

Auditory Rehabilitation and Emotions



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Abstract

Hearing loss is a public health problem that affects about 10% of the Portuguese population. It shows itself in personal, family, social and work life, leading many individuals to experience negative emotions such as fear, irritation, frustration, embarrassment, among others. Technologies developed for Hearing Rehabilitation, such as hearing aids, allow to relieve the impact of hearing loss. In this research, the emotional questions of the HHIE questionnaire were used, in 10 individuals, before and after the auditory rehabilitation process with Widex Evoke bilateral hearing systems to assess emotional differences in the moment immediately before the process and two months after the beginning of the process. The results demonstrate that it is more frequent to experience anxiety, frustration and embarrassment in a hearing loss and that after the hearing rehabilitation process there is a reduction in the emotions of embarrassment, frustration, feeling diminished, anxiety and isolation.

Keywords: Auditory; Emotions; Hearing aid; HHIE; Hearing loss

Abbreviations: HHIE: Hearing Handicap Inventory for the Elderly; HRQoL: Health Related Quality of Life; SPSS: Statistical Package for the Social Sciences

Introduction

Hearing loss affects around 10% of the world's population and, in Portugal, it affects around one million Portuguese with direct consequences on their quality of personal life, social and professional [1,2]. Hearing aids are the most common and effective intervention to minimize the consequences of the auditory handicap, allowing an improvement in the general condition of the individual, including cognitive abilities, memory and comprehension of language [3]. While the benefits of its use are evident and appreciated, there is still some resistance from the population to the use of hearing aids, which leads to feelings of depression and social isolation [3,4]. Studies show that auditory deprivation and non-use of hearing correction arouse negative feelings such as frustration, anger, anxiety and guilt [5]. Your feelings and/or emotions experienced by auditory deprivation can be very harmful to the human being in its different areas of intervention: personal, social and professional.

There is a tendency towards feelings of marginalization or misunderstanding that lead to isolation and non-participation in daily tasks or routines [2,6-8]. Hearing loss raises the possibility of cognitive decline and potentiates situations of dementia in the elderly [2,9,10]. Cognitive and concentration disorders resulting from auditory deprivation awaken symptoms such as depression

and loneliness [2,6]. Based on the Hearing Handicap Inventory for the Elderly-HHIE the present study intends to evaluate the emotions that are present in the phase before the auditory correction and during the auditory rehabilitation process, with a view to integrating more information into the counseling and adjustment and to improve the Audiologist's approach throughout the process.

Technology and Hearing Loss

Technological evolution has been increasing in the health area, enabling new and improved access to the quality of life of each patient. Currently, a person diagnosed with hearing loss should be referred for a process of improving hearing acuity through medical or surgical treatment or prosthetic hearing rehabilitation [10]. Hearing rehabilitation is the process conducted by a specialized health professional who seeks to attenuate, through the use of technologies and strategies, the auditory handicap caused by hearing loss [11-20]. The auditory rehabilitation process should start with a pre-intervention through the research of clinical history, audiological data, difficulties experienced and the impact of hearing loss on personal, social and work life.

Before any intervention, it is essential to know the impact of hearing difficulties, which can be obtained through assessment

questionnaires, such as the Hearing Handicap Inventory for the Elderly (HHIE) [21-23]. This process is supported by external or implantable hearing systems which are technologies developed based on the human ear. They are hearing aid systems by acoustic, vibratory or mechanical stimulation or electrical stimulation, allowing the correction and reduction of hearing loss, thus ensuring desirable levels of communication in individuals with hearing deficits [11, 23]. According to several studies, the use of these devices allows increase the ability to capture and discriminate surrounding sounds and, consequently, improve the ability to perceive speech. The programming of these devices must be based on the deficit in each frequency as well as the needs and preferences of the user [11, 23].

The quality of life of hearing device users, which can be assessed using the HRQoL (Health Related Quality of Life) questionnaire, is significantly improved by increasing the ability to detect and discriminate sounds, favoring speech discrimination. In cases where individuals do not use the devices on a regular basis, their improvement in quality of life is compromised, increasing the possibility of risk of loneliness associated with communication difficulties in their personal, family, social and work lives. These individuals therefore need to increase the degree of concentration, attention and listening effort in order to be able to follow the sounds of their surroundings. It is important to analyze and work on motivation in the various stages of the process, in order to manage the fears and specific needs of each case [11].

Psychological component of hearing loss

In everyday life, people experience emotions about 90% of their time, most often joy, love and anxiety. When evaluating its effect, its impact on human behavior, decision-making and the way in which relates to others [24]. Studies show that when faced with a difficult task, negative feelings such as stress, anxiety and irritation are associated, which in turn make the task more complicated to perform due to their consumption of resources [25]. These Tasks can be equated with the process of listening/understanding, since listening requires a lot of resources for auditory processing to be effective. Hearing loss is considered a public health problem due to its negative impact on the individual's life. Their quality of life is severely affected by the inability to maintain their personal, family, social and work commitments without obstacles, requiring greater effort that results in fatigue, lower productivity and inevitably withdrawal. Consequently, it leads to mental health disorders [26-28].

At an early stage, most people with hearing loss experience negative emotions such as disbelief, anger and fear. In social situations, these individuals may experience high levels of anxiety about not being able to actively participate and correctly, failing to respond or ignoring conversations. This tension created by situations that they cannot control causes nervousness, irritability and uncertainty that leads to situations of isolation or

feelings of marginalization or diminishment towards the other [5,29,30]. Negative emotions arise with the communication difficulties of hearing loss or the limitations of the auditory rehabilitation process. Anxiety, anger, frustration and irritation are very common due to the daily impact of these difficulties, often making participation impossible. Discomfort/embarrassment is associated with the inability to accompany their peers and the use of hearing aids, due to the stigma still present in society. Guilt and sadness are directly related to restrictions on participation and sharing, leading to loneliness or isolation [5,30].

Studies suggest that individuals with progressive hearing loss have a more controlled emotional reaction that can be called "silenced emotions". This type of emotions happens when there is time for the acceptance of the hearing condition and it is not considered serious in their daily commitments, often using the expression "it is normal for my age". However, they mention a mix of feelings about hearing loss that when faced with particular situations in which there is an impact of hearing loss triggers the emotional part emerging immediately, we feel negative [30-32]. When individuals do not perceive their hearing loss, they tend to experience more positive emotions and have a lower handicap [31]. Positive emotions arise at the time of auditory correction, when obtaining an explanation about their auditory condition and difficulties, a therapeutic plan is presented that invokes feelings of hope in an opportunity to hear better and gratitude for having help. Unfortunately, when expectations are not managed or matched to the real benefit of the auditory system, these positive emotions can fade and re-experience negative emotions or dissatisfaction with the auditory rehabilitation process [30-32].

Hearing loss has a profound psychological impact on the individual, by influencing their emotions, they change behaviors and these alter their relationships, consequently, changes in relationships will affect their emotions, entering a closed circle of influences [5,33,34]. The most common initial reaction to hearing loss is denial. Active people tend to ignore the difficulty, attributing the responsibility for not understanding to the bad diction of the other or refer to "selective hearing". This reaction is simpler and less psychologically painful, reducing the fear of social approval and self-image. Depression is a consequence of hearing loss, the fact that they go through situations of frustration, anger and guilt [5,33]. The stigma in society associated with the use of auditory systems leads many individuals to experience negative emotions when faced with this need. Postponing the use of the correction system implies the emotions already described above for not being able to participate in their normal life. This set of situations can result in depression or social isolation [32,35].

Kyle, Jones and Wood (1985) consider that there are three stages in hearing loss to consider the individual's handicap, they are: awareness stage, acceptance stage and adjustment stage. The duration of these phases depends on the individual's psychological state, family support/support and their

expectations regarding hearing loss [5,36]. In the awareness phase, the process of recognizing hearing impairment takes place. In the case of progressive hearing loss, initially there is no perception of the hearing difficulty itself, since the body itself creates compensation strategies to suppress this handicap. It is often the closest people who issue the alert and raise awareness of the difficulties and strategies acquired. It is at this moment of hearing loss identification that the individual pays more attention to his surroundings regarding the use of hearing rehabilitation technologies [5,36].

In the acceptance phase, the individual seeks solutions for his hearing handicap, a decisive moment for the auditory rehabilitation process. The healthcare professional must be prepared to deal with fears around the stigma of hearing loss, independence, rejection from family and friends, job loss and control of social situations and create goals and targets for both to explore the effects of hearing loss. and find viable solutions [5,36]. The adjustment phase consists of stabilizing the auditory system, allowing an improvement in the hearing condition and consequently in the quality of life. It should be noted the importance of using technologies to support listening or other strategies to reduce the handicap in situations of difficult listening that cannot be suppressed by the use of hearing aids [5,36]. The study of hearing loss and emotions/psychological impact is crucial to understand human functioning and how we can intervene in their behavior or quality of life [34].

Preparatory study

The present study intends to evaluate the therapeutic efficacy of the use of hearing aids. The use of these devices implies a demanding auditory rehabilitation process in the knowledge of the individual in its various dimensions: personal, family, social and work, with physical presence being an important factor for evaluations and clinical observations. Due to the Covid-19 pandemic, it was not possible to guarantee the requirement of the auditory rehabilitation process, so it was not feasible to collect data from a reasonable sample (30 individuals) that was intended. Thus, this study is considered a preparatory study for a future, more in-depth and improved study in sample and instrumentation. Prospective, longitudinal study with a pre- experimental clinical trial (no control group). The sample of this study was planned for 30 individuals, however, due to the COVI-19 pandemic, it is only composed of 10 individuals of both sexes, with nationality

Portuguese aged 65 or over. As inclusion criteria, moderate hearing loss (>40dB and <71dB, according to the BIAP calculations) bilateral, with verbal discrimination $\geq 80\%$ and rehabilitated by hearing aids and that placed aids in both ears. As an exclusion criterion, the diagnosed psychological/psychiatric situations.

Materials and Methods

The Hearing Handicap Inventory for the Elderly, translated and validated for European Portuguese by Julieta Martins, was the basis of the investigation [37]. The present work focused on the questions listed as emotional in the HHIE and investigated the responses of individuals to the same question before and after the auditory rehabilitation process using a hearing aid. The hearing aids used in this study are from the WIDEX brand of the Evoke range and are the most suitable model for the individual's hearing loss and needs. The first consultation of the auditory rehabilitation process is extremely important for the success of the process, it is at this moment that the professional must be attentive to all dimensions of the individual, whether clinical, personal, family, social or work. Therefore, physical presence becomes essential for objective observations and specific evaluations that will be the starting point for delineating the therapeutic plan for that individual. It is equally important to involve the people around you so that you have the support and understanding needed throughout the process.

The designation of "auditory rehabilitation process" indicates that follow-up consultations are necessary to achieve success and maintain the stability of the adaptation, which can be affected by several external factors (eg, mask use, loss of lip reading). As an integral part of the procedures, an anamnesis (clinical history) and audiological tests were carried out with the Simple Tonal Audiogram and Vocal Audiogram at the first consultation, in order to guarantee the inclusion or exclusion criteria previously defined. Still in the first consultation, the HHIE questionnaire was applied (initial moment-Q1), in order to address emotional issues. Subjects who met the inclusion criteria started the Hearing Rehabilitation process at the first consultation with the adaptation of the Widex Evoke bilateral hearing system suited to the hearing loss and their individual needs. About two months after the beginning of the process, the HHIE questionnaire was applied again (moment Q2). Then the answers obtained in Q1 and Q2 Were analyzed and compared. The Q2 moment was chosen two months after the beginning of the auditory rehabilitation process so that the treatment plan could be monitored and readjusted within the satisfaction/return guarantee period (90 days).

The study was limited in number of participants due to the Covid-19 pandemic, which directly involved the intended consultation methodology and it was not possible to perform the required audiological tests, in teleconsultations, for inclusion in the sample criteria. Statistical analysis was performed using the IBM Statistical Package for the Social Sciences (SPSS), version 25, with a significance level α set to 0.05. Responses to each question included No (0 points), Sometimes (2 points) and Yes (4 points). the total score of responses was obtained by adding the corresponding scores. The mean and standard deviation were calculated for continuous variables and the relative and absolute

frequency for nominal variables. The normality of distributions was analyzed using the Shapiro Wilk test. The Wilcoxon signed-rank test was used to establish significant changes in the frequency of responses before and after Hearing Rehabilitation [38-40].

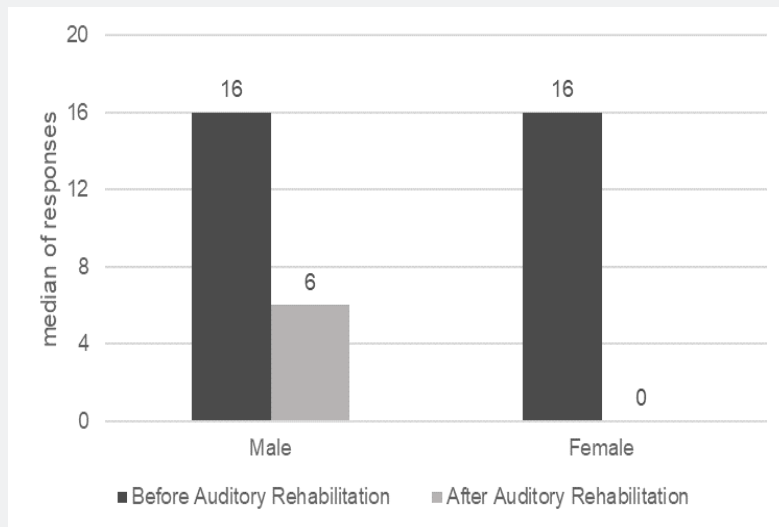
Results

The sample included a total of 10 individuals (3 men and 7 women) with a mean age of 71.0±6.3 years, both before and after the Hearing Rehabilitation. The answers to the selected questions of the HHIE Scale at the two moments of the investigation and their inferential analysis using the Wilcoxon signed-rank test are shown in (Table 1). The most frequently

reported emotions before Auditory Rehabilitation were anxiety (70.0%), frustration (60.0%) and embarrassment (60.0%). After Hearing Rehabilitation, frustration was more frequent (40.0% sometimes). Subjects reported a significant reduction in the frequency of emotions linked to embarrassment (p=0.14), frustration (p=.008), decrease (p=.011), anxiety (p=.020) and isolation (p=.034), but not marginalization (p=.102). (Graph 1) represents the median of the total score obtained in the selected questions of the HHIE Scale according to the individual's gender. There was a significant reduction in the median score in females after Hearing Rehabilitation (Mdn=0; p=.018), but not in males (Mdn=6; p=.102).

Table 1: Global comparison of HHIE Scale responses before and after Hearing Rehabilitation (Wilcoxon signed-rank test) Values are % (n).

Emotions	Before (n=10)	Later (n=10)	P value
Embarrassed/Discomfortable			0.014
No	10,0 (1)	80,0 (8)	
Sometimes	30,0 (3)	10,0 (1)	
Yes	60,0 (6)	10,0 (1)	
Frustration			0.008
No	20,0 (2)	60,0 (6)	
Sometimes	20,0 (2)	40,0 (4)	
Yes	60,0 (6)	0,0 (0)	
Decreased			0.011
No	30,0 (3)	80,0 (8)	
Sometimes	40,0 (4)	20,0 (2)	
Yes	30,0 (3)	0,0 (0)	
Anxious			0.02
No	30,0 (3)	80,0 (8)	
Sometimes	0,0 (0)	10,0 (1)	
Yes	70,0 (7)	10,0 (1)	
Isolated			0.034
No	40,0 (4)	80,0 (8)	
Sometimes	30,0 (3)	10,0 (1)	
Yes	30,0 (3)	10,0 (1)	
Marginalized			0.102
No	60,0 (6)	80,0 (8)	
Sometimes	0,0 (0)	10,0 (1)	
Yes	40,0 (4)	10,0 (1)	



Graph 1: Changes in responses to the HHIE RA Scale, Auditory Rehabilitation; * $p < 0.05$; ** $p > 0.05$.

Discussion

The sample presented is small, so statistically the results are fragile. We should look to the research results as guides to structure future research on the topic. The results presented suggest that in the face of hearing loss there are more frequent emotions: anxiety, frustration and embarrassment. Frustration is the most prevalent emotion after auditory rehabilitation processes. This emotion may be related to expectations management, since in 2 months of auditory rehabilitation process, we may not obtain all the desired gain and benefit. During the auditory rehabilitation process, there is a favorable evolution in the vast majority of emotions: embarrassment, frustration, decrease, anxiety and isolation. The only emotion studied that did not show significant improvement was marginalization, which may be related to the fact that it was the emotion that fewer individuals experienced before the process (60%-No). If we relate to the studies presented above, we can see that this feeling often arises after the installation of many other negative emotions that culminate in isolation.

Also, a possible justification may be the fact that those around the individual are the first to detect the difficulty and seek help or solutions to minimize the situation and, by using communication strategies or being more careful in the way they communicate, do not allow them to feel or experience marginalization or isolation. Although the sample is very small, it will be interesting to observe that in the comparison between genders, the process of auditory rehabilitation in females seems to be more favorable. Such results lack a large sample because one of the male individuals mentioned not always using the auditory system all day, which could also be an explanation for this discrepancy between genders. The results obtained demonstrate the need for the Hearing Rehabilitation

professional to be aware of the individual's emotional issues throughout the process.

As previously mentioned, one of the individuals did not use the complete system for at least 8 hours a day (the recommended for a good adaptation) and is also the individual who shows the least improvement compared to the other participants. This case can describe situations of failure, since the intended improvements were not achieved and maintains the negative experiences associated with hearing loss. In view of the results obtained, there is relevant material to deepen the study of emotions and the Rehabilitation Process, so it is suggested to continue the study with more specific material, such as a questionnaire built for the purpose in which it can address negative emotions and also positive, thus being able to assess whether with the Hearing Rehabilitation Process there is a greater experience of positive sensations in their day-to-day.

Conclusion

Throughout this work, several studies were addressed that report emotions involved in the course of hearing loss, however the present study addressed only some of these emotions that are present in the HHIE Scale. The limitations imposed by the Covid-19 pandemic impacted the collection of information, making it impossible to obtain a larger and more diverse sample, preventing statistically significant conclusions for application. The results presented in the study refer that emotions are related to the individual's hearing capacity and can improve the perception of negative emotions using the auditory rehabilitation process, data that are interesting for the area and in need of more specific research. Exposing the described needs, the study proved to be

challenging in its design, but very fruitful and interesting for its deepening, making it possible to carry out a complete and solid study in a PhD (3rd Cycle). Thus, it is suggested to continue the study with a questionnaire created from scratch and specific to the topic with a wider sample.

References

1. (2015) População residente com deficiência segundo os Censos: total e por tipo de deficiência. PORDATA.
2. Joanna N, Denny M, Andrew P, Nicholas SR (2019) The cognitive and psychosocial effects of auditory training and hearing aids in adults with hearing loss. *Clin Interv Aging* 14: 123-135.
3. MR Pereira-Jorge, KC Andrade, FX Palhano-Fontes, PRB Diniz, M Sturzbecher, et al. (2018) Anatomical and functional MRI changes after one year of auditory rehabilitation with hearing aids. *Neural Plasticity* p: 13.
4. Laura L, Roulla K, PT Kitterick (2018) The psychological and social consequences of single-sided deafness in adulthood. *Int J Audiol* 57(1): 21-30.
5. RS Andrew Valla (2000) Psychology of individuals with hearing impairment. em *Textbook of Hearing Aid Amplification*, San Diego, Singular Thomson Learning Pp: 557-569.
6. Alexandra JH, Kimberly SC, J Zhuang, Linda KG, RA Adcock, et al. (2018) Relating sensory, cognitive and neural factors to older persons -perceptions about happiness: an exploratory study. *Journal of Aging Research* p: 11.
7. EV Svinndal, Chris J, Marit R (2020) Employees with hearing impairment. A qualitative study exploring managers experiences. *Disabil Rehabil* 42(13): 1855-1862.
8. EV Svinndal, Chris J, Marit R (2020) Working life trajectories with hearing impairment. *Disabil Rehabil* 42(2): 190-200.
9. TX Diao, QH Han, HJ Shan, XQ Wu, YJ Lin et al. (2019) Study on the relationship between age-related hearing loss and cognitive impairment. *Zhonghua Er Bi Yan Hou Tou Jing Wai Ke Za Zhi* 54(2): 110-115.
10. KS McClannahan, Kristina CB, Kelly LT (2019) Auditory evoked responses in older adults with normal hearing, untreated and treated age-related hearing loss. *Ear Hear* 40(5): 1106-1116.
11. L Monteiro, J Subtil, Fernando Vilhena de M (2018) *Audiologia, som e audicao das bases a clinica*. Queluz: Circulo Medico p: 315.
12. PC Carmo, R Pimenta, PL Ferreira (2011) A Qualidade De Vida No Indivíduo Com Perda Auditiva. em *Conferencia Nacional da Economia da Saude*, Lisboa.
13. E Batlle, E Scherdel A (2013) *Estupina, Tratado de audiologia*. Barcelona: Elsevier Masson.
14. J Katz (1999) *Tratado de Audiologia*. Sao Paulo: Manole.
15. T Santos, I Russo (1991) *A pratica da audiologia clinica*. Sao Paulo: Cortez Editora.
16. K Moore, A Dalley (2007) *Cabeca*. em *Anatomia Orientada para a Clinica*, Rio de Janeiro, Guanabara Koogan SA Pp: 946-964.
17. JL Reis (2002) *Surdez: Diagnostico e Reabilitacao Vol I*. Lisboa: Servier.
18. F Bess, H Larry (1992) *Fundamentos de Audiologia*. Porto Alegre: Artmed.
19. DGS Direcao Geral de Saude.
20. L Ferreira, SL Debora Befo-Lopes (2005) *Tratado de fonoaudiologia*. Sao Paulo: Roca.
21. JL Reis (2003) *Surdez: Diagnostico e Reabilitacao Vol II*. Lisboa: Servier.
22. AC Lopes (2006) *Tratado de clinica medica*. Sao Paulo: Roca.
23. M Valente (2002) *Strategies for Selecting and Verifying Hearing Aid Fitting*. New York: Thieme.
24. L Lu, X Zhang, X Gao (2019) Non- implantable artificial hearing technology. *Adv Exp Med Biol* 1130: 145-163.
25. H Levitt (2007) A historical perspective on digital hearing aids: how digital technology has changed modern hearing aids. *Trends Amplif* 11(1): 7-24.
26. M Bille, A Jensen, E Kjaerbol, V Vesterager, P Sibelle, et al. (1999) Clinical study of a digital vs an analogue hearing aid. *Scand Audiol* 28(2): 127-135.
27. C Magni, F Freiburger, K Tonn (2005) Evaluation of satisfaction measures of analog and digital aid users. *Braz J Otorhinolaryngol* 71(5): 650-657.
28. KE Hecox, JL Punch (1988) The impact of digital technology on the selection and fitting of hearing aids. *Am J Otol* 9(Suppl): 77-85.
29. JR Curran, JA Galster (2013) The master hearing aid. *Trends Amplif* 17(2): 108-134.
30. WIDEX (2016) *Widex Evoke hearing aid*. Copenhagen.
31. Cochlear (2018) *Portefolio para profissionais: escolher um processador de som Cochlear*.
32. D Trampe, J Quoidcach, M Taquet (2015) Emotions in everyday life. *PLOS One* 10(12): e0145450.
33. E Klein, S Bieck, J Bloechle, S Huber, J Bahnmüller, et al. (2019) Anticipation of difficult tasks: neural correlates of negative emotions and emotion regulation. *Behav Brain Funct* 15(1): 4.
34. Dialechti T, Daphne K, Petros G (2018) Determinants of health-related quality of life (HRQoL) among deaf and hard of hearing adults in Greece: a cross-sectorial study. *Arch Public Health* 76: 55.
35. EV Svinndal, Chris J, Marit R (2020) Employees with hearing impairment. A qualitative study exploring managers' experiences. *Disabil Rehabil* 42(13): 1855-1862.
36. C Heine, C J Browning, CH Gong (2019) Sensory Loss in China: prevalence use aids and impacts on social participation. *Front Public Health* 7: 5.
37. D Perez-Garin, Patricia R, Alejandro M, Fernando M, C Garcia-Ael (2018) Perceived discrimination and emotional reactions in people with different types of disabilities: a qualitative approach. *Span J Psychol* 21: E12.
38. E Heffernan, NS Coulson, H Henshaw, Johanna GB, Melanie AF (2016) Understanding the psychosocial experiences of adults with mild-moderate hearing loss: An application of Leventhal's self-regulatory model. *Int J Audiol* 55(Suppl 3): S3-S12.
39. R Novak (2000) Considerations for selecting and fitting of amplification for geriatric adults. *Hearing aid amplification*, San Diego, Singular Thomson Learning Pp: 571- 603.
40. BIAP. BIAP.ORG.



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