtes Gebiet. Daher führt das Institut für Sozialmedizin und Epidemiologie der Medizinischen Universität Graz eine Vergleichsstudie, die sich mit dieser Thematik beschäftigt, durch. Verglichen werden sollen die Daten von normalhörenden und altersschwerhörigen Personen.

Ich bitte Sie, Ihre wertvollen Erfahrungen mit uns zu teilen und den beiliegenden Fragebogen auszufüllen.

Die Erkenntnisse dieser Studie sollen primär zur Sensibilisierung des Personals im Gesundheits- und Sozialbereich beitragen und ein Bewusstsein dafür schaffen, wie sich das Hörvermögen auf die Bedürfnisse, Gesundheit und Lebensqualität von normalhörenden und altersschwerhörigen Menschen auswirkt.

Ablauf der Studie

Ich möchte Sie bitten, an der dieser Vergleichsstudie teilzunehmen, in dem sie den beiliegenden Fragebogen ausfüllen. Bitte lassen Sie dabei keine Fragen aus und beantworten Sie die Fragen wahrheitsgetreu. Anschließend bitte ich Sie den ausgefüllten Fragebogen zurück zu geben bzw. zu schicken.

Ihre Zustimmung zur Teilnahme

Die Teilnahme an dieser Studie ist freiwillig. Daher bitte ich Sie, mit Ihrer Unterschrift zu bestätigen, dass Sie an der Studie teilnehmen.

Sollten Sie im Verlauf der Studie nicht mehr teilnehmen bzw. den Fragebogen nicht fertig ausfüllen wollen, können Sie jederzeit zurücktreten.

Einverständniserklärung

Medizinische Universität Graz

Verwendung Ihrer Daten

Ich benötige neben den von Ihnen ausgefüllten Fragebogen auch ihre audiometrischen Daten zu Ihrem Hörvermögen. Daher bitte ich Sie um Erlaubnis, Ihre Hörtestdaten für die Studie verwenden zu dürfen.

Ihre Informationen und Daten werden streng vertraulich behandelt. Die Auswertung erfolgt nur für wissenschaftliche Publikationen, dabei werden Ihre Angaben nur in anonymisierter Form, also ohne Namen und Anschrift festgehalten und wissenschaftlich bearbeitet. Die gesetzlichen Bestimmungen des Datenschutzgesetzes werden akribisch eingehalten, so dass Sie die Gewissheit haben dürfen, dass die Ergebnisse nicht auf Sie zurückverfolgt werden können.

[redacted]

Sarah Moser

Kontaktdaten:

Sarah Moser, MSc, BSc

[redacted]

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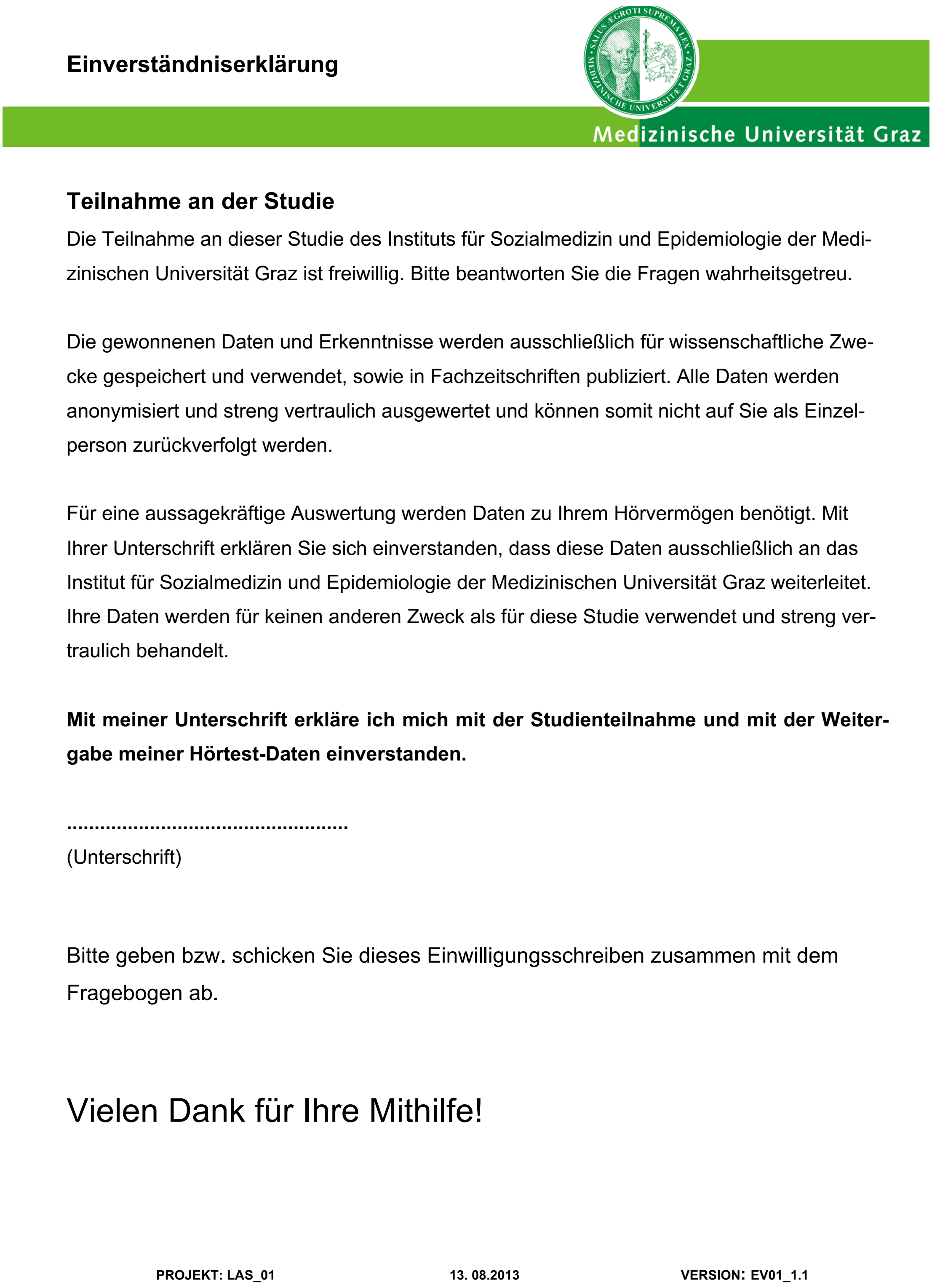

Einverständniserklärung

Medizinische Universität Graz

Teilnahme an der Studie

Die Teilnahme an dieser Studie des Instituts für Sozialmedizin und Epidemiologie der Medizinischen Universität Graz ist freiwillig. Bitte beantworten Sie die Fragen wahrheitsgetreu.

Die gewonnenen Daten und Erkenntnisse werden ausschließlich für wissenschaftliche Zwecke gespeichert und verwendet, sowie in Fachzeitschriften publiziert. Alle Daten werden anonymisiert und streng vertraulich ausgewertet und können somit nicht auf Sie als Einzelperson zurückverfolgt werden.

Für eine aussagekräftige Auswertung werden Daten zu Ihrem Hörvermögen benötigt. Mit Ihrer Unterschrift erklären Sie sich einverstanden, dass diese Daten ausschließlich an das Institut für Sozialmedizin und Epidemiologie der Medizinischen Universität Graz weiterleitet. Ihre Daten werden für keinen anderen Zweck als für diese Studie verwendet und streng vertraulich behandelt.

Mit meiner Unterschrift erkläre ich mich mit der Studienteilnahme und mit der Weitergabe meiner Hörtest-Daten einverstanden.

....
(Unterschrift)

Bitte geben bzw. schicken Sie dieses Einwilligungsschreiben zusammen mit dem Fragebogen ab.

Vielen Dank für Ihre Mithilfe!

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APPENDIX II. PATIENT INFORMATION AND CONSENT FORM FOR SURVEY (NORMAL HEARING ELDERLY)

Einverständniserklärung

Medizinische Universität Graz

Sehr geehrte Studienteilnehmerin!
Sehr geehrter Studienteilnehmer!

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Die Erkenntnisse dieser Studie sollen primär zur Sensibilisierung des Personals im Gesundheits- und Sozialbereich beitragen und ein Bewusstsein dafür schaffen, wie sich das Hörvermögen auf die Bedürfnisse, Gesundheit und Lebensqualität von normalhörenden und altersschwerhörigen Menschen auswirkt.

Ablauf der Studie

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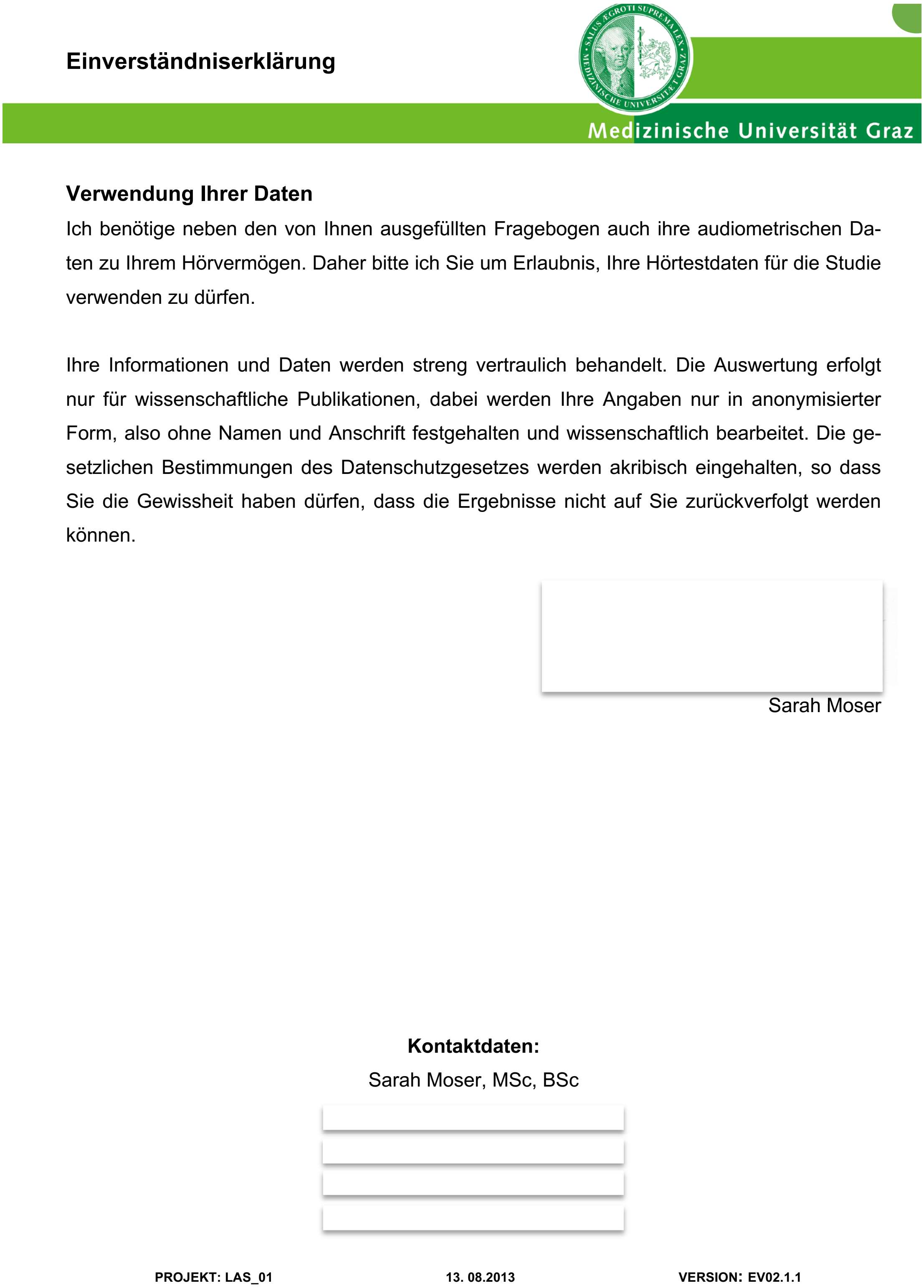

Einverständniserklärung

Medizinische Universität Graz

Verwendung Ihrer Daten

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[redacted]

Sarah Moser

Kontaktdaten:

Sarah Moser, MSc, BSc

[redacted]

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Einverständniserklärung

Medizinische Universität Graz

Teilnahme an der Studie

Die Teilnahme an dieser Studie des Instituts für Sozialmedizin und Epidemiologie der Medizinischen Universität Graz ist freiwillig. Bitte beantworten Sie die Fragen wahrheitsgetreu.

Die gewonnenen Daten und Erkenntnisse werden ausschließlich für wissenschaftliche Zwecke gespeichert und verwendet, sowie in Fachzeitschriften publiziert. Alle Daten werden anonymisiert und streng vertraulich ausgewertet und können somit nicht auf Sie als Einzelperson zurückverfolgt werden.

Für eine aussagekräftige Auswertung werden Daten zu Ihrem Hörvermögen benötigt. Mit Ihrer Unterschrift erklären Sie sich einverstanden, dass diese Daten ausschließlich an das Institut für Sozialmedizin und Epidemiologie der Medizinischen Universität Graz weiterleitet. Ihre Daten werden für keinen anderen Zweck als für diese Studie verwendet und streng vertraulich behandelt.

Mit meiner Unterschrift erkläre ich mich mit der Studienteilnahme und mit der Weitergabe meiner Hörtest-Daten einverstanden.

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Bitte geben bzw. schicken Sie dieses Einwilligungsschreiben zusammen mit dem Fragebogen ab.

Vielen Dank für Ihre Mithilfe!

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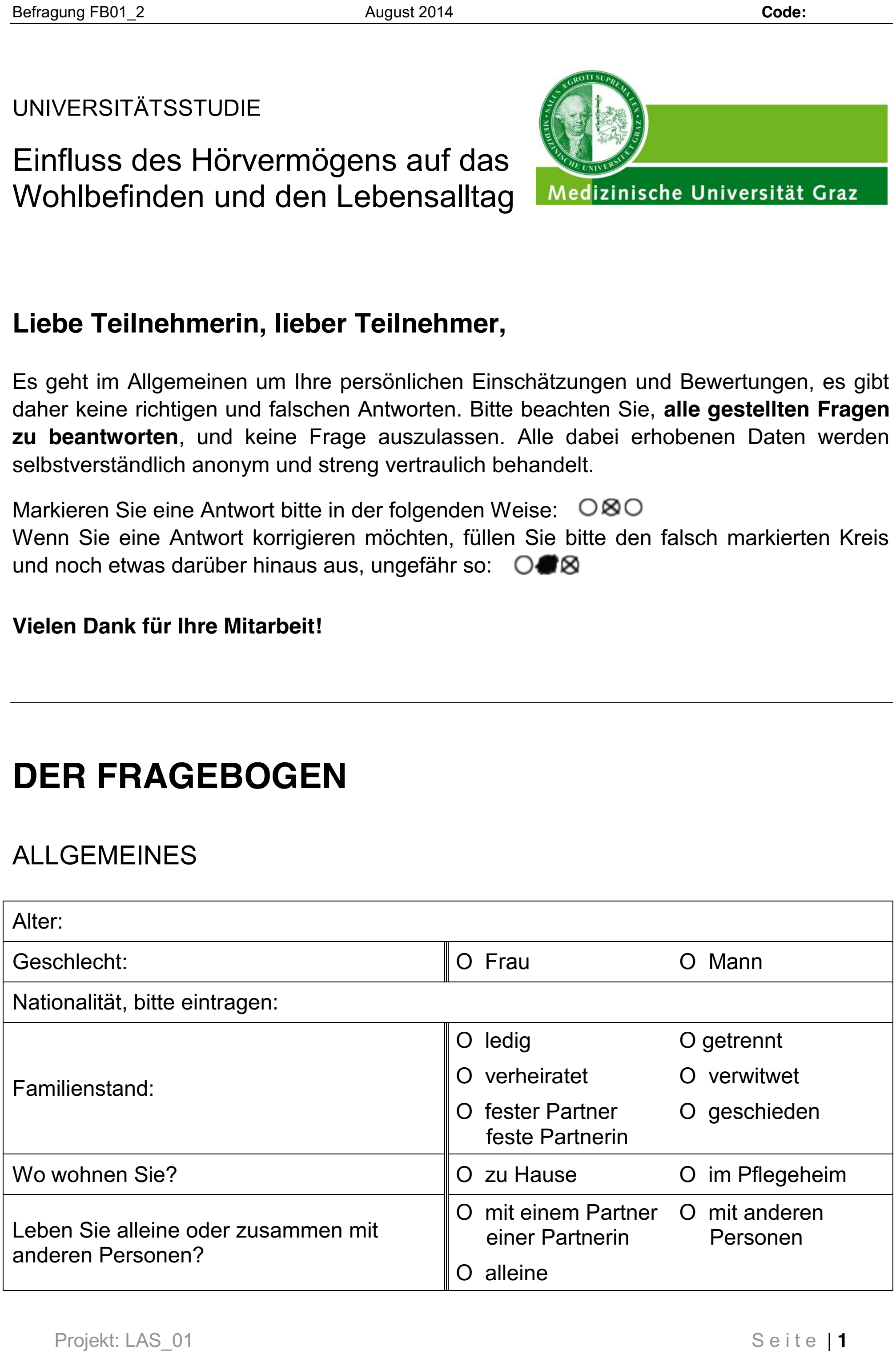
APPENDIX III. SURVEY



UNIVERSITÄTSSTUDIE

Einfluss des Hörvermögens auf das Wohlbefinden und den Lebensalltag

Medizinische Universität Graz

Liebe Teilnehmerin, lieber Teilnehmer,

Es geht im Allgemeinen um Ihre persönlichen Einschätzungen und Bewertungen, es gibt daher keine richtigen und falschen Antworten. Bitte beachten Sie, **alle gestellten Fragen zu beantworten**, und keine Frage auszulassen. Alle dabei erhobenen Daten werden selbstverständlich anonym und streng vertraulich behandelt.

Markieren Sie eine Antwort bitte in der folgenden Weise: ○⊗○
Wenn Sie eine Antwort korrigieren möchten, füllen Sie bitte den falsch markierten Kreis und noch etwas darüber hinaus aus, ungefähr so: ○●⊗

Vielen Dank für Ihre Mitarbeit!

DER FRAGEBOGEN

ALLGEMEINES

Alter:		
Geschlecht:	○ Frau	○ Mann
Nationalität, bitte eintragen:		
Familienstand:	○ ledig ○ verheiratet ○ fester Partner feste Partnerin	○ getrennt ○ verwitwet ○ geschieden
Wo wohnen Sie?	○ zu Hause	○ im Pflegeheim
Leben Sie alleine oder zusammen mit anderen Personen?	○ mit einem Partner einer Partnerin ○ alleine	○ mit anderen Personen

Befragung FB01_2 August 2014 **Code:**

Ihre höchste abgeschlossene Ausbildung:	○ Pflichtschule ○ Höhere Schule ohne Matura ○ Universität/ Fachhochschule	○ Lehre ○ Höhere Schule mit Matura ○ kein Abschluss
Welche berufliche Tätigkeit hatten Sie zuletzt (haben Sie zurzeit)?	○ ungelernter Arbeiter/ungelernte Arbeiterin ○ Facharbeiter/Facharbeiterin Meister/Meisterin ○ einfacher Angestellter/Beamter einfache Angestellte/Beamtin ○ höherer Angestellter/Beamter höhere Angestellte/Beamtin ○ selbständig ○ freier Akademiker/freie Akademikerin ○ Sonstiges, nämlich:	

Haben Sie derzeit körperliche Beschwerden bzw. Krankheiten?	**○ Nein**	**○ Ja**	
Wenn ja, welche Beschwerden bzw. Krankheiten haben Sie? (Mehrfachnennung möglich)			
○ Wundliegen	○ Krebs	○ Angina Pectoris	○ Herzinsuffizienz
○ Bluthochdruck	○ Arteriosklerose	○ Harninkontinenz	○ erhöhte Fettwerte
○ Herzinfarkt	○ Schlaganfall	○ Diabetes	○ Osteoporose
○ Atemwegserkrankungen	○ Morbus Parkinson	○ Rückenleiden	○ Gelenksleiden (z.B. Arthrose)
○ Seelische Störungen	○ Infektionskrankheit	○ Erkrankungen der Haut	○ Erkrankungen des Nervensystems
○ Darmentzündung	○ Niereninsuffizienz	○ Entzündung der Bauchspeicheldrüse	○ Erkrankungen der Geschlechtsorgane
○ Hepatitis	○ Depression	○ Schlafstörungen	○ Magenentzündung
○ Sehschwäche			
Sonstiges, bitte eintragen:______________________			

Liegt bei Ihnen eine Schwerhörigkeit vor?	**○ Nein**	**○ Ja**
Wenn nein, bitte gehen Sie gleich weiter auf Seite 3, zu den Fragen über Lebensqualität.		
Wann wurde bei Ihnen die Hörbeeinträchtigung festgestellt (Jahr)? Bitte eintragen:		
Seit wann sind Sie mit Hörgeräte versorgt (Jahr)? Bitte eintragen:		
Wie oft tragen Sie Ihr Hörgeräte?	○ immer ○ sporadisch ○ nie	

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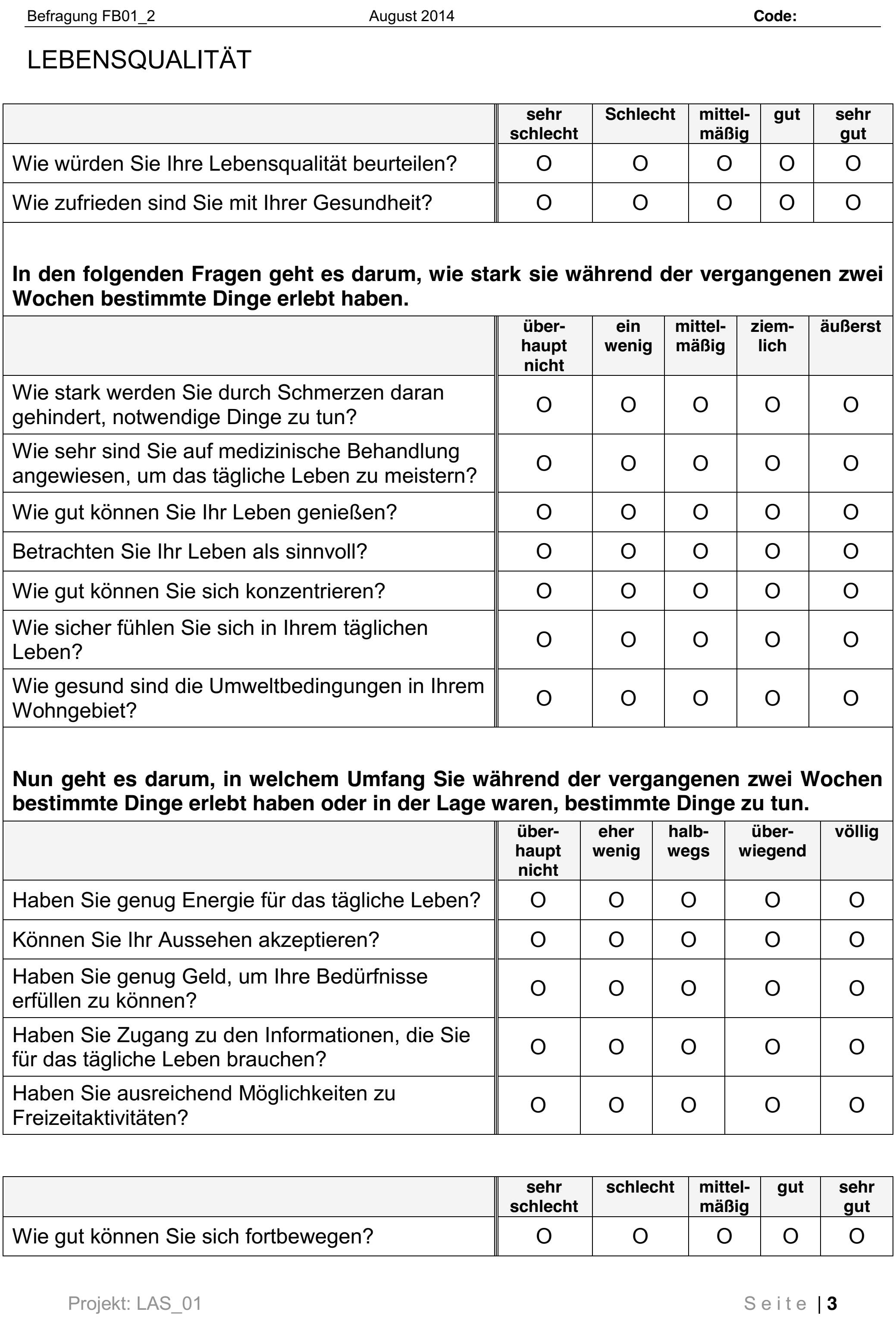


Befragung FB01_2 August 2014 **Code:**

LEBENSQUALITÄT

	sehr schlecht	**Schlecht**	**mittel-mäßig**	**gut**	**sehr gut**
Wie würden Sie Ihre Lebensqualität beurteilen?	○	○	○	○	○
Wie zufrieden sind Sie mit Ihrer Gesundheit?	○	○	○	○	○

In den folgenden Fragen geht es darum, wie stark sie während der vergangenen zwei Wochen bestimmte Dinge erlebt haben.

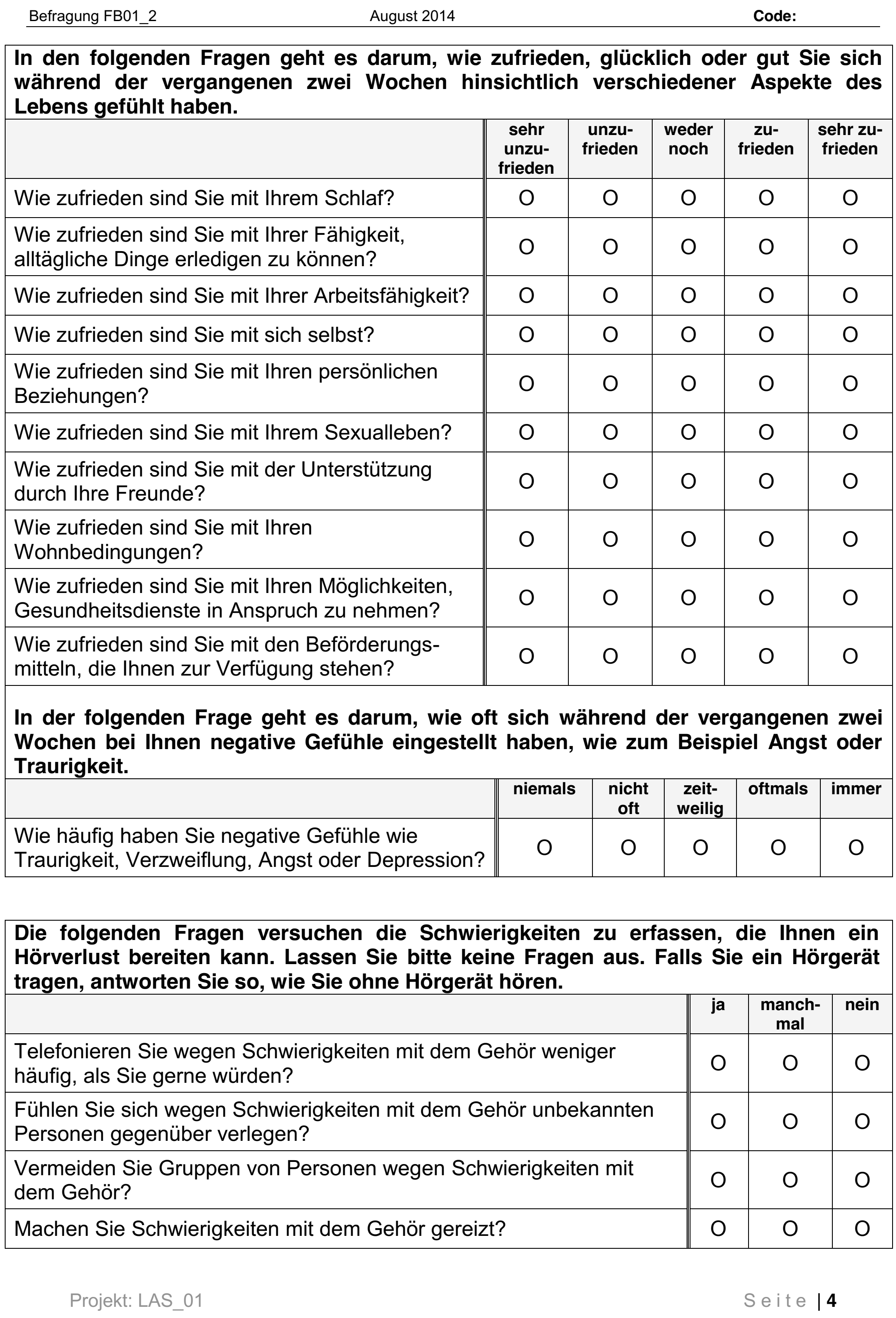
	über-haupt nicht	**ein wenig**	**mittel-mäßig**	**ziem-lich**	**äußerst**
Wie stark werden Sie durch Schmerzen daran gehindert, notwendige Dinge zu tun?	○	○	○	○	○
Wie sehr sind Sie auf medizinische Behandlung angewiesen, um das tägliche Leben zu meistern?	○	○	○	○	○
Wie gut können Sie Ihr Leben genießen?	○	○	○	○	○
Betrachten Sie Ihr Leben als sinnvoll?	○	○	○	○	○
Wie gut können Sie sich konzentrieren?	○	○	○	○	○
Wie sicher fühlen Sie sich in Ihrem täglichen Leben?	○	○	○	○	○
Wie gesund sind die Umweltbedingungen in Ihrem Wohngebiet?	○	○	○	○	○

Nun geht es darum, in welchem Umfang Sie während der vergangenen zwei Wochen bestimmte Dinge erlebt haben oder in der Lage waren, bestimmte Dinge zu tun.

	über-haupt nicht	**eher wenig**	**halb-wegs**	**über-wiegend**	**völlig**
Haben Sie genug Energie für das tägliche Leben?	○	○	○	○	○
Können Sie Ihr Aussehen akzeptieren?	○	○	○	○	○
Haben Sie genug Geld, um Ihre Bedürfnisse erfüllen zu können?	○	○	○	○	○
Haben Sie Zugang zu den Informationen, die Sie für das tägliche Leben brauchen?	○	○	○	○	○
Haben Sie ausreichend Möglichkeiten zu Freizeitaktivitäten?	○	○	○	○	○

	sehr schlecht	**schlecht**	**mittel-mäßig**	**gut**	**sehr gut**
Wie gut können Sie sich fortbewegen?	○	○	○	○	○

Projekt: LAS_01 Seite | **3**



Befragung FB01_2 August 2014 **Code:**

In den folgenden Fragen geht es darum, wie zufrieden, glücklich oder gut Sie sich während der vergangenen zwei Wochen hinsichtlich verschiedener Aspekte des Lebens gefühlt haben.

	sehr unzufrieden	**unzufrieden**	**weder noch**	**zufrieden**	**sehr zufrieden**
Wie zufrieden sind Sie mit Ihrem Schlaf?	○	○	○	○	○
Wie zufrieden sind Sie mit Ihrer Fähigkeit, alltägliche Dinge erledigen zu können?	○	○	○	○	○
Wie zufrieden sind Sie mit Ihrer Arbeitsfähigkeit?	○	○	○	○	○
Wie zufrieden sind Sie mit sich selbst?	○	○	○	○	○
Wie zufrieden sind Sie mit Ihren persönlichen Beziehungen?	○	○	○	○	○
Wie zufrieden sind Sie mit Ihrem Sexualleben?	○	○	○	○	○
Wie zufrieden sind Sie mit der Unterstützung durch Ihre Freunde?	○	○	○	○	○
Wie zufrieden sind Sie mit Ihren Wohnbedingungen?	○	○	○	○	○
Wie zufrieden sind Sie mit Ihren Möglichkeiten, Gesundheitsdienste in Anspruch zu nehmen?	○	○	○	○	○
Wie zufrieden sind Sie mit den Beförderungsmitteln, die Ihnen zur Verfügung stehen?	○	○	○	○	○

In der folgenden Frage geht es darum, wie oft sich während der vergangenen zwei Wochen bei Ihnen negative Gefühle eingestellt haben, wie zum Beispiel Angst oder Traurigkeit.

	niemals	**nicht oft**	**zeitweilig**	**oftmals**	**immer**
Wie häufig haben Sie negative Gefühle wie Traurigkeit, Verzweiflung, Angst oder Depression?	○	○	○	○	○

Die folgenden Fragen versuchen die Schwierigkeiten zu erfassen, die Ihnen ein Hörverlust bereiten kann. Lassen Sie bitte keine Fragen aus. Falls Sie ein Hörgerät tragen, antworten Sie so, wie Sie ohne Hörgerät hören.

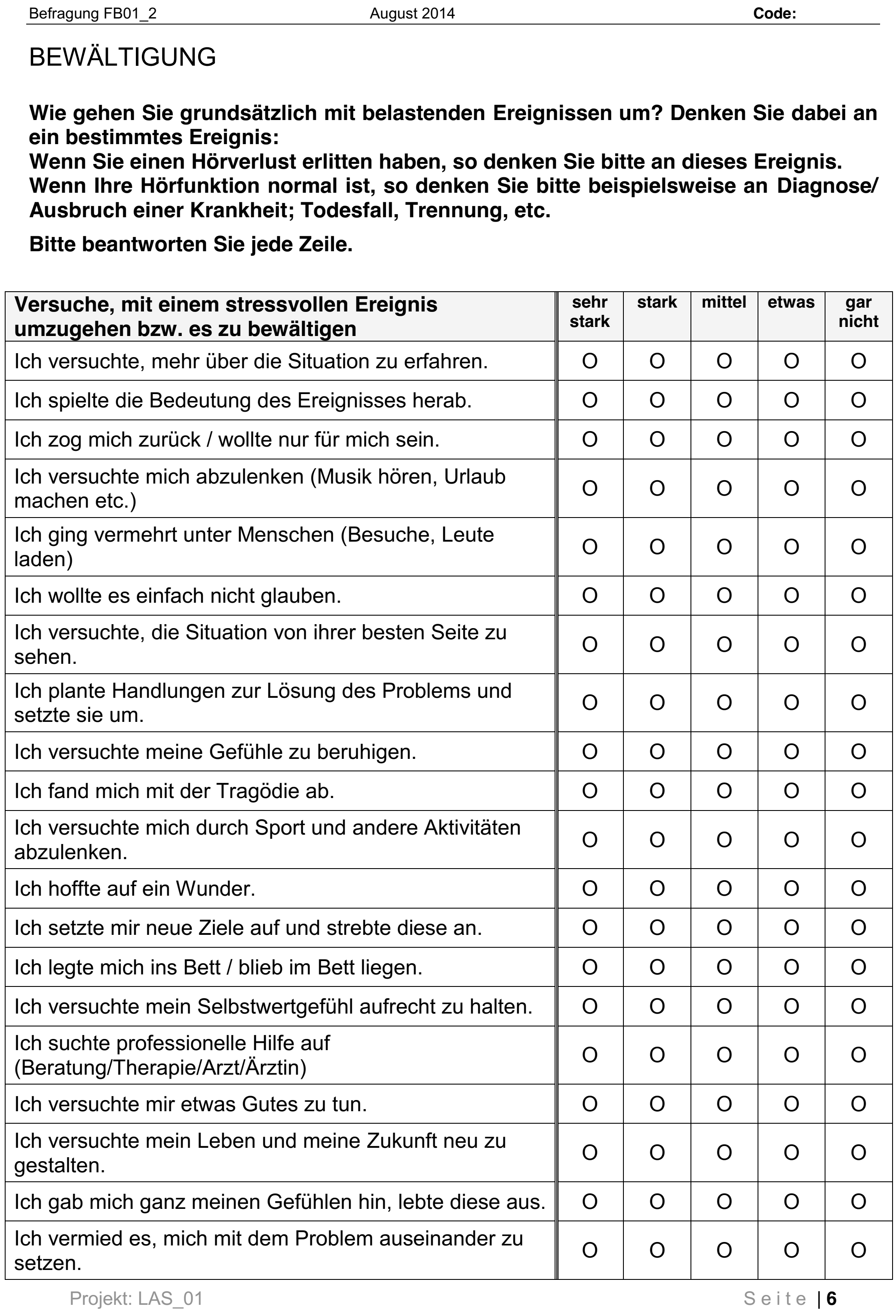
	ja	**manchmal**	**nein**
Telefonieren Sie wegen Schwierigkeiten mit dem Gehör weniger häufig, als Sie gerne würden?	○	○	○
Fühlen Sie sich wegen Schwierigkeiten mit dem Gehör unbekannten Personen gegenüber verlegen?	○	○	○
Vermeiden Sie Gruppen von Personen wegen Schwierigkeiten mit dem Gehör?	○	○	○
Machen Sie Schwierigkeiten mit dem Gehör gereizt?	○	○	○

Projekt: LAS_01 Seite | **4**

Befragung FB01_2 August 2014 **Code:**

	ja	**manch-mal**	**nein**
Fühlen Sie sich wegen Schwierigkeiten mit dem Gehör entmutigt, wenn Sie mit Ihren Familienangehörigen sprechen?	○	○	○
Erschweren Ihnen Schwierigkeiten mit dem Gehör den Umgang in Gesellschaft?	○	○	○
Führen Schwierigkeiten mit dem Gehör bei Ihnen zum Gefühl des „Dummseins"?	○	○	○
Haben Sie Mühe, jemanden zu verstehen, der flüstert?	○	○	○
Empfinden Sie Ihre Hörschwierigkeiten als Behinderung?	○	○	○
Erschweren Ihnen Schwierigkeiten mit dem Gehör Besuche bei Bekannten, Verwandten oder Nachbarn?	○	○	○
Gehen Sie wegen Hörschwierigkeiten seltener zur Kirche oder zu anderen Veranstaltungen als Sie möchten?	○	○	○
Machen Sie Schwierigkeiten mit dem Gehör nervös?	○	○	○
Besuchen Sie Bekannte, Verwandte, Nachbarn wegen Schwierigkeiten mit dem Gehör weniger häufig, als Sie eigentlich möchten?	○	○	○
Haben Sie wegen Schwierigkeiten mit dem Gehör Streit und Auseinandersetzungen mit ihren Familienangehörigen?	○	○	○
Stören Sie Schwierigkeiten mit dem Gehör beim Fernsehen oder Radiohören?	○	○	○
Gehen Sie wegen Schwierigkeiten mit dem Gehör weniger häufig einkaufen, als Sie eigentlich möchten?	○	○	○
Haben Sie sich wegen Schwierigkeiten mit dem Gehör jemals aufgeregt?	○	○	○
Führen Schwierigkeiten mit dem Gehör bei Ihnen dazu, dass Sie sich wünschen, alleine zu sein?	○	○	○
Führen Schwierigkeiten mit dem Gehör dazu, dass Sie sich weniger mit Ihren Angehörigen unterhalten, als Sie eigentlich möchten?	○	○	○
Habe Sie das Gefühl, dass Schwierigkeiten mit dem Gehör Ihr privates und gesellschaftliches Leben einschränken oder behindern?	○	○	○
Erschweren Ihnen Schwierigkeiten mit dem Gehör den Besuch eines Restaurants mit Verwandten oder Bekannten?	○	○	○
Fühlen Sie sich wegen Schwierigkeiten mit dem Gehör niedergeschlagen?	○	○	○
Schalten Sie Fernsehen oder Radio seltener ein, als Sie gerne möchten, weil Sie Schwierigkeiten mit dem Gehör haben?	○	○	○
Ist es Ihnen unangenehm, sich mit Bekannten zu unterhalten, weil Sie Schwierigkeiten mit dem Gehör haben?	○	○	○
Fühlen Sie sich wegen Hörschwierigkeiten in einer Gruppe von Personen ausgeschlossen?	○	○	○

Projekt: LAS_01 Seite | **5**



BEWÄLTIGUNG

Wie gehen Sie grundsätzlich mit belastenden Ereignissen um? Denken Sie dabei an ein bestimmtes Ereignis:
Wenn Sie einen Hörverlust erlitten haben, so denken Sie bitte an dieses Ereignis.
Wenn Ihre Hörfunktion normal ist, so denken Sie bitte beispielsweise an Diagnose/ Ausbruch einer Krankheit; Todesfall, Trennung, etc.

Bitte beantworten Sie jede Zeile.

Versuche, mit einem stressvollen Ereignis umzugehen bzw. es zu bewältigen	**sehr stark**	**stark**	**mittel**	**etwas**	**gar nicht**
Ich versuchte, mehr über die Situation zu erfahren.	○	○	○	○	○
Ich spielte die Bedeutung des Ereignisses herab.	○	○	○	○	○
Ich zog mich zurück / wollte nur für mich sein.	○	○	○	○	○
Ich versuchte mich abzulenken (Musik hören, Urlaub machen etc.)	○	○	○	○	○
Ich ging vermehrt unter Menschen (Besuche, Leute laden)	○	○	○	○	○
Ich wollte es einfach nicht glauben.	○	○	○	○	○
Ich versuchte, die Situation von ihrer besten Seite zu sehen.	○	○	○	○	○
Ich plante Handlungen zur Lösung des Problems und setzte sie um.	○	○	○	○	○
Ich versuchte meine Gefühle zu beruhigen.	○	○	○	○	○
Ich fand mich mit der Tragödie ab.	○	○	○	○	○
Ich versuchte mich durch Sport und andere Aktivitäten abzulenken.	○	○	○	○	○
Ich hoffte auf ein Wunder.	○	○	○	○	○
Ich setzte mir neue Ziele auf und strebte diese an.	○	○	○	○	○
Ich legte mich ins Bett / blieb im Bett liegen.	○	○	○	○	○
Ich versuchte mein Selbstwertgefühl aufrecht zu halten.	○	○	○	○	○
Ich suchte professionelle Hilfe auf (Beratung/Therapie/Arzt/Ärztin)	○	○	○	○	○
Ich versuchte mir etwas Gutes zu tun.	○	○	○	○	○
Ich versuchte mein Leben und meine Zukunft neu zu gestalten.	○	○	○	○	○
Ich gab mich ganz meinen Gefühlen hin, lebte diese aus.	○	○	○	○	○
Ich vermied es, mich mit dem Problem auseinander zu setzen.	○	○	○	○	○

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	sehr stark	**stark**	**mittel**	**etwas**	**gar nicht**
Ich versuchte, mich durch Kontakte zu anderen Menschen abzulenken.	○	○	○	○	○
Ich grübelte/dachte ständig darüber nach.	○	○	○	○	○
Ich verhielt mich passiv und wartete ab, dass sich etwas veränderte.	○	○	○	○	○
Ich ließ es nicht an mich herankommen.	○	○	○	○	○
Ich versuchte mir Quellen neuer Lebenszufriedenheit zu schaffen.	○	○	○	○	○
Ich setzte mich gedanklich mit dem Problem auseinander.	○	○	○	○	○
Ich trank viel, aß viel und beruhigte mich so.	○	○	○	○	○
Ich verließ mich bei der Lösung des Problems auf andere.	○	○	○	○	○
Ich versuchte einen Sinn in dem Ereignis/Problem zu finden.	○	○	○	○	○
Ich hielt mir vor Augen, dass ich wichtig und wertvoll sei.	○	○	○	○	○
Ich relativierte das Ereignis (es gibt Wichtigeres / Schlimmeres)	○	○	○	○	○
Ich hielt mir vor Augen, dass ich andere Belastungen bewältigt habe.	○	○	○	○	○
Ich versuchte mit aller Kraft dagegen anzukämpfen.	○	○	○	○	○
Ich versuchte etwas Positives an der Situation zu sehen	○	○	○	○	○
Ich setzte aktive Schritte zur Problemlösung.	○	○	○	○	○
Ich versuchte die Ungewissheit zu ertragen.	○	○	○	○	○
Ich gab auf/verzichtete auf eine Bewältigung.	○	○	○	○	○
Ich machte anderen Menschen Vorwürfe.	○	○	○	○	○
Ich hielt mir vor Augen, dass jede Krise auch etwas Gutes beinhaltet.	○	○	○	○	○
Ich schloss mich einer Selbsthilfegruppe an.	○	○	○	○	○
Ich redete mir ein, dass es kein Problem gäbe.	○	○	○	○	○
Ich biss meine Zähne zusammen/riss mich zusammen.	○	○	○	○	○
Sonstiges, bitte eintragen:					

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SOZIALE UNTERSTÜTZUNG

	trifft nicht zu	**trifft eher nicht zu**	**weder noch**	**trifft eher zu**	**trifft zu**
Ich finde ohne weiteres jemanden, der sich um meine Wohnung kümmert, wenn ich mal nicht da bin.	○	○	○	○	○
Es gibt Menschen, die mich ohne Einschränkung so nehmen wie ich bin.	○	○	○	○	○
Ich erfahre von anderen viel Verständnis und Geborgenheit.	○	○	○	○	○
Ich habe einen sehr vertrauten Menschen, mit dessen Hilfe ich immer rechnen kann.	○	○	○	○	○
Bei Bedarf kann ich mir ohne Probleme bei Freunden oder Nachbarn etwas ausleihen.	○	○	○	○	○
Ich habe Freunde/Angehörige, die sich auf jeden Fall Zeit nehmen und gut zuhören, wenn ich mich aussprechen möchte.	○	○	○	○	○
Ich kenne mehrere Menschen, mit denen ich gerne etwas unternehme.	○	○	○	○	○
Ich habe Freunde/Angehörige, die mich einfach mal umarmen.	○	○	○	○	○
Wenn ich krank bin, kann ich ohne Zögern Freunde/ Angehörige bitten, wichtige Dinge für mich zu erledigen.	○	○	○	○	○
Wenn ich mal sehr bedrückt bin, weiß ich, zu wem ich damit ohne weiteres gehen kann.	○	○	○	○	○
Es gibt Menschen, die Freude und Leid mit mir teilen.	○	○	○	○	○
Bei manchen Freunden/Angehörigen kann ich auch mal ganz ausgelassen sein.	○	○	○	○	○
Ich habe einen vertrauten Menschen, in dessen Nähe ich mich ohne Einschränkung wohl fühle.	○	○	○	○	○
Es gibt eine Gruppe von Menschen (Freundeskreis), zu der ich gehöre und mit der ich mich häufig treffe.	○	○	○	○	○

Vielen herzlichen Dank für Ihre Zeit und für die Beantwortung der Fragen!

APPENDIX IV. PATIENT INFORMATION AND CONSENT FORM FOR QUALITATIVE INTERVIEWS

Information über die Studie und Einverständniserklärung

Medizinische Universität Graz

Sehr geehrte Studienteilnehmerin!
Sehr geehrter Studienteilnehmer!

Der Einfluss des Hörvermögens auf das eigene Wohlbefinden und auf die Kommunikation mit der persönlichen und sozialen Umwelt ist ein noch wenig erforschtes Gebiet. Daher führt das Institut für Sozialmedizin und Epidemiologie der Medizinischen Universität Graz die Studie mit dem Titel „Leben mit Altersschwerhörigkeit“ durch, die sich mit dieser Thematik tiefgehend beschäftigt, durch.

Ich bitte Sie, Ihre wertvollen Erfahrungen und Ansichten in einem persönlichen Interview mit uns zu teilen.

Die Erkenntnisse dieser Studie sollen primär zur Sensibilisierung des Personals im Gesundheits- und Sozialbereich beitragen und ein Bewusstsein dafür schaffen, wie sich das Hörvermögen auf die Bedürfnisse, Gesundheit und Lebensqualität von älteren Menschen mit altersbezogenem Hörverlust auswirkt.

Ablauf der Studie

Ich möchte Sie bitten, am Interview teilzunehmen und Fragen zu folgenden Themen zu beantworten: 1) Kommunikation sowie Kommunikationsschwierigkeiten, 2) Umgang mit Schwerhörigkeit, 3) Lebensqualität bzw. Wohlbefinden und 4) soziale Unterstützung. Das Interview wird in einem stillen (ohne Hintergrundgeräusche) und hellen Raum durchgeführt. Mit Ihrer Zustimmung wird das Gespräch mit einem Audiorecorder aufgezeichnet. Beim Gespräch, welches ca. 30 Minuten dauern wird, werden bei Bedarf bzw. nach Wunsch Pausen eingelegt.

Ihre Zustimmung zur Teilnahme

Die Teilnahme an dieser Studie ist freiwillig. Daher bitte ich Sie, mit Ihrer Unterschrift zu bestätigen, dass Sie der Studienteilnahme zustimmen.

Sollten Sie im Verlauf der Studie nicht mehr teilnehmen bzw. das Interview abbrechen wollen, können Sie jederzeit zurücktreten.

Information über die Studie und Einverständniserklärung

Medizinische Universität Graz

Verwendung Ihrer Daten

Neben den Interviewdaten benötige ich auch Ihre audiometrischen Daten zu Ihrem Hörvermögen. Daher bitte ich Sie um Erlaubnis, Ihre Hörtestdaten für diese Studie verwenden zu dürfen.

Ihre Informationen und Daten werden streng vertraulich behandelt. Die mit dem Audiorecorder aufgezeichneten Daten werden für die Datenanalyse und darauffolgende Ergebnisdarstellung wortwörtlich abgeschrieben.
Die Auswertung erfolgt nur für wissenschaftliche Publikationen, dabei werden Ihre Angaben nur in anonymisierter Form, also ohne Namen und Anschrift festgehalten und wissenschaftlich bearbeitet. Die gesetzlichen Bestimmungen des Datenschutzgesetzes werden akribisch eingehalten. Folglich dürfen Sie die Gewissheit haben, dass die Ergebnisse nicht auf Sie zurückverfolgt werden können.

[redacted]

Sarah Moser

Kontaktdaten:

Sarah Moser, MSc, BSc
[redacted]

Information über die Studie und Einverständniserklärung

Medizinische Universität Graz

Teilnahme an der Studie

Die Teilnahme an dieser Studie des Instituts für Sozialmedizin und Epidemiologie der Medizinischen Universität Graz ist freiwillig. Bitte beantworten Sie die Fragen wahrheitsgetreu.

Die gewonnenen Daten und Erkenntnisse werden ausschließlich für wissenschaftliche Zwecke gespeichert und verwendet, sowie in Fachzeitschriften publiziert. Alle Daten werden anonymisiert und streng vertraulich ausgewertet und können somit nicht auf Sie als Einzelperson zurückverfolgt werden.

Für eine aussagekräftige Auswertung werden Daten zu Ihrem Hörvermögen benötigt. Mit Ihrer Unterschrift erklären Sie sich einverstanden, dass diese Daten ausschließlich an das Institut für Sozialmedizin und Epidemiologie der Medizinischen Universität Graz bzw. an Frau Moser Sarah (Dissertantin) weitergeleitet werden. Ihre Daten werden für keinen anderen Zweck als für diese Studie verwendet und streng vertraulich behandelt.

Mit meiner Unterschrift erkläre ich mich mit der Studienteilnahme und mit der Weitergabe meiner Hörtest-Daten einverstanden.

....
(Unterschrift)

Vielen Dank für Ihre Mithilfe!

APPENDIX V. QUALITATIVE INTERVIEW GUIDELINES

Medizinische Universität Graz

Dissertationsprojekt: Leben mit Altersschwerhörigkeit (LAS_01; 2015)

Leitfaden für die qualitative Befragung

Einleitung (Information und Einverständnis)

mündliche Information über Studie, Ablauf der Befragung
Einverständnis einholen

Einstieg

Ich möchte Sie bitten, eine besondere Erfahrung / Geschichte, die mit Ihrer Schwerhörigkeit zusammenhängt, zu beschreiben. Sie können erzählen, was Ihnen gerade hierzu einfällt.

Alternativer Einstieg, falls Schwierigkeiten beim ersten Punkt auftauchen: *Beschreiben Sie mir bitte Ihren typischen Alltag. Wie sieht bei Ihnen ein typischer Tag aus? Bitte nehmen Sie dabei Bezug auf Ihre Schwerhörigkeit.*

Ggf. vertiefende Fragen: je nachdem was erzählt wird (gilt für das gesamte qualitative Interview):

- *Wie sind Sie mit dieser Situation umgegangen bzw. wie gehen Sie mit dieser Situation um?*

BLOCK A: Diagnose und Hörgeräte

Wann wurde bei Ihnen Ihr Hörverlust festgestellt bzw. wie lange sind Sie schon schwerhörig?

Wie sind Sie mit dieser Feststellung umgegangen? Was war Ihr erster Gedanke dabei?

Wie waren die ersten Erfahrungen mit den Hörgeräten?

Wie erleben Sie den Alltag mit den Hörgeräten? Wie kommen Sie mit den Hörgeräten zurecht?

BLOCK B: Kommunikation / Hören bzw. verstehen können

Wie erleben Sie die alltägliche Kommunikation – bzw. wie geht es Ihnen bei alltäglichen Gesprächen mit Mitbewohnern und Mitbewohnerinnen, mit Ihren Angehörigen bzw. mit den Pflegepersonen oder auch mit anderen Personen – (zum Beispiel beim Einkauf, am Telefon)?

Was unternehmen Sie gerne untertags bzw. was machen Sie gerne (Hobbies…)? Wie beeinflusst Sie die Schwerhörigkeit bei diesen Aktivitäten?

Vertiefende Fragen, je nachdem was der Inhalt der Antworten ist:

- *Welche Schwierigkeiten erleben Sie, wenn Sie sich mit Personen unterhalten oder beim Fernsehen, Radiohören etc.?*
- *Wo haben Sie die größten Schwierigkeiten bzw. in welchen Momenten haben Sie die größten Schwierigkeiten?*

BLOCK C: Umgang mit Schwerhörigkeit

Wie gehen Sie mit Ihrer Schwerhörigkeit im Alltag um bzw. wie bewältigen Sie den Alltag mit Ihrer Schwerhörigkeit?
Haben Sie bestimmte Wege / Strategien gefunden, wie Sie mit Ihrer Schwerhörigkeit im Alltag, (Hobbies, Gesprächen etc.) umgehen können, bzw. diesen Alltag erleichtern können?

Alternative Fragen: *Haben Sie das Gefühl, dass die Schwerhörigkeit Ihren Alltag beeinflusst? Wenn ja, würden Sie mir bitte beschreiben, inwiefern Schwerhörigkeit Ihren Alltag beeinflusst und wie Sie diese Situationen meistern, bewältigen?*

BLOCK D: (soziale) Unterstützung

Wie gehen Ihre Angehörigen, ihre Mitbewohner und -bewohnerinnen und das Pflegepersonal mit Ihrer Schwerhörigkeit um?

Inwiefern werden Sie bei der Bewältigung vom Alltag mit Ihrer Schwerhörigkeit unterstützt?
Von wem werden Sie unterstützt?

Alternative Fragen: *Welche Maßnahmen werden (von wem) gesetzt, die Ihnen den Umgang mit Ihrer Schwerhörigkeit erleichtern?*

BLOCK F: Lebenseinstellung und Lebensqualität

Lebenseinstellung

Wie sehen Sie Ihre Schwerhörigkeit bzw. wie bewerten Sie Ihre Schwerhörigkeit? Wie beschreiben Sie Ihre Lebenseinstellung?

Alternative Fragen: *Wie beurteilen Sie die Lebenseinschränkungen bedingt durch Ihre Schwerhörigkeit?*

Lebensqualität

Wie zufrieden sind Sie mit Ihrem Leben allgemein? (sozialer, emotionaler und körperlicher Ebene)
Wie beschreiben Sie Ihr Leben mit Schwerhörigkeit?
Möchten Sie zu dieser Frage noch etwas erzählen/beschreiben?

ABSCHLUSS

Erhebung SOZIODEMOGRAFISCHER DATEN (Alter, Geschlecht, aktueller bzw. letzter Beruf, höchste Ausbildung) und SONSTIGES

Sarah Moser, MSc, BSc

APPENDIX VI. MISSING VALUES

Table 32. Missing values in the hearing impaired group (n=65)

Items	*Missing values in n (%)*
Pure-tone Audiometry	0 (0.0)
Time of Diagnosis (in years)	12 (18.5)
Time of getting the first hearing aids (in years)	2 (3.1)
Use of hearing aids	0 (0.0)
Wearing hearing aids (always, sporadically, never)	1 (1.5)

Table 33. Missing values in entire sample in terms of socio-demographic data (n=138)

Items	*Missing values in n (%)*
Age	4 (2.9)
Sex	0 (0.0)
Education	3 (2.2)
Living Form	3 (2.2)
Marital Status	1 (0.7)
Comorbidity	3 (2.2)

Table 34. Missing values in entire sample in terms of WHOQOL-BREF (Quality of Life)

Items	*Missing values in n (%)*
QOL_1	2 (1.4)
QOL_2	3 (2.2)
QOL_3	7 (5.1)
QOL_4	5 (3.6)
QOL_5	5 (3.6)
QOL_6	0 (0.0)
QOL_7	5 (3.6)
QOL_8	4 (2.9)
QOL_9	3 (2.2)
QOL_10	3 (2.2)
QOL_11	3 (2.2)
QOL_12	3 (2.2)
QOL_13	4 (2.9)
QOL_14	4 (2.9)
QOL_15	4 (2.9)
QOL_16	1 (0.7)
QOL_17	1 (0.7)
QOL_18	2 (1.4)
QOL_19	2 (1.4)
QOL_20	2 (1.4)
QOL_21	9 (6.5)
QOL_22	1 (0.7)
QOL_23	1 (0.7)
QOL_24	2 (1.4)
QOL_25	2 (1.4)
QOL_26	1 (0.7)

Table 35. Missing values in entire sample in terms of HHIE (Hearing Handicap)

Items	*Missing values in n (%)*
HHIE_1	0 (0.0)
HHIE_2	0 (0.0)
HHIE_3	0 (0.0)
HHIE_4	0 (0.0)
HHIE_5	0 (0.0)
HHIE_6	0 (0.0)
HHIE_7	0 (0.0)
HHIE_8	0 (0.0)
HHIE_9	0 (0.0)
HHIE_10	0 (0.0)
HHIE_11	0 (0.0)
HHIE_12	0 (0.0)
HHIE_13	0 (0.0)
HHIE_14	0 (0.0)
HHIE_15	0 (0.0)
HHIE_16	0 (0.0)
HHIE_17	0 (0.0)
HHIE_18	0 (0.0)
HHIE_19	0 (0.0)
HHIE_20	0 (0.0)
HHIE_21	0 (0.0)
HHIE_22	0 (0.0)
HHIE_23	0 (0.0)
HHIE_24	0 (0.0)
HHIE_25	0 (0.0)

Table 36. Missing values in entire sample in terms of SozU-14 (Social Support)

Items	*Missing values in n (%)*
SozU_1	4 (2.9)
SozU_2	5 (3.6)
SozU_3	5 (3.6)
SozU_4	5 (3.6)
SozU_5	5 (3.6)
SozU_6	4 (2.9)
SozU_7	4 (2.9)
SozU_8	4 (2.9)
SozU_9	4 (2.9)
SozU_10	4 (2.9)
SozU_11	4 (2.9)
SozU_12	4 (2.9)
SozU_13	5 (3.6)
SozU_14	4 (2.9)

Table 37. Missing values in entire sample in terms of FLB (coping strategies)

Items	***Missing values in n (%)***
COPING_1	4 (2.9)
COPING_2	3 (2.2)
COPING_3	4 (2.9)
COPING_4	4 (2.9)
COPING_5	4 (2.9)
COPING_6	4 (2.9)
COPING_7	3 (2.2)
COPING_8	4 (2.9)
COPING_9	3 (2.2)
COPING_10	3 (2.2)
COPING_11	4 (2.9)
COPING_12	3 (2.2)
COPING_13	4 (2.9)
COPING_14	4 (2.9)
COPING_15	6 (4.3)
COPING_16	4 (2.9)
COPING_17	4 (2.9)
COPING_18	4 (2.9)
COPING_19	4 (2.9)
COPING_20	3 (2.2)
COPING_21	3 (2.2)
COPING_22	2 (1.4)
COPING_23	2 (1.4)
COPING_24	3 (2.2)
COPING_25	4 (2.9)
COPING_26	2 (1.4)
COPING_27	3 (2.2)
COPING_28	3 (2.2)
COPING_29	2 (1.4)
COPING_30	2 (1.4)
COPING_31	2 (1.4)
COPING_32	3 (2.2)
COPING_33	4 (2.9)
COPING_34	3 (2.2)
COPING_35	4 (2.9)
COPING_36	4 (2.9)
COPING_37	2 (1.4)
COPING_38	2 (1.4)
COPING_39	3 (2.2)
COPING_40	4 (2.9)
COPING_41	4 (2.9)
COPING_42	4 (2.9)

APPENDIX VII. UTTERANCES IN GERMAN LANGUAGE (ORIGINALS)

Table 38. Utterances in "The path towards recognizing hearing loss".

Number	*Language*	*Utterances*
1.	**English**	*“It gradually decreased more and more (…) I realized it especially at work as some of my colleagues shook their head and they kind of talked about me behind my back and this was an unpleasant situation (…). This is how I realized my hearing was getting worse and about ten years ago, I finally went to the ENT doctor.” (Christine)*
	German	*“Es ist einfach ganz schleichend immer mehr geworden. (…) Ich habe es vor allem in der Arbeit gemerkt, dass manche den Kopf geschüttelt haben und irgendwie, und so ein bisschen getuschelt worden ist und das ist eine unangenehme Situation gewesen, bei Kolleginnen. (…) So habe ich es mitbekommen und vor gut 10 Jahren bin ich dann zum Ohrenarzt gegangen.” (Christine)*
2.	**English**	*„The hearing impairment appeared bit by bit, you know, and I probably should have done something earlier. However, you often realize it only when the hearing problem is acute or when your spouse says that your hearing is poor.“ (Samuel)*
	German	*“Es ist natürlich schleichend gekommen, ist klar, oder, und ich hätte es wahrscheinlich früher machen sollen. Aber oft einmal merkt man es erst natürlich, wenn es akut ist dann, oder wenn der Partner sagt, dass man schlecht hört.” (Samuel)*
3.	**English**	*„I heard what I needed and then suddenly I heard much less. All of a sudden! And then, two years ago, I saw one doctor after the other, one ENT doctor after the other.” (Inge)*
	German	*“Man hat gehört, was man gebraucht hat und dann auf einmal habe ich viel weniger gehört. Auf einmal! Und dann bin ich, ja das sind zwei Jahre, und dann bin ich von Arzt zu Arzt, von Ohrenarzt zu Ohrenarzt.” (Inge)*
4.	**English**	*„Well, when I talked to my husband I always had the feeling that it was him who did not understand me but it actually was the other way around.” (Emma)*
	German	*“Ja, wenn ich mit meinem Mann gesprochen habe, hatte ich immer das Gefühl, er hätte mich nicht verstanden, stattdessen ist es aber umgekehrt gewesen.” (Emma)*

Table 39. Utterances in "What does it mean or feel like to be hearing impaired?“.

Number	*Language*	*Utterances*
1.	**English**	*„When words are missing in one sentence or in a conversation, I can piece everything together on my own (…) and then the others think ‘she is able to hear more than she says’. They have a totally wrong idea and I do suffer from that.” (Inge)*
	German	*“Wenn in einem Satz oder in einem Gespräch diese und diese Worte fehlen, kann ich selber zusammensetzen (…) und dann glauben die Leute, sie hört mehr, als sie sagt. Und das ist eine Täuschung, also da leide ich schon.” (Inge)*
2.	**English**	*„My stepchildren always said: ‘For God’s sake, why do you wear hearing aids and are still not able to hear? Why not?’ Then I answered: ‘Because you either all talk to me at the same time, or whisper. Talk clearly and precisely, then, I will be able to follow what you say.” (Mia)*
	German	*“Meine Stiefkinder haben dann immer gesagt: ‘Herrgott, wieso hast du Hörgeräte und hörst nichts? Wieso nicht?” Dann habe ich gesagt: ”Weil ihr alle auf mich einredet, und die einen wieder so flüstern. Redet klar und deutlich, dann komme ich mit.’” (Mia)*
3.	**English**	*„Once you worked on hundreds of cases (note: at negotiations), everything somehow has a pattern or a scheme, and I worked intensively and effectively with this scheme.” (Adrian)*
	German	*“Wenn man hunderte Fälle gemacht hat (Anm.: bei Verhandlungen), dann hat das alles irgendwo ein Schema, und mit dem Schema habe ich mich ganz gut, also habe ich mich intensiv mit diesem Zeug beschäftigt” (Adrian)*

Table 40. Utterances in „In need of hearing aids“

Number	*Language*	*Utterances*
1.	**English**	*„I said: 'Okay, I will take the hearing aids now' because I heard that adjusting to hearing aids is difficult, so better get used to them sooner than later. The doctor confirmed that it would be easier to accustom to hearing aids when the hearing loss is not so severe yet and the accustoming would also be faster." (Christine)*
	German	*"Dann nehme ich gleich die Hörgeräte", weil man hört immer, es sei so schwierig, sich an ein Hörgerät zu gewöhnen, dann mache ich es gleich, und der Doktor hat mir das bestätigt. Ja, es sei einfacher, sich an Hörgeräte zu gewöhnen, wenn man noch nicht so schwer hörgeschädigt ist, weil man sich da schneller daran gewöhnt." (Christine)*
2.	**English**	*„I said to him: 'I want a hearing aid so that I can better communicate with people.' Then he said: 'Well, I'll prescribe you hearing aids but don't allow others to persuade you.' And then I thought 'I will not allow them, I just would like to have hearing aids because with them I should be able to hear better'. He added: 'The devices cost a lot and don't help much, so don't be persuaded. Well, I thought: 'what should I do then?'" (Inge)*
	German	*„Ich habe ihm gesagt: ‚Ich möchte ein Hörgerät, dass ich besser mit den Leuten sprechen kann'. Und dann hat er gesagt: ‚Ja, das unterschreibe ich Ihnen, aber lassen Sie sich nichts aufschwätzen'. Und dann habe ich mir gedacht, ‚das tu ich nicht, ich will nur ein Hörgerät und mit dem Hörgerät sollte man besser hören'. Und der sagt: ‚Die kosten viel und nützen Ihnen nichts, also lassen Sie sich nichts einreden.' Also ich habe mir gedacht, ‚was soll ich dann'?" (Inge)*

Table 41. Utterances in „Usage of and experiences with hearing aids and assistive listening device“.

Number	*Language*	*Utterances*
1.	**English**	*„I always say, when somebody needs glasses in order to read, then s/he can't leave them at home or forget them because s/he would also not able to see, wouldn't s/he?!" (Adrian)*
	German	*"Ich sage immer, wenn jemand etwas lesen muss und er braucht eine Brille, dann kann er sie auch nicht daheim liegen lassen. Dann sieht er es auch nicht, oder?!" (Adrian)*
2.	**English**	*"Beloved and hated hearing aids." (Barbara)*
	German	*"Geliebt gehasstes Hörgerät." (Barbara)*
3.	**English**	*„When I used my first hearing aids, I walked down the street and stopped and I could hear the birds singing (…) You can't imagine what kind of feeling it was to be able to hear a bird singing again." (Albert)*
	German	*"Wie ich das erste Hörgerät hatte, bin ich da ein Stück weit runter (Anm.: gegangen), dann bin ich stehengeblieben und habe gehört wie die Vögel wieder singen (…) Das kann man sich gar nicht vorstellen, was das für ein Gefühl war, wenn du wieder einen Vogel singen hörst." (Albert)*
4.	**English**	*„This was a catastrophe (note: hearing aids paid by social insurance). I thought there has got to be something better. (…) As I said, at the beginning, I was happy but this happiness diminished quite soon. When somebody said something, I said 'yes' although I had not understood it, only had heard it distantly. I said to myself that this cannot be it (…), 'you cut yourself off, your marginalize yourself, you do not participate anymore, you simply walk away from the very issue." (Samuel)*
	German	*"Das ist eine Katastrophe gewesen (Anm.: Kassenhörgerät), ich habe mir gedacht, da gibt es sicher etwas Besseres. (…) Wie gesagt, am Anfang bin ich natürlich happy gewesen, aber das ist dann schon abgeflacht. Wenn einer etwas gesagt hat, dann sagst du halt, ja, obwohl du es nicht verstanden hast, nur so im Hintergrund. Da habe ich mir gesagt, das kann es nicht sein. (…) Du kapselst dich ab, gehst auf die Seite oder nimmst nicht mehr teil usw. Du gehst einfach der Sache aus dem Weg." (Samuel)*
5.	**English**	*„I read about it in the newspaper. I guess it exits probably for a longer time but nobody told me that there was a loop system for example in theatres or churches for hearing impaired people. So I had my hearing aids programmed so that I am able to use this system." (Emma)*
	German	*"Ich habe es aus der Zeitung erfahren, das gibt es aber sicher schon länger, aber ich habe nicht die Möglichkeit gehabt oder man hat mir auch nichts erzählt, dass man kann, wenn zum Beispiel ein Theatersaal oder die Kirchen (Anm.: Induktionsanlage), neuerdings in Dornbirn, die haben das umgeschaltet für Hörbehinderte und das habe ich mir jetzt können programmieren lassen. (…)" (Emma)*

Table 42. Utterances in „Perceived hearing problems and demanding hearing situations”. (1)

Number	*Language*	*Utterances*
Watching television		
1.	**English**	*„News presenters, I always understand them. However, in the movies there are passages where the people or actors only mumble.” (Samuel)*
	German	*“Fernsehsprecher, die reden, die Nachrichten reden, die verstehst du immer, sage ich jetzt einmal. Aber in einem Film, da kommen oft einmal Passagen, wo nur gemurmelt wird” (Samuel)*
2.	**English**	*„Watching TV is also a thing. If there is no background music, it is okay. Once there is music or something else, e.g., clapping or so in a Sitcom, that does not work, I use closed captions.” (Barbara)*
	German	*“Ja, Fernsehen ist halt auch so eine Sache. Wenn keine Musikuntermalung ist, sonst mache ich Film mit Untertiteln, weil sobald die Musik dazwischen kommt, oder irgend so eine Sitcom, wo man dazwischen klatscht oder so, das geht nicht, dann mache ich es mit Untertitel.” (Barbara)*
Phone calls		
1.	**English**	*„I have difficulties in talking via phone. It is my biggest problem, I would like to say, that I am not able to understand phone calls. From time to time, it works well, sometimes it works badly. It depends on how the counterpart talks. And that worries me most, that I am not able to make phone calls properly.” (Elias)*
	German	*“Ich habe am Telefon Schwierigkeiten, zum Telefonieren, das ist mein allergrößtes Problem, möchte ich sagen, dass ich am Telefon nicht verstehe. Ab und zu gut, ab und zu schlecht, je nachdem, wie die Person redet. Und das stört mich am allermeisten, dass ich nicht gescheit telefonieren kann.” (Elias)*
Hearing difficulties in crowds and groups.		
1.	**English**	*„Well, I decided I go to as few events as possible. I simply avoid them because I don’t benefit from them at all.” (Elias)*
	German	*“Ja, auf Veranstaltungen, habe ich mich entschlossen, gehe ich, da gehe ich so wenig wie möglich. Das meide ich einfach, weil erstens habe ich nichts davon.” (Elias)*
2.	**English**	*„Back then, I liked to attend courses, e.g., a language course. I have not had the courage to attend courses anymore because I simply don’t understand enough.” (Emma)*
	German	*“Ich bin früher so gerne auch einmal in einen Kurs gegangen, in einen Sprachkurs. Und das habe ich mich die letzten Jahre nicht mehr getraut, weil ich dann einfach zu wenig verstehe.” (Emma)*
Listening to music		
1.	**English**	*„[It bothers me] that I can’t really hear music. When I listen to a CD I know from the past it all sounds horrible in my ears. It does not sound the way I remember it. Going to a concert is not possible at all.” (Barbara)*
	German	*“Dass ich die Musik überhaupt nicht mehr richtig, also wenn ich eine CD abhöre von früher, die ich kenne, die klingt ganz furchtbar in meinen Ohren. (…) das klingt nicht mehr so wie ich es in Erinnerung habe. Konzert geht gar nicht.” (Barbara)*
On the street		
1.	**English**	*„When I am on the street and I hear a car, using my hearing aids I can’t say which direction the sound comes from. So, I have to look. When somebody is calling me I have to look where they are calling from? I have to take a 360 degrees look.” (Sonja)*
	German	*“Wenn ich auf der Straße bin und ich höre ein Auto, dann kannst du mit den Hörgeräten nicht sagen aus welcher Richtung. Da muss ich schauen .... oder es ruft jemand, dann muss ich schauen, von wo kommt es her? 360 Grad schauen.” (Sonja)*
Doorbell		
1.	**English**	*„The doorbell, I also could not hear it.” (Emma)*
	German	*“Und die Türglocke, die habe ich auch nicht gehört.” (Emma)*

Table 43. Utterances in „Perceived hearing problems and demanding hearing situations". (2)

Number	Language	Utterances
Speech understanding and hence conversation is impeded		
1.	**English**	*„I could understand nothing anymore. I still have difficulty because they talk so sloppily (…) Not everybody but many. There are also adults, I realized it among my colleagues, they speak differently. Vowels disappear and then you can't understand anything anymore." (Samuel)*
	German	*"Ich habe nichts mehr verstanden. Ich habe zwar heute noch Mühe, weil sie einfach schlampig reden (…) Es sind nicht alle, aber sehr viele. Aber das ist auch bei Erwachsenen, da habe ich es gemerkt, Kollegen, die reden anders, da verschwinden die Vokale, und dann verstehst du das nicht mehr." (Samuel)*
2.	**English**	*„How the sounds come out, plays a big role. When you hear if the language is clear or less clear. There is a big difference. And you realize it in particular when you are hearing impaired." (Christine)*
	German	*"Und das spielt eine ganz große Rolle, wie die Laute heraus kommen. Wenn man das einfach hört, ob die Sprache einfach deutlich ist oder weniger deutlich. Da ist ein ganz großer Unterschied. Und das kriegt man einfach, gerade wenn man schlechter hört, ganz, ganz gut mit." (Christine)*
3.	**English**	*„It is also difficult when I have a conversation which takes too long. I get tired because of paying attention. And then I am actually glad when the conversation is over." (Elias)*
	German	*"Ja, ja was auch schwierig ist für mich, wenn ich eine Unterhaltung habe, die zu lange dauert. Dann werde ich zu müde vom Aufmerksamsein, und ich weiß nicht, dann bin ich froh, wenn es wieder aus ist." (Elias)*
4.	**English**	*„From time to time I am able to hear well. I guess it is because of the weather (…), the same way you get a headache, this might also depend on the weather. Yes, it affects the ears sometimes." (Albert)*
	German	*"Ab und zu höre ich ganz gut. Es ist glaube ich wegen der Witterung (…) so wie man Kopfweh bekommt, das hängt auch vom Wetter ab. Ja, ja das schlägt sich manchmal auf die Ohren." (Albert)*

Table 44. Utterances in „Various strategies to cope with hearing handicap". (1)

Number	Language	Utterances
Maladaptive coping strategies		
1.	**English**	*„It is possible that I nod and I don't know at all what they are talking about." (Emma)*
	German	*"Kann auch sein, dass ich 'ja' nicke und ich weiß aber gar nicht, um was es geht" (Emma)*
2.	**English**	*„You are not able to understand everything and you can't ask for repetition all day. I feel ashamed and prefer to be silent." (Inge)*
	German	*"Man versteht schon so manches nicht und man kann nicht den ganzen Tag fragen. Da schämt man sich und dann ist man lieber still." (Inge)*
3.	**English**	*„Sometimes it is quite alright not to be able to hear everything." (Adrian)*
	German	*"Was man hie und da nicht hört ist vielmal auch ganz gut, oder." (Adrian)*
4.	**English**	*„I ask for repetition or leave it. From time to time I think 'this was not really important anyway'." (Hannah)*
	German	*"Da frage ich noch einmal, oder ich lasse es bleiben. Ab und zu denke ich mir eh, 'das war eh nicht wichtig'." (Hannah)*
5.	**English**	*„Recently, I was on an event and it went quite well. I could understand the speaker on the microphone pretty well. But to be honest, I rather avoid events." (Barbara)*
	German	*"Kürzlich bin ich irgendwo gewesen, da ist es gut gegangen, da habe ich den Redner am Mikrofon ganz gut verstanden, aber ehrlich gesagt gehe ich dem ziemlich aus dem Weg (Anm.: Veranstaltungen)." (Barbara)*
6.	**English**	*„The arts and leisure center in our town, sometimes there events which I would like to attend but I also avoid them because I cannot enjoy them anymore and this makes me angry so I don't attend events at all." (Emma)*
	German	*"Und das Kulturhaus bei uns in Dornbirn, da sind auch manchmal Veranstaltungen, wo man vielleicht einmal gerne hinging und das habe ich dann auch gemieden, weil ich einfach nicht den Genuss habe. Und das ärgert mich und dann gehe ich schon gar nicht hin." (Emma)*

Table 45. Utterances in „Various strategies to cope with hearing handicap". (2)

Number	Language	Utterances
Adaptive coping strategies		
1.	English	*„In church I always take a seat in the first row because I have a clear view to the priest and I am able to lip-read." (Eva)*
	German	*"In der Kirche bin ich immer in der ersten Bank, da habe ich einen klaren Blick zum Priester, da kann ich es auch vom Mund ablesen." (Eva)*
2.	English	*„I need to look at people so that the sounds comes directly to me. Once they talk from aside it is considerably more difficult." (Christine)*
	German	*"Ich muss die Leute anschauen, dass der Schall direkt auf mich kommt, von der Seite, da ist es schon wesentlich schwieriger." (Christine)*
3.	English	*„Talking a lot to each other is a little be difficult, especially with people don't talk clearly. So I ask for repetition, for god's sake, if I did not understand something or I ask for having it written down." (Samuel)*
	German	*"Wenn man viel miteinander redet, dann ist es schon ein bisschen schwierig, gerade bei solchen Personen, die nicht sehr deutlich reden. Und dann frage ich halt in Gottes Namen noch einmal nach, wenn ich es gar nicht verstanden habe. Oder 'schreibe es mir auf'." (Samuel)*
4.	English	*„It can be really annoying but there is nothing we can do about it." (Tanja)*
	German	*"Das ist schön lästig, ja, aber man kann halt nichts machen." (Tanja)*
5.	English	*„ I say: 'Please talk louder because I don't hear everything'. I don't feel ashamed to ask." (Mia)*
	German	*"Das sage ich dann schon. Dann sage ich: 'Reden Sie bitte lauter, ich höre nicht alles." Da muss man sich nicht schämen." (Mia)*
6.	English	*„When something is important to me I make it clear to these people and I don't have any problems with this. When something is not important, I don't mention it. This means it simply is not all that relevant for me." (Christine)*
	German	*"Wenn mir etwas wichtig ist, dann sage ich das den Leuten und da habe ich also kein Problem und wenn mir etwas nicht so wichtig ist, dann sage ich es halt nicht. Dann ist es mir auch nicht so wichtig." (Christine)*
7.	English	*„I study everything which relates to 'hearing' (…) I have been interested in new things my entire life." (Adrian)*
	German	*"Und ich studiere alles, was mit hören zusammenhängt (…,) und ich habe mich ein Leben lang immer wieder für Neues interessiert." (Adrian)*
8.	English	*„I once attended a course in which it was explained what should be avoided and so and that some voices sound different because of the hearing aids, they have a different sound." (Barbara)*
	German	*"Ich habe einmal so einen Kurs gemacht, wo man gesagt hat, was man meiden soll und so, und manche Stimmen sind durch die Hörgeräte dann anders, haben einen anderen Klang bekommen." (Barbara)*
9.	English	*„One needs to live with it (note: hearing loss), there is no way around it. I need to learn to cope with it. There is no point in making a big fuss about it and do god knows what about it. What would that help?" (Tanja)*
	German	*"Man muss leben damit (Anm.: Hörverlust), das hat keinen Wert. (…) Ja, ich muss halt umgehen können damit, ich kann da nicht Probleme machen und weiß Gott was tun. Was will ich da anfangen." (Tanja)*
10.	English	*„My father is hearing impaired. At the age of 60 he took early retirement because of his hearing loss (…) Und that is why I already know what hearing loss is like (…).I could accept it easier because I knew what it would be like (…) and I don't have any big problems like others seem to have (…). I was not really shocked, nothing, it is the way it is." (Christine)*
	German	*"Mein Vater ist schon altersschwerhörig und der ist mit 60 Jahren schon in die Frühpension gegangen wegen seiner Schwerhörigkeit (...) Und dadurch habe ich das einfach mitbekommen, wie das ist, die Schwerhörigkeit (...) Und ich habe sie auch leichter annehmen können, weil ich einfach gewusst habe, wie das Ganze wird (...) und habe damit keine riesigen Probleme, als wie man bei manch anderen hört. (...) ich bin auch nicht geschockt gewesen, nichts, das ist einfach so, ist halt so." (Christine)*
11.	English	*„No, my god, I have hearing aids and I can live with that. On the upside, I can hear better with them. I need to accept all of this like glasses or any other device when you need it. We should be glad that these things exist" (Mia)*
	German	*"Nein, mein Gott, das habe ich jetzt und ich kann damit leben und ich höre dafür besser. Das muss man alles annehmen, genau wie eine Brille oder ein anderes Gerät, wenn du es brauchst. Wir müssen froh sein, dass es das gibt." (Mia)*

Table 46. Utterances in „Various strategies to cope with hearing handicap". (3)

Number	**Language**	**Utterances**
Adaptive coping strategies		
12.	**English**	*„ I honestly need to say, it does not bother me when they are visible. No. Because I think when people can see that I wear hearing aids maybe they rather make an effort. Well, I don't do it, I don't hide them." (Barbara)*
	German	*"Aber ich muss ehrlich sagen, mich stört es auch nicht, wenn man sie sieht. Nein, weil ich denke mir, wenn die Leute es sehen, dass ich ein Hörgerät habe, vielleicht bemühen sie sich dann eher. Also ich tue es nicht, ich verberge es nicht." (Barbara)*
13.	**English**	*„There are more promotions from companies, Hansaton and so and from famous older people and it seems to me that hearing loss is considered somehow as more normal than back then." (Christine)*
	German	*"Es wird auch mehr Reklame gemacht von den Firmen, Hansaton und so und von prominenten älteren Leuten und, und mir kommt schon vor, es geht schon in die Richtung, dass das irgendwo als normaler angeschaut wird als früher." (Christine)*
Coping as a process		
1.	**English**	*„It took me one whole year until I told myself that I hearing aids. I realized that there was no way around it and that I have to come to terms with it. (…) I could not accept that I suddenly was not able to hear anymore because I could hear everything well all along." (Emma)*
	German	*"Da habe ich aber ein ganzes Jahr gebraucht, bis ich das im Kopf umgesetzt habe, dass ich ein Hörgerät brauche. Und dann bin ich halt darauf gekommen, ja, es nützt nichts. Ich muss mich mit dem abfinden. (...) Ich habe einfach nicht akzeptieren können, dass ich plötzlich nicht mehr hör, wenn ich die ganze Zeit alles gut gehört habe." (Emma)*
2.	**English**	*„I would not have achieved all these positions if I had admitted that my hearing was poor. You can believe me, it would have been impossible. I knew beforehand this is a problem (note: hearing loss) but we could manage it." (Adrian)*
	German	*"Alle diese Positionen (Anm.: beruflich) hätte ich nicht erreicht, wenn ich gesagt hätte, ich höre schlecht. Das können Sie mir glauben, das wäre unmöglich gewesen. Von vorn herein habe ich immer gewusst, dass das ein Problem ist, aber wir haben es richten können." (Adrian)*
Satisfaction, Optimism and Humor		
1.	**English**	*„If you are satisfied then everything works out. That is true." (Tanja)*
	German	*"Wenn man zufrieden ist, dann geht alles, gell. Das ist schon wahr." (Tanja)*
2.	**English**	*„When I am at the hairdresser and take off my hearing aids I always say: 'Now you can start bitching but once I use them again it's over." (Mia)*
	German	*"Oder wenn ich es beim Friseur raus tu (Anm.: Hörgerät), sage ich immer: 'Jetzt könnt ihr schimpfen, wenn ich es wieder rein tu, dann ist vorbei.'" (Mia)*

Table 47. Utterances in „Social support and its influence on hearing impaired individuals". (1)

Number	**Language**	**Utterances**
Poor or negative social support		
1.	**English**	*„They say it once and they think he might remember it, I say or I hope it at least. But they eventually falls back into their old pattern." (Samuel)*
	German	*"Man sagt es dann halt einmal und dann merkt er sich das wahrscheinlich, sage ich jetzt oder ich hoffe es einmal. Man fällt natürlich dann auch wieder ins alte Schema hinein." (Samuel)*
2.	**English**	*„The women, they all mumble. I tell them they should talk normally so that I can follow but if they all whisper I can't follow. Then they look at me and wonder: 'Why do you not hear, although you have hearing aids'?" (Mia)*
	German	*"Und die Weiber da, die nuscheln alle so. Ich sage ihnen, sie sollen doch normal reden, dann komme ich mit, aber wenn sie alle so wispern und flüstern, dann komme ich nicht mit. Dann schauen sie mich an und fragen; 'Wieso hörst du nicht, hast ja zwei Dinger drinnen.'" (Mia)*
3.	**English**	*„My sister, she hears well. She is two years older than me but she can't comprehend. She complains and simply doesn't get it. This is all part of this affliction." (Inge)*
	German	*"Und meine Schwester, die hört gut, die ist zwei Jahre älter und hört gut, aber das kann sie nicht begreifen, dann schimpft sie und kann es nicht kapieren, aber das gehört zu dem Leiden." (Inge)*

Table 48. Utterances in „Social support and its influence on hearing impaired individuals". (2)

Number	Language	Utterances
Poor or negative social support		
4.	**English**	*„When my husband and I go to church it can happen that he says: 'Well, it does not matter, it is not so important that you understand everything." (Emma)*
	German	*"Wenn mein Mann, wir gehen gar nicht so viel in die Kirche, aber ab und zu einmal. Dann kann er schon sagen, 'Ach, das macht nichts, das ist nicht so wichtig, dass du alles verstehst'". (Inge)*
Positive social support		
1.	**English**	*„Without my secretaries I would not have managed all this (note: cope with hearing loss in working life) (…) You can imagine, without my good wife it would not have been possible (…), she wrote notes at home (…), she took over the phone calls." (Adrian)*
	German	*"Also wenn ich ohne meine Sekretärinnen gewesen wäre, hätte ich es nicht geschafft. (…) Können Sie sich vorstellen, ohne gute Frau ist das nicht möglich gewesen. (…) sie hat daheim mitgeschrieben (…) sie hat mir das Telefon abgenommen." (Adrian)*
2.	**English**	*„Actually, it worked for the most part, yes, because I always asked for repetition and that is why they knew that they have to talk louder." (Barbara)*
	German	*"Eigentlich ist es beim Großteil schon gut gegangen, ja. Weil ich immer nachgefragt habe, dann haben sie gewusst, dass sie lauter reden müssen." (Barbara)*
3.	**English**	*„Putting on the hearing aids is still a little bit difficult, until I get the feeling for it. At the moment, my wife still does it (…). In the event hall, I can soften the noise (…). My wife can do that. Once I tell her she presses the button (note: volume control) to put down the volume and when we leave the hall she does the same to turn up the volume." (Albert)*
	German	*"Nur das Anlegen (Anm.: der Hörgeräte) ist ein bisschen schwierig noch, bis man das Gefühl hat. Jetzt vorläufig macht es noch die Frau. (…) in der Halle kannst du den Lärm dämpfen (…) Das kann die Frau, wenn ich es sage, drückt sie (Anm.: Lautstärkeregelung) oder irgendwie und wenn du wieder rausgehst, macht sie wieder das Gleiche." (Albert)*
4.	**English**	*„H. said once to A who mumbled a little bit: Listen, you know that mum can't hear well, so talk to her while looking at her. Don't say something behind her or don't mumble." (Sonja)*
	German	*"Das hat er auch einmal der A. gesagt, der H., die hat dann auch etwas gemurmelt und dann hat er zu ihr gesagt: "Du hör mal, du weißt, dass die Mama schlecht hört, dann schau sie an und sag es ihr. Nicht hinter ihr etwas murmeln und sagen." (Sonja)*
Peer to Peer		
1.	**English**	*„Due to her poor hearing I told her: 'Go and try hearing aids' (…) and I tell them the advantages because I am glad I have them because I would not be able to go on the street otherwise." (Mia)*
	German	*"Oder weil sie schlecht hört, da habe ich gesagt. 'Lassen Sie sich zwei Hörer machen.' (…) und sage ihnen die Vorteile, weil ich selber froh bin, weil ich könnte ja nicht auf die Straße" (Mia)*

Table 49. Utterances in „Quality of Life". (1)

Number	Language	Utterances
Psychological Mood		
1.	**English**	*„It is weird that you can't understand it anymore. I miss it but I have to come to terms with it, I guess." (Tanja)*
	German	*"Das ist komisch, dass man es nicht mehr versteht. Das geht einem schon ab, aber man muss sich damit abfinden, denke ich." (Tanja)*
2.	**English**	*„You feel embarrassed and then you prefer to be silent (note: ask for repetition) and I think, well, I am glad of you leave again (note: communication partner)." (Inge)*
	German	*"Schämt man sich und dann ist man lieber still (Anm.: bzgl. Nachfragen) und denkt sich, ja, ich bin froh, wenn du wieder gehst." (Inge)*

Table 50. Utterances in „Quality of Life". (2)

Number	***Language***	***Utterances***
Psychological Mood		
3.	**English**	*„It makes me angry then. If there is, e.g., a fun theater play and everybody laughs and the punch line would be really funny but I don't know what it is all about. And I don't like this, so I avoid it." (Emma)*
	German	*"Und das ärgert mich dann. Dann, wenn, oder z.B. wenn es ein lustiges Theaterstück ist und alle lachen und die Pointe wäre wirklich zum Lachen, und ich weiß aber nicht um was es geht. Und dann mag ich das nicht, das vermeide ich." (Emma)*
4.	**English**	*„I am lucky that I have a good wife who helps me. I have difficulties in making phone calls." (Elias)*
	German	*"Ich habe das Glück, dass ich eine nette Frau habe, die mir dann hilft. Ich habe am Telefon Schwierigkeiten beim Telefonieren." (Elias)*
Life satisfaction		
1.	**English**	*„Yes, yes, well I am satisfied, since I have started to wear hearing aids." (Eva)*
	German	*"Ja, ja, also ich bin zufrieden, seit ich diese Hörer habe (…)." (Eva)*
2.	**English**	*„I am insofar satisfied that I can hear tolerably but not well I would say. (…) I simply need to be satisfied with what I have, with what works somewhat, okay. And what does not work I need to avoid." (Elias)*
	German	*"Ich bin soweit zufrieden, dass ich einigermaßen höre, gut möchte ich nicht sagen. (…) Ich muss mit dem einfach zufrieden sein, was ich habe, was einigermaßen geht, ok. Und was nicht geht, das muss ich halt meiden." (Elias)*