

**Illness Representations, Acceptance, Coping and Psychological Distress in Chronic
Tinnitus.**

**Thesis submitted for the degree of
Doctor of Clinical Psychology
University of Leicester**

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Declaration

**I confirm that the literature review and research report
contained within this thesis have not been submitted
for any other degree, or to any other institution.**

Summary

Tinnitus is a prevalent condition which is associated with significant distress and disability in a substantial proportion of the population. The variance in distress is not adequately explained by audiological characteristics of the symptom and it has been widely accepted that other variables are influential in determining the relationship between the stimulus and distress. A review of the literature highlights significant relationships between many psychosocial variables and tinnitus severity (impact on life). However, conclusions based on existing research are limited due to methodological weaknesses and widespread neglect of coherent theoretical foundations. The review identifies a need for further research with comprehensive theoretical underpinning to provide a greater understanding of adaptation to chronic tinnitus.

One theoretical framework which has been applied extensively to explore the process of adaptation to chronic conditions is Leventhal's Self Regulation Model (SRM). This model has not yet been applied to the study of chronic tinnitus with sufficient methodological rigour to draw firm conclusions on its utility for this patient group. Existing research on tinnitus suggests that coping efforts (integral to the SRM) are often associated with increased distress with the notable exception of strategies indicative of acceptance. Recent research into chronic pain has indicated a role for acceptance in predicting adaptation, however it has not been investigated in the context of tinnitus to date. Therefore, research was undertaken to investigate the relationships between cognitive illness representations, coping, acceptance and psychological distress in patients with chronic tinnitus. The findings suggest that cognitive illness representations predict variance in psychological distress and that coping and acceptance variables enhance the explanatory power of the models. The clinical implications of the findings and the limitations of the study are discussed. Finally, an account of the process of undertaking the research and reflections on this experience is presented.

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Section 1

Literature Review

Psychosocial Predictors of Tinnitus Severity

Psychosocial Predictors of Tinnitus Severity

Purpose: To interrogate the literature examining relationships between psychosocial factors and tinnitus severity.

Method: Five electronic databases were scrutinised in a systematic literature search for studies focusing on psychological and social variables associated with tinnitus severity. Thirty-two papers were elicited for inclusion.

Results: Significant relationships were found between tinnitus severity and personality constructs, mood states, cognitive processing biases and health appraisals. Studies examining coping yielded equivocal findings. Research examining social factors was circumscribed but suggested a role for marital cohesion and spousal response. Socioeconomic variables showed little or no relationship with tinnitus severity. Heterogeneity in samples, measurement techniques and conceptualisation of constructs studied precluded systematic comparison between studies.

Conclusions: Consensus on the definition of the term tinnitus severity remains necessary and will enable meaningful comparison across studies. Numerous psychosocial variables studied showed relationships to tinnitus severity, however, the sparse theoretical foundation of most studies precluded consideration of explanatory models. Theoretically driven research employing validated tools is urgently required and prospective designs should be utilised to address ambiguity regarding the direction of the relationships.

Key words: tinnitus, severity, psychosocial, predictors, review

Target Journal: Clinical Psychology Review

1.0 Introduction

Tinnitus is a term describing acoustic perceptions which are not attributable to external stimuli (Vesterager, 1997). Physical causes of tinnitus perception have been linked to cochlear damage or insult to neural auditory pathways (Tunland, 2004). However, the condition can present as a consequence of a number of other conditions including Ménière's disease, temporomandibular joint disorder and vascular disease (Tunland, 2004). The most dominant risk factor for tinnitus development is hearing loss, however in many cases physical aetiology remains unknown and tinnitus may also present in the absence of any apparent organic damage. Epidemiological studies suggest that between 10.1 and 14.5% of the adult population report chronic tinnitus (Sanchez, 2004). Whilst the majority of patients adjust well to the symptom, approximately 1% of the population experience significant disability (Coles, Smith, & Davis, 1988).

Tinnitus severity refers to the condition's impact on life and although used rather fluidly across research studies, here it refers solely to impact on life rather than the objective characteristics of the symptom. Early research exploring severity focussed on patient distress as a function of the audiological qualities of the tinnitus, assuming that distress would increase with tinnitus that was objectively worse. However, findings have been inconsistent; some revealing that volume does not predict poorer patient adaptation (e.g. Jakes, Hallam, Chambers, & Hinchcliffe, 1985; Hallam, Rachman, & Hinchcliffe, 1984), others demonstrating significant correlations between such audiological characteristics and tinnitus severity (for a summary see Henry & Wilson, 1995). Equivocal findings suggest that

variance in tinnitus distress is not solely accounted for by audiological characteristics prompting investigation of psychosocial variables' role. It is this body of evidence which forms the subject of this review.

2.0 Method

2.1 Aims

The aim of the current paper is to review the literature exploring psychosocial predictors of tinnitus severity.

2.2 Search strategy

Relevant electronic databases were interrogated using title and abstract searches for the following terms; “tinnitus AND predict\$ OR correlate\$ OR impact OR function\$ OR quality of life OR sever\$ OR distress\$ OR disab\$ OR handicap OR outcome OR adjust\$ OR coping OR sleep OR anxi\$ OR depress\$ OR mental\$ OR emoti\$ or cognit\$ or affect\$ OR personality\$ OR psych\$ OR social”. The number of articles resulting from each database are presented in table 1.

Table 1: Number of articles retrieved from literature searches

Database	Number of articles identified
Medline (1950-January 2007) and Embase (1980-January 2007)	480
Psychinfo (1950-January 2007)	70
Cinahl (1982-January 2007)	330
Web of Science (1970-January 2007)	112

2.3 Inclusion/exclusion criteria

Following the initial search, duplicates were removed and resulting papers were assessed for relevance according to the following inclusion criteria:

- English language;
- Research concerning adult samples with chronic tinnitus;
- A specific focus on the relationship between psychosocial variables and tinnitus severity. Tinnitus severity was defined as any marker of tinnitus' impact on life including psychological morbidity, functional outcomes, and quality of life.

Exclusion criteria eliminated review papers and research focusing solely on:

- Treatment;
- Prevalence of psychological morbidity;
- Measurement of tinnitus severity;
- Biomedical predictors of tinnitus severity.

The refined results yielded twenty-seven papers for inclusion in the review and scrutiny of

the reference lists of these papers yielded five further relevant articles.

3.0 Results

The papers highlighted for inclusion in the review address the impact of a range of psychosocial variables on tinnitus severity. These include the influence of personality, mood states, cognitive characteristics, coping style, the role of other individuals and socioeconomic variables. A table summarising the key features of the papers reviewed is presented in Appendix 2.

3.1 Personality Variables

Two of the studies reviewed addressed the role of personality profiles rather than specific traits. Erlandsson and Persson (2006) investigated distress profiles of tinnitus patients diagnosed with personality disorder (PD) three years after initial assessment. Of seventy patients, eighteen showing average or above average psychopathology at assessment were followed up. Eight of these patients were diagnosed with PD and demonstrated no change in distress one and half years later, whilst significant decreases in distress were observed in the ten patients who were not diagnosed with PD suggesting that personality factors may impact on adjustment to the condition. It is unclear whether the PD diagnosis was shared with patients. Arguably receipt of such a diagnosis may in itself have impacted on the capacity of individuals to adapt. Furthermore, the psychiatric interview undertaken to determine PD diagnoses was not repeated at follow-up therefore the prognostic validity of the diagnoses is

uncertain.

Significant associations have also been found between all subscales of the Mini-Mult form of the Minnesota Multiphasic Personality Inventory (MMPI; Kincannon, 1968) and tinnitus severity (Meric, Gartner, Collet & Chery-Croze, 1998). An interesting facet of this study was that three different measures of tinnitus severity were employed. Whilst MMPI subscales were related to severity as measured by the Tinnitus Reaction Questionnaire (TRQ; Wilson, Henry, Bowen, & Haralambos, 1991) and Tinnitus Handicap Questionnaire (THQ; Kuk, Tyler, Russel, & Jordan, 1990), no such relationship existed with the Subjective Tinnitus Severity Scale (STSS; Halford & Anderson, 1991a). The latter finding may be attributed to the authors' decision to set the significance level at $p < 0.0001$ for simple correlations due to the large sample size. However, the associations found with the other two severity measures did reach this magnitude, highlighting the case that different measures of severity may be tapping different constructs and should therefore be compared with caution.

Nine of the reviewed studies investigated the relationship between specific personality traits and tinnitus severity. Some traits appear to confer a protective function, such as, optimism inversely relating to four subscales of a tinnitus severity measure; emotional distress, irrational beliefs, auditory perceptual difficulties and insomnia (Andersson, 1996). Similarly, hardiness appears to be significantly associated with high self-rated coping ability (Kirsch, Blanchard, & Parnes, 1989). Perfectionism, on the other hand has been related to higher levels of distress with differential gender effects suggesting that personal standards (tendency to set high standards and criticise self according to attainment of these standards)

predict distress in men whilst organisation (tendency to be neat/orderly) predicts distress in women (Andersson, Airikka, Buhrman, & Kaldo, 2005).

In a study of psychosocial and personality predictors of tinnitus distress, life satisfaction (a construct from the personality measure employed) was found to be the third most important predictor of distress after initial insomnia attributed to tinnitus and anxiety. Together, these variables measured during the first four weeks after tinnitus onset, predicted 56% of the variance in distress at six month follow-up (Langenbach, Olderog, Michel, Albus, & Kohle, 2005). This study suffered from a small sample size (n=34 included in the regression analysis) and recruited only inpatients, therefore the generalisability of these findings is limited. Furthermore, the extent to which one item from a questionnaire may be a valid reflection of a personality construct is questionable.

Traits associated with mood have received attention in several studies with findings indicating negative associations between trait anxiety and self-rated coping ability (Kirsch et al, 1989) and between trait anger and help-seeking behaviour (Scott & Lindberg, 2000). Halford and Andersson (1991b) also found that trait anxiety and depressive tendency were significantly related to tinnitus severity but stated that the correlation coefficients were small ($R^2=0.28$ and 0.32 respectively). Anxiety sensitivity (fear of anxiety-related symptoms) has been found to correlate significantly with tinnitus severity as measured by the TRQ (Andersson, Kaldo, Stromgren, & Strom, 2004). Furthermore, anxiety sensitivity predicted tinnitus severity beyond the effect of audiological variables (minimum masking and hearing thresholds) with a stronger effect observed in females (Andersson & Vretblad, 2000).

Studies investigating personality traits solely have shown some evidence for relationships with tinnitus severity. However, the cognitive variables, catastrophic thought and dysfunctional beliefs have been found to mediate the relationship between trait anxiety variables and tinnitus severity (Lee, Kim, Hong, & Lee, 2004). Similarly, these cognitive variables mediated the relationship between symptom intensity markers and tinnitus severity. Thus personality traits and symptom intensity markers may not influence tinnitus severity directly, but rather via their influence on cognitive processing biases which may be amenable to cognitive interventions to mitigate tinnitus distress.

Although variables cited above appear to relate to tinnitus severity, interpretation of findings is problematic for two main reasons. Firstly, none of the studies employed a prospective design measuring personality constructs before the onset of tinnitus. Therefore, results from personality measures are potentially confounded by the more immediate reaction to the tinnitus. Secondly, as noted previously, evidence exists that trait variables do not directly influence tinnitus severity, but do so through their impact on cognitive processes (Kim et al, 2004).

3.2 Mood States

In addition to studies which have investigated the impact of emotional variables as traits or dispositions, nine of the reviewed studies also reported the relationships between affective states and tinnitus severity. Patients suffering from current depression scored significantly higher on a measure of tinnitus severity than non-depressed patients (Folmer, Griest, Meikle

& Martin, 1999), although this study relied on dichotomous patient-ratings of affective state which may not have been clinically valid. Similarly, identified items from the Nottingham Health Profile (Wicklund, Herlitz & Hjalmarsson, 1989), were strong predictors of protracted occupational absenteeism (Holgers, Erlandsson, & Barrenas, 2000). The authors hypothesise that one of these items ('the days seem to drag') is representative of depression, however, in the absence of validated measures for comparison, conclusions are difficult to draw.

Well-validated tools have however been deployed in other studies which have shown depression to significantly relate to tinnitus severity in several studies (Andersson et al, 2005; Budd & Pugh, 1995; Unterrainer, Greimel, Leibetseder, & Koller, 2003). However, the use of different measures of depression and tinnitus severity in each study precludes comparison. Anxiety has also been significantly related to tinnitus severity (Andersson et al, 2005; Budd & Pugh, 1995) but again different tools utilised prevent meaningful comparison. Finally, anxiety measured during the first four weeks following tinnitus onset, was one of three variables which together predicted 56% of the variance in distress at six month follow-up (Langenbach et al, 2005).

Other studies have investigated associations between mood and other outcomes related to severity. For example, anxiety and depression have been found to relate to self-rated coping ability (Kirsch et al, 1989) and help-seeking and non-help seeking patients have been found to differ significantly in their score on a number of different mood scales (Scott & Lindberg, 2000). Two studies investigated factors predictive of 'severe tinnitus suffering' defined as

absence from work for more than one consecutive month and more than three health appointments due to tinnitus during the eighteen month period following first consultation (Holgers et al, 2005; Zoger, Svedlund & Holgers, 2006). In the first of these studies, anxiety disorders but not depressive disorders, diagnosed on the basis of psychiatric interview, were found to be more prevalent in patients classified as having ‘severe tinnitus suffering’ when compared with patients who did not meet the criteria (Holgers et al, 2005). The second study employed the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) as well as psychiatric interview in tinnitus patients at high risk for developing ‘severe tinnitus suffering’ (Zoger et al, 2006). The results showed highly significant correlations between these disorders and tinnitus severity measured using the Tinnitus Severity Questionnaire (TSQ; Coles, Lutman, Axelsson, & Hazell, 1991). It is worth noting that in this case the sample was highly specified, therefore the generalisability of the findings is limited.

3.3 Cognitive Characteristics

The finding that anxiety and depression relate to tinnitus severity is not a revelation since a significant component of most measures of tinnitus severity is focussed on psychological distress. The association may therefore represent measures of the same phenomena to an extent. Perhaps of more interest are the putative mechanisms underlying these conditions which may contribute to the development of heightened distress in certain individuals. Other research has gone beyond the examination of the broad diagnostic entities of anxiety and depression to investigate more specifically defined cognitive variables (thinking styles, attitudes, beliefs and perceptions relating to the condition).

3.3.1 Thinking style

Dysfunctional thinking, as a putative mechanism in depression, has received attention in two of the reviewed studies. Patients with elevated tinnitus severity have lower mood scores (measured via Beck Depression Inventory; Beck, Ward, & Mendelsohn, 1961) and engage in more tinnitus-related dysfunctional thinking (measured by the Automatic Thoughts Questionnaire; Hollon & Kendall, 1980) than those with low tinnitus severity (Henry & Wilson, 1995). However, general negative cognitions did not differ between these two groups suggesting that tinnitus-specific cognitions were influential as opposed to a more generalised negative cognitive style. Similarly, tinnitus-related dysfunctional beliefs and catastrophic thoughts appeared to mediate the relationship between symptom intensity and distress (Lee et al, 2004).

3.3.2 Perceived attitudes

As part of wider investigations, three of the reviewed papers considered the relationship between patient perceptions of other's attitudes and tinnitus severity. Perceived negative attitudes (e.g. people get annoyed with me, tinnitus causes conflict in my family, people treat me differently) have been shown to relate positively to a standardised measure of tinnitus severity (Erlandsson et al, 1992). Further support for this finding was reported in a study in which perceived negative attitudes alongside impaired concentration, feeling depressed, hypersensitivity to sound, average hearing level and tinnitus duration accounted for 65% of variance in quality of life (Erlandsson & Hallberg, 2000). However, since quality of life in

this study was measured using responses to two individual questions taken from two separate measures, the validity of the questions as an adequate measure of this construct is questionable. Perceived attitudes towards tinnitus have also emerged as one of a group of predictors of increased perceived handicap (Hallberg et al, 1993). Further analysis revealed that entering the variable social support related to tinnitus into the regression model attenuated the impact of perceived attitudes on tinnitus handicap. It is suggested that social support may have the effect of bringing attention to the tinnitus which is detrimental to habituation (Hallberg et al, 1993).

3.3.3 Health appraisal

A model which has been extensively used to explain adjustment to chronic conditions in research on other health conditions is the Self-Regulation Model (SRM; Leventhal, Meyer, & Nerenz, 1980). This model states that individuals develop cognitive and emotional representations of symptoms which determine their emotional and behavioural reactions to health threats. Preliminary investigation of the relationship between tinnitus distress and illness representations has recently been undertaken (Reynolds, Gardner, & Lee, 2004) in a study using the Illness Perceptions Questionnaire (IPQ; Weinman, Petrie, Moss-Morris, & Horne, 1996) to measure these constructs. *Illness identity* (number of symptoms attributed to tinnitus) and *consequences* (beliefs concerning the potential outcome of the condition) correlated positively with anxiety and depression scores on the HADS. Furthermore, *consequences* accounted for 13.6% and 34.6% of the variance in anxiety and depression scores respectively in a step-wise multiple regression. Significantly lower ratings of

intrusiveness, sleep problems and psychological impact as measured by the Tinnitus Questionnaire (TQ; Hallam, Jakes, & Hinchcliffe, 1988) were observed for patients scoring in the mild-moderate range of the anxiety subscales of the HADS when compared to those scoring in the moderate-severe range. Although no such differences were observed for the depression subscale, the authors note that the group scoring in the severe range for depression was small (10% of the sample). In addition, the small sample size for this study (n=55) precludes strong conclusions being drawn on the basis of these results.

One of the illness representations dimensions proposed by the SRM concerns the patient's perceptions of the degree to which the condition is curable and/or controllable (either due to personal efforts or the effects of treatment). Reynolds et al (2004) did not observe a relationship between the *control/cure* dimension of the IPQ and tinnitus severity, possibly due to the circumscribed sample size in this study. However, other studies which have addressed control as an isolated construct have employed larger samples permitting more rigorous assessment. Findings indicate that perceived controllability significantly predicts discomfort from and adaptation to tinnitus (Scott, Lindberg, Melin, & Lyttkens, 1990). Two further studies demonstrated a significant negative correlation between internal locus of control and tinnitus severity (Budd & Pugh, 1995; Unterrainer et al, 2003). Notably, locus of control was not directly related to tinnitus severity but the effect was mediated by the impact of locus of control on anxiety and depression (Budd & Pugh, 1995). This suggests that the anxious and depressed states which are associated with increased tinnitus severity and are likely to be identified as clinical presenting problems, may be underpinned in part by underlying perceptions of a lack of control. This would imply that interventions designed to

enhance patient perceptions of control may be effective in reducing levels of anxiety, depression and tinnitus severity.

The construct of perceived control was further subdivided in a study investigating the impact of perceptions of general control over health, symptom control and retrospective control on depressive symptoms and wellbeing (Sirois, Davis, & Morgan, 2006). Perceived control over general health and symptoms were significantly related to better psychological adjustment whereas retrospective control was related to poorer outcomes. Symptom control moderated the relationship between perceived symptom severity and adjustment. That is, stronger beliefs in the ability to control symptoms were more predictive of better adjustment in patients with more severe symptoms. Another study did not find a significant relationship between 'control over stressor' and self-rated disability assessed by ratings on three Likert scales relating to role perceived disability in work, social and home/family domains (Sullivan, Katon, Russo, Dobie, & Sakai, 1994). Comparison of the studies investigating perceptions of control is precluded due to the use of different measures of the control constructs and a lack of use of standardised measures of tinnitus severity. Findings relating to perceived control seem to point to a role for this variable. However, further research investigating perceived control within a theoretical framework which controls for the impact of other variables is needed to elucidate the relative importance of this association.

3.4 Coping with tinnitus

Coping is a term that is frequently used to explain the cognitive and behavioural means used

to manage situations which are appraised as stressful (Lazarus & Folkman, 1984). The construct has been conceptualised in a number of ways, in particular distinguishing between problem- and emotion-focused coping (Lazarus & Folkman, 1984) and active/approach and passive/avoidant coping (Suls & Fletcher, 1985). Furthermore, dispositional coping styles have been advanced to reflect generalised coping as opposed to the selection and adaptation of individual strategies according to the nature of the stressor and the resources available (De Ridder, 1997). Despite strong criticism of the adequacy of coping as a theoretical construct (De Ridder, 1997) it has nevertheless been widely used in empirical research and therefore merits review.

Five studies explored coping as the central construct under investigation. Sullivan et al (1994) used the Revised Ways of Coping Checklist with reference to tinnitus as the stressor in question. Results suggested that avoidant coping and seeking social support were associated with lower levels of role dysfunction in work, social and home/family domains. The finding regarding the benefit of avoidant coping appears contrary to common understanding of this coping style as maladaptive. However, it is argued that given the nature of the condition and the aim of habituating to the stimulus, it is unsurprising that this coping strategy should be effective for tinnitus patients. Whilst this is a plausible argument for the beneficial effect of avoidant coping, the same does not apply to seeking social support as this could be regarded to confer the opposite effect and draw increased attention to the tinnitus.

Four of the studies reviewed employed two different tinnitus-specific coping measures. Budd and Pugh (1996a; 1996b) report two factor analytic studies investigating coping styles

adopted by tinnitus patients. The first of these determined three coping style factors labelled maladaptive, passive and effective coping. Maladaptive and passive styles were significantly associated with increased tinnitus severity, depression and state anxiety. Effective coping however was significantly associated only with less anxiety but was unrelated to the measures of severity or depression. In a similar study, (Budd & Pugh, 1996b) two of the original three factors were replicated; maladaptive coping, characterised by practical and cognitive avoidance and catastrophic thinking and effective coping characterised by acceptance, positive self-talk, increasing range of daily activities facilitating distraction and attention focusing. The association between maladaptive style and increased tinnitus severity was replicated and in this study the effective style did not show any relationship with depression, anxiety or severity. The authors speculate that a potential reason for this could be that, rather than the use of 'effective' strategies being beneficial in itself, it may be that people who have learned to accept their tinnitus have done so by avoiding 'maladaptive' strategies.

Two studies reviewed employed measures addressing coping strategies as opposed to styles using the Tinnitus Coping Strategies Questionnaire (Henry & Wilson, 1995) which captures both frequency of use and the perceived benefit derived from a range of individual strategies. In the first of these studies, no differences were observed between two groups reporting high and low tinnitus severity in the frequency or benefit of coping strategies (Henry & Wilson, 1995). However, the authors considered that the use of total scores for this measure may have exerted a potential masking effect on any differences in individual types of coping strategies employed by the different groups. Of note however, was a trend towards a positive

association between frequency of use of strategies and tinnitus severity. A later study using the same severity and coping measures allows a rare opportunity for comparison (Andersson, Kaldo, Stromgren, & Strom, 2004). Correlation analyses revealed a significant association in the same direction as the trend reported previously (Henry & Wilson, 1995) that more frequent use of coping strategies was associated with higher tinnitus severity even when the effects of psychological distress and anxiety sensitivity were controlled. A similar but smaller relationship was observed between perceived benefit of coping strategies and increased tinnitus severity.

Andersson et al (2004) found that most coping items (73%) showed positive significant relationships with tinnitus severity with only one item 'I continue with my daily life as though the tinnitus is not there' showing a significant negative correlation, suggesting use of acceptance. These findings suggest that adaptation may be achieved by disengaging from active coping efforts and is compatible with the theory that adaptation to tinnitus will be achieved by habituating to the stimulus (Hallam et al, 1988) since conscious engagement in coping is likely to maintain focus on the symptom.

A further three of the studies reviewed addressed coping as part of a wider investigation. In a study using the Revised Ways of Coping Checklist (Vitaliano, Russo, & Carr, 1985) depressed tinnitus patients were found to use less problem-focused coping than those without depression, whilst non-depressed tinnitus patients showed a similar coping profile to hearing-impaired controls (Sullivan et al, 1988). The tinnitus group reported more avoidant coping than controls, although the effectiveness of these strategies was not reported.

Consistent with Sullivan et al (1988), a study using the ‘Strategies for Handling Stress Questionnaire’ (Demorest & Erdman, 1987) found that use of active coping as well as non-verbal communication strategies were associated with lower levels of perceived handicap, whilst maladaptive behaviour and escape coping were associated with increased perceptions of handicap (Hallberg, Johnsson, & Axelsson, 1993). These effects no longer remained when the variable ‘acceptance of hearing problems’ was included in the regression. This study assessed a male-only sample with noise-induced hearing loss (both with and without tinnitus) and therefore the generalisability of the findings is limited. In contrast, a study using the ‘Freiberg Disorder Coping Questionnaire’ (Muthny, 1989) reported that patients with decompensated tinnitus (high severity) engaged in more problem-focussed and active coping strategies including conscious diversion and self-rehabilitative efforts than did a group of patients with compensated tinnitus (low severity) (Stobik et al, 2005).

3.5 Relationships

Relationship status has seldom been investigated in the context of tinnitus, however the role of attachment is considered in one paper whilst two further studies have investigated marital relationships. Avoidant attachment was associated with greater tinnitus severity whilst both avoidant and ambivalent attachment styles were related to perceived punitive family responses (Granqvist, Lantto, Ortiz, & Andersson, 2001). Avoidant attachment predicted tinnitus severity even when the effects of perceived family support were controlled. Secure attachment however, was unrelated to both measures.

The role of marital support was investigated in a study in which patient-rated marital cohesion was found to negatively relate to perceived disability (rated on Likert scales) in work, social and home/family domains (Sullivan et al, 1994). Spouse-rated punitive responses to illness behaviour were also found to correlate with higher levels of patient-rated disability. Interaction effects also emerged showing that the effect of marital cohesion and punishing responses on disability were significantly more pronounced in patients with higher levels of depression, thereby supporting a stress-buffering model of social support. Yet since the patients in this study were pre-selected for a double blind trial of anti-depressant medication the highly specified sub-group of patients at the more severe end of the spectrum may not be representative of the wider tinnitus population.

A later study further investigated the impact of spousal responses and marital satisfaction on coping style, tinnitus severity, anxiety and depression (Pugh, Stephens, & Budd, 2004). Marital satisfaction inversely related to anxiety and depression whilst ‘punishing responses’ (ignoring or selectively punishing complaints) were associated with increased anxiety and depression, maladaptive coping and tinnitus severity. Partial correlations suggest that anxiety and depression mediate the relationship between punishing responses and tinnitus severity. Interestingly, ‘solicitous responses’ (sympathetic responses to complaints about tinnitus), were also associated with increased distress and maladaptive coping. In summary, whilst marital satisfaction seems to be associated with positive outcomes, spousal responses whether sympathetic or punitive appear to be associated with increased distress.

3.6 Socioeconomic factors

The systematic review process identified a number of papers which incidentally reported the relationship between socioeconomic variables and tinnitus severity. These studies suggest that tinnitus severity is unrelated to age (Sullivan et al, 1994; Langenbach, 2005) socioeconomic status (Sullivan et al, 1994; Scott & Lindberg 2000), marital status (Scott & Lindberg, 2000; Langenbach et al 2005) and patient's residential location (Scott & Lindberg, 2000). Two studies reporting on educational attainment produced contradictory findings. Whilst respondent's educational attainment did not predict tinnitus severity six months after symptom onset (Langenbach et al, 2005), 'years of education' did show a relationship with perceived handicap in another study (Hallberg et al, 1993). Both of these studies were methodologically compromised, the former by a small sample and constrained follow-up period and the latter by use of an all male sample comprising hearing impaired patients both with and without tinnitus, undermining generalisability to the chronic tinnitus population as a whole.

One study in the review was conducted with the sole aim of investigating the role of socioeconomic factors in predicting tinnitus severity (Unterrainer, Greimel, & Leibetseder, 2001). Consistent with Hallberg et al (1993) lower levels of education were found to predict higher scores for emotional-cognitive related handicap whilst age, gender and marital status were all found to be unrelated to tinnitus severity. Altogether, the amount of variance in tinnitus severity explained by the socioeconomic variables was very small at 5.6% of the emotional-cognitive subscale and 1.4% of the functional-communicative subscale of the

Tinnitus Handicap Inventory (Newman, Jacobson, & Spitzer, 1996).

4.0 Discussion

4.1 Summary of findings

Studies reviewed herein have reported associations between tinnitus severity and a vast array of psychological variables. Focus of personality constructs has highlighted positive associations between tinnitus severity and perfectionism, life satisfaction, self-consciousness, trait anger and a range of anxiety-related variables. A relationship has also been observed between hardiness and high self-rated coping ability. Furthermore, patients with personality disorder exhibited no significant change in distress profiles over time. However, research based on personality constructs has tended to investigate isolated variables and more recent work suggests that controlling for other factors may attenuate the influence of some personality traits (Lee et al, 2004).

Research concerning cognitive variables suggests a role for anxious and depressed mood states and more specifically dysfunctional/ catastrophic thinking in predicting increased tinnitus severity. Studies addressing attitudes and beliefs about tinnitus have received limited attention, however one study has identified a relationship between both illness identity and perceived consequences taken from the self-regulation model and tinnitus severity.

Perceptions of control as a predictor have received somewhat more attention with results pointing to the beneficial effect of an internal locus of control. Whilst two studies supported

the positive impact of having greater levels of perceived control over tinnitus, another did not find such a relationship. A lack of use of standardised instruments and in some instances small sample sizes preclude meaningful comparison of these results.

Studies investigating coping have yielded extremely equivocal findings with both problem-focused and avoidant styles of coping showing associations with positive and negative outcomes. In addition, a replicated factor analysis study has pointed to two distinct coping styles employed by tinnitus patients labelled 'maladaptive' and 'effective'. Whilst maladaptive coping related to increased severity as expected, effective coping conferred no identifiable benefit. Two further studies investigated the frequency of coping strategies used and benefits derived with one finding the unexpected result that more frequent use and perceived benefit of strategies was positively related to increased severity and the other identifying a similar trend. No clear picture emerges from these findings which may be reflective of the use of a number of different measures of coping. De Ridder (1997) has argued that the majority of coping assessment tools are methodologically flawed, possessing low internal consistency and a lack of evidence to support test-retest reliability and construct and predictive validity. Furthermore, problems with the theoretical operationalisation of coping as a construct, such as a lack of agreement on the number and character of coping dimensions and relative importance of dispositional versus situation specific coping responses underpins the difficulties in deriving adequate measures of coping.

The majority of papers identified appear to focus on intrapersonal factors which have been hypothesised to affect tinnitus severity. However, interpersonal variables have also received

some attention. Patients' perceptions of negative attitudes in other people have emerged as detrimental to adjustment, as has an avoidant attachment style. Secure attachment, on the other hand, showed no relationship with tinnitus severity. Marital relationships have also been the subject of some interest with two studies supporting the positive effects of perceived marital cohesiveness. Perceptions of punishing spousal responses were also found to relate to increased tinnitus severity in both studies and in one, solicitous responses had the same effect.

Socioeconomic variables generally showed no relationship with tinnitus severity apart from education level which emerged as predictive in two studies. The contribution of this factor to the explained variance, however, was very small.

5.0 Critique

5.1 Patient samples

None of the papers reviewed explicitly reported *a priori* power calculations to determine required sample size, and in some of the papers the sample size was evidently small, limiting the conclusions that could be drawn. Populations examined were broadly consistent in using samples of adults with chronic tinnitus; however, elements of inconsistency arise in other aspects of sampling. Although gender as a predictor of outcomes in tinnitus has not been considered in this review, it is important to note that gender effects were reported in a number of the studies reviewed. Therefore, failure to control for gender effects in studies where the

sample was gender imbalanced (39% to 100% male) may introduce bias to the results. Few studies reported the aetiology of the tinnitus and in the absence of specified inclusion criteria it is likely that cause was heterogeneous. Hearing loss, an extremely common concomitant of tinnitus, was measured in some studies but controlled for in only a few. Mean age ranged from 41.4 to 62.3 years and mean tinnitus duration, where reported ranged from 4.2 to 10.5 years apart from in one study where patients were recruited within the first four weeks following onset. Samples were most frequently drawn from outpatient clinics however, a range of other sources were used, adding to the potential heterogeneity of the samples reviewed in terms of factors such as symptom intensity and treatment undergone. The inclusion criteria/ sampling methods of the studies reviewed are reported in Appendix 2.

5.2 Theoretical basis of research

Many psychosocial constructs have been addressed in the research reviewed in this paper. However, the selection of these constructs for study appears to lack sound theoretical grounding. Authors have often chosen to concentrate on one or a few isolated psychological constructs, however coherent theoretical grounds for the selection of studied variables is generally lacking. As a consequence there has also been widespread failure to control for other potentially influential variables. This case is highlighted where a relationship has been observed but the influence is subsequently attenuated by the addition of other variables to a model.

Observing relationships between isolated psychosocial constructs and tinnitus severity may

be of intrinsic interest but does not advance comprehensive understanding of the process of adaptation to the condition. Given the substantial body of research which has applied contemporary health psychology models in research of other conditions, it is somewhat surprising that tinnitus research continues to lag behind. Perhaps tinnitus has been relatively neglected due to its nature as a hidden condition and the absence of associated medically treatable pathology. However, tinnitus is recognised as a condition associated with severe distress and disability in a substantial proportion of cases and therefore understanding of the process of adaptation and adjustment is critical. To enhance such understanding, research which employs designs underpinned by validated models of adaptation to chronic conditions remains necessary.

5.3 Design

Researchers have repeatedly questioned whether personality factors or pre-existing vulnerability predisposes certain individuals to greater distress and/or disability or whether this emerges as a reaction to the onset of the condition. Cross-sectional designs dominate the research reviewed and consequently this problem remains inadequately addressed and the direction of the relationships observed remains ambiguous. Measures intended to assess stable and enduring personality traits have been used in an effort to mitigate this weakness. However, any measure of stable and enduring traits administered after the onset of an aversive condition may reflect only the reaction to this condition rather than pre-existing personality characteristics. Prospective longitudinal research remains necessary to demonstrate whether pre-existing psychological characteristics and social factors predispose

individuals to greater distress.

5.4 Methodological Issues

Tinnitus severity is a broad term encompassing any potential domain of impact of tinnitus on patient's lives. The studies reviewed have employed a range of measures of tinnitus severity from idiosyncratic methods such as visual analogue scales (requiring responses quantifying the overall amount of annoyance attributed to tinnitus) to standardised measures which focus on varied aspects of the impact of tinnitus on life. Some authors have constructed scales of severity which incorporate the perceived quality of the stimulus itself. These differences point to the considerable heterogeneity in the way in which the term tinnitus severity has been operationalised by different authors (see also Kennedy, Wilson, & Stephens, 2004). Furthermore, authors have also made use of related outcome variables such as quality of life, help-seeking behaviour, time off work, perceptions of coping ability and emotional distress. The lack of a unitary construct of tinnitus severity precludes meaningful comparison of the papers reviewed.

5.5 Clinical relevance

Determining the clinical implications of the studies reviewed presents a challenge. As mentioned previously, the methodological weaknesses and absence of theoretical underpinning of the research prevents strong conclusions being drawn on the basis of these findings. Overall, the research suggests that many psychological variables show

relationships with tinnitus severity in excess of the impact of biological variables. However, the direction and potential complexities of these relationships remains unclear and further work is required to clarify these relationships in order to determine which factors may be most usefully targeted in therapeutic work to enhance adjustment.

A further issue concerns the distinction between clinical and statistical significance.

Although this was not relevant in most of the studies reviewed, studies which assessed change in distress over time or made group comparisons neglected the opportunity to comment on this salient factor. For example, Erlandsson and Persson (2006) showed that patients without a personality disorder showed statistically significant decreases in distress over time but did not comment on whether this represented a clinically meaningful change. Similarly, Henry and Wilson (1995) found a statistically significant difference in tinnitus related negative cognitions between high and low distress groups but did not comment on the clinical significance of this finding.

6.0 Conclusions and implications for future research

The role of audiological characteristics of tinnitus in determining tinnitus severity is limited and socioeconomic variables investigated to date have shown little or no relationship with tinnitus distress. On the other hand, psychological variables have often shown relationships with tinnitus severity, though in the absence of longitudinal research the direction of the associations remains unclear. The relationships reported in the literature reviewed have not been uniformly direct and some of the papers reviewed have identified differential effects

according to gender and also the mediating role of mood states or more specifically cognitive styles. Furthermore, the picture concerning the role of coping styles and strategies remains confused and it has been suggested that acceptance may prove a more useful construct in accounting for variance in adjustment. These factors point to the complexity of the model which may help to explain the relationship between psychological factors and tinnitus severity. Whilst the research reviewed has highlighted many possible areas of influence, a comprehensive model explaining the interactions between psychological variables and tinnitus severity remains to be determined. Research which is theoretically underpinned, employing established and validated assessment tools with well defined samples is required to replicate and extend existing work. Such studies will also promote comparison which is essential given the heterogeneity of interpretation of the constructs investigated to date.

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Section 2

Research Report (OPTION A)

Illness Representations, Acceptance, Coping and Psychological Distress in Chronic Tinnitus.

Abstract

Objectives: To investigate the role of cognitive illness representations, coping and acceptance in relation to distress in patients with chronic tinnitus.

Method: Participants were recruited from NHS clinics and via advertisement through a national tinnitus organisation. The data collected included demographic, biomedical and mental health history background variables. The standardised assessments completed were; Illness Perceptions Questionnaire – Revised (IPQ-R), Brief Coping Orientation to Problems Experienced (COPE), Hospital Anxiety and Depression Scale (HADS), Tinnitus Handicap Inventory (THI) and the Chronic Pain Acceptance Questionnaire (CPAQ). Responses from 176 participants were retained for analysis.

Results: Illness representations constructs and coping both explained significant and unique proportions of variance in the models accounting for tinnitus severity, anxiety, depression and emotional representations. After controlling for other studied variables, the acceptance variable ‘activity engagement’ made a significant and unique contribution in explaining depression and emotional representations and ‘tinnitus willingness’ added a significant contribution to the model for tinnitus severity.

Conclusions: There may be a role for targeting illness representations via cognitive-behavioural interventions for tinnitus distress. Furthermore, acceptance based intervention approaches may be beneficial and their effectiveness, especially in comparison to coping based treatment approaches, requires further investigation.

1.0 Introduction

Tinnitus is a term describing auditory perceptions such as ringing, buzzing and humming which are not due to external stimuli (Vestergaard, 1997). The symptom predominantly arises as a concomitant of audiological damage (Tunland, 2004) but is not pathological in its own right. Chronic tinnitus is prevalent, affecting between 10.1% and 14.5% of the adult population in the United Kingdom (Sanchez, 2004) with approximately 1% of the population reporting considerable distress or disability due to the symptom (Coles, Smith, & Davis, 1988). A substantial body of literature exists demonstrating elevated prevalence of psychological distress in tinnitus patients, and furthermore, that the variance in distress is not adequately explained by audiological characteristics of the symptom (Andersson, 2002).

Research exploring the influence of psychosocial variables on tinnitus severity has pointed to the influence of a number of factors (see Andersson, 2002 for a review). However, the research to date is limited by its focus on isolated concepts with very few studies attempting to apply or generate comprehensive theoretical models explaining adjustment to chronic tinnitus. Whilst relationships between isolated psychosocial variables and tinnitus severity or psychological distress are of some utility, there is a limit to the weight that can be given to these findings without a more comprehensive theoretical underpinning or control for other relevant variables.

One well established and extensively researched model of appraisal and adaptation to health threats is the Self Regulation Model (SRM; Leventhal, Meyer, & Nerenz, 1980; Leventhal,

Leventhal, & Robitaille, 1998). This model states that, when faced with a threat to health, individuals construct both cognitive and emotional representations of the threat based on lay information, the social environment and personal experience. These representations are theorised to determine the selection of goal-oriented coping strategies, which, in turn determine functional and affective outcomes. Finally, the model proposes that individuals will appraise the effectiveness of their coping efforts in relation to the goals envisaged and resulting in alteration to coping strategies, the representations held about the illness or the pool of knowledge held about the condition.

Extensive pilot work undertaken in the generation of the model (Leventhal et al, 1980) and more recent exploration of its structure (Hagger & Orbell, 2003) have suggested that cognitive illness representations comprise five basic dimensions: *Illness Identity*, referring to the number of symptoms attributed to the condition; *timeline*, the perceived duration or transience of the condition; *consequences*, an assessment of the degree of impact exerted on life due to the condition; *control/cure*, the degree of perceived control or curability attributed to personal efforts or treatment; and *cause*, ideas concerning the factors which have caused or contributed to the condition.

Frequent application of the SRM across a range of health conditions has enabled a meta-analytic review (Hagger & Orbell, 2003) which has demonstrated that predictable patterns exist between the illness representations dimensions and psychological distress. In particular, increased perceptions of control/curability have been consistently associated with more favourable outcomes whilst increased identification of symptoms, perceived serious

consequences and longer expected duration have been associated with poorer psychological outcomes.

Only one study to date (Reynolds, Gardner, & Lee, 2004) has attempted to apply the SRM to the investigation of adaptation to chronic tinnitus. The results of this study provided preliminary indications that illness representations were related to psychological distress in a group of tinnitus patients. Multiple regression showed that *consequences* explained 13.6% and 34.6% of the variance in anxiety and depression scores respectively. However, this study was disadvantaged by its small sample and failure to consider coping which is integral to the SRM. Therefore, whilst these findings indicate that the SRM may constitute a useful framework for understanding tinnitus adaptation, replication and extension of this study is required.

The SRM provides a useful theoretical framework for investigating adaptation to chronic conditions. However, results from studies investigating a range of conditions indicate that illness representations may only account for approximately 10% to 50% of the variance in psychological and functional outcomes (Heijmans, 1998; Kemp, Morley, & Anderson, 1999; Helder, Kaptein, van Kempen, Weinman, van Houwelingen, & Roos, 2002). Therefore, in many cases, the majority of the variance in outcomes remains unexplained, leaving scope for the investigation of other potentially influential constructs.

Tinnitus is a symptom which shares key characteristics with chronic pain (Erlandsson, 2000). Both can be chronic conditions with no discernable outward characteristics other than patient

reactions. Characteristics of symptoms and severity in both conditions vary widely and underlying aetiology is also likely to be heterogeneous (Moller, 2000). Notably, both conditions can occur where there is no identified physical pathology and the presence of the symptom does not cause physical damage or degeneration. Absence of physical markers in these conditions means that symptom reporting and condition severity can only be monitored by subjective ratings. Due to the many similarities between the conditions it is logical that research into tinnitus can be helpfully informed by the evolution of research in chronic pain.

The goal of adaptation to tinnitus is often cited as ‘learning to live with it’ (Deafness Research UK, 2006), arguably a statement reflecting the concept of acceptance. Acceptance is a construct which has received increasing attention over recent years in chronic pain research (Nicholas & Asghari, 2006) and has been advanced as a potentially fruitful construct for investigation in tinnitus (Andersson, 2004). Conceptually, acceptance may be operationalised in several ways. Risdon, Eccleston, Crombez, and McCracken (2003) investigated the conceptualisation of the term acceptance in reference to chronic pain. A qualitative methodology was employed and derived eight distinguishable accounts of acceptance. The shared features among the accounts were expressions of a need to: resist becoming overpowered by pain and to focus away from it to other aspects of life; acknowledge that pain is unlikely to change so change in life is required and to refute the idea that pain is a sign of personal weakness and failure in life.

Despite the potential heterogeneity in conceptualising this construct, the majority of research addressing acceptance of chronic pain has utilised one measure of acceptance (Chronic Pain

Acceptance Questionnaire (CPAQ); Geiser, 1992) which facilitates comparison. Following investigation of its factor structure (McCracken, 1999b; McCracken et al, 2004) the original questionnaire was revised yielding a measure with two subscales addressing the extent to which patients engage in life activities despite pain and the degree to which they are willing to experience pain. Using this measure, a number of studies have found evidence for associations between acceptance and lower pain intensity, pain-related anxiety and avoidance, depression, physical and psychosocial disability as well as more daily uptime and better work status (McCracken, 1998; McCracken & Eccleston, 2003; Viane, Crombez, Eccleston, Devulder, & De Corte, 2004).

Despite initial compelling findings concerning the role of acceptance in predicting adjustment to chronic pain, a failure to control for other potentially relevant demographic and cognitive factors has been identified (Nicholas & Asghari, 2006). Indeed, after controlling for a small number of demographic, illness severity and cognitive variables (catastrophic thinking, fear of movement) the role of acceptance lost its significance in explaining physical disability, retaining influence only in the model accounting for depression (Nicholas & Asghari, 2006). Thus, whilst acceptance may have a role in explaining adaptation to chronic pain, its influence may be attenuated by controlling for other relevant variables including cognitive variables.

A single study (Rankin & Holtum, 2003) has investigated both acceptance and illness representations in the context of chronic pain. This study investigated the relationship between a global acceptance score and the dimensions of illness representations and found

correlations indicating that *identity* and *consequences* were both inversely related to acceptance. These findings suggest some interaction between cognitive representations of illness and acceptance of the illness. However, this study did not use the CPAQ therefore it must be considered that the aspect of acceptance addressed in this study may be different to that cited previously. Furthermore, only the relationships between the constructs were addressed in this study. Further work is required to assess the unique contributions of SRM constructs and acceptance to the explanation of variance in outcomes such as psychological distress and condition severity.

In summary, the psychosocial research endeavouring to explain adaptation to chronic tinnitus has been hampered by the use of designs considering isolated variables which lack theoretical underpinning. The single attempt to address this problem using the SRM (Reynolds et al, 2004) has methodological shortcomings inviting replication and extension. Furthermore, given that the SRM is unlikely to explain all of the variance in tinnitus distress, other constructs should be explored. Recent work considering the role of acceptance in chronic pain highlights a potentially fruitful avenue given the similarities between the two conditions.

1.1 Research Questions and hypotheses

1.1.1 What relationships exist between illness representations of tinnitus, coping strategies and the outcomes of anxiety, depression, emotional representations and tinnitus severity?

1.1.1.1 Hypothesis 1(a).

The outcomes (anxiety, depression, tinnitus severity and emotional representations) will be significantly positively related to the illness representation constructs of identity, consequences, duration and significantly negatively related to constructs of control and illness coherence.

1.1.1.2 Hypothesis 1(b).

Illness representations constructs will be associated with the coping strategies employed.

1.1.1.3 Hypothesis 1(c).

Coping strategies will be significantly associated with psychological distress and tinnitus severity.

1.1.2 Are illness representations and coping predictive of anxiety, depression and tinnitus severity?

1.1.2.1 Hypothesis 2(a).

Illness representations constructs and coping will predict a significant proportion of the variance in psychological distress and tinnitus severity.

1.1.2.2 Hypothesis 2(b)

Coping strategies will mediate the influence of illness representations on psychological distress and tinnitus severity.

1.1.3 What relationships exist between acceptance, anxiety, depression and tinnitus severity?

1.1.3.1 Hypothesis 3.

The acceptance constructs 'Engagement in life despite tinnitus' and 'Tinnitus willingness' will be significantly and negatively associated with psychological distress and tinnitus severity.

1.1.4 Is acceptance predictive of anxiety, depression and tinnitus severity?

1.1.4.1 Hypothesis 4.

The acceptance constructs 'Engagement in life despite tinnitus' and 'Tinnitus willingness' will predict a significant proportion of the variance in psychological distress and tinnitus severity.

2.0 Methodology

2.1 Design

A quantitative cross-sectional correlational design was employed to investigate the relationships between illness representations, acceptance, coping, anxiety, depression, tinnitus severity, emotional representations and a range of demographic and biomedical variables.

2.2 Participants

2.2.1 Power Analysis

An *a priori* power analysis was undertaken during the planning stages of the research to calculate the sample size necessary to achieve adequate statistical power (at least 0.8). The calculation was based on finding a correlation of 0.25 (medium effect according to Cohen, 1988) between illness representations and psychological distress at a significance level of $p = 0.05$. An on-line calculator provided by the University of California at <http://calculators.stat.ucla.edu/power/calc/correlation/> was employed and determined that the necessary sample size was 99. The sample size calculation was necessarily based on a correlation analysis due to a lack of previous research precluding calculation based on a regression analysis.

2.2.2 Inclusion/Exclusion Criteria

Participants were deemed eligible for inclusion if they met the following criteria;

- Diagnosis of chronic tinnitus (tinnitus having been present for at least six months with sounds typically lasting more than five minutes).
- Aged over 16 years.
- No diagnosis of Ménière's disease (due to the potential for a qualitatively different experience of tinnitus from sufferers for whom it is the primary complaint).

2.3 Research procedure

2.3.1 Obtaining the sample

Recruitment took place over a six-month period (September 2006-February 2007). To maximise recruitment, participants were sought both from National Health Service (NHS) outpatient clinics and via advertisement. An advertisement (Appendix 6) was placed in two consecutive issues of the journal of a national tinnitus organisation requesting volunteers to contact the researcher with expressions of interest in participation. Patients attending five clinics across four NHS Trusts were approached by their treating clinician to solicit interest in participation. The designation of staff recruiting at each clinic is outlined in table 2 below.

Table 2. Professional designations of the recruiting clinicians.

Clinic	Clinician Designations
Clinic A	One hearing therapist
Clinic B	Two hearing therapists
Clinic C	Five audiologists
Clinic D	Two audiologists
Clinic E	One audiovestibular physician

Due to the recruitment methods employed, it was not possible to monitor the number and characteristics of patients who declined participation.

2.3.2 Ethical approval

Ethical approval was obtained from the University of Leicester, a Multi-site Research Ethics Committee and local approval from the Research and Development department of each of the four NHS trusts involved (Appendices 3, 4 and 5).

2.3.3 Data collection

Participants fitting the inclusion criteria, who expressed interest in participation, were given a research pack by their treating clinician (in person) or the researcher (by post). The research pack contained an invitation letter (Appendices 7 and 8), an information sheet (Appendices 9 and 10), the questionnaire pack (Appendix 11) and a pre-paid return envelope. The

researcher was available by phone and email to provide further information and to answer questions. Consent was assumed from voluntary completion and return of the questionnaire pack.

2.4 Measures

The measures used were selected with the aim of providing a balance of psychometric robustness, previous use with chronic tinnitus populations and brevity.

2.4.1 Demographic/Biomedical Information

Demographic and biomedical data on gender, age, occupational status and marital status were collected in a brief structured questionnaire constructed by the researcher. Biomedical data and descriptors of the tinnitus; presence of other health problems, tinnitus duration, nature of onset (sudden/gradual), location of sound, constancy, pitch and loudness of tinnitus were recorded. Finally, information on history of and professional help for emotional difficulties and experience of stressful life events prior to and at the time of tinnitus onset, was also recorded.

2.4.2 Measure of illness representations

The Illness Perceptions Questionnaire – Revised (IPQ-R; Moss-Morris, Weinman, Petrie, Horne, Cameron, & Buick, 2002)

The IPQ-R is a revised version of the original Illness Perceptions Questionnaire (Weinman, Petrie, Moss-Morris, & Horne, 1996) which was developed to assess the constructs described within the Self-Regulation Model (SRM; Leventhal, Meyer, & Nerenz, 1980). The original measure contained five subscales addressing perceptions of *illness identity*, *consequences*, *timeline*, *control/cure* and *cause*. The revised measure also provides subscales for *illness coherence*, *emotional representations* (condition specific emotional responses), and developed measures of *timeline* reflecting perceptions of a cyclical illness course and *control/cure* reflecting beliefs about personal ability and treatment effectiveness in controlling or curing the condition. A more detailed description of the subscales is provided in Appendix 12.

Good internal consistency of the subscales has been demonstrated with alpha values ranging from $\alpha = 0.79$ to 0.89 in a study of eight different illnesses (Moss-Morris et al, 2002). Data from renal patients and patients with rheumatoid arthritis have demonstrated acceptable levels of test-retest reliability (Moss-Morris et al, 2002). The IPQ-R has not previously been used in research concerning chronic tinnitus therefore data concerning its psychometric properties for this population are not available.

2.4.3 Measure of acceptance

Chronic Pain Acceptance Questionnaire - revised (CPAQ - revised; McCracken, Vowles, & Eccleston, 2004)

The current study is the first research to address the construct of acceptance in a chronic tinnitus population. Therefore it was not possible to select a measure which has been validated for tinnitus patients. The CPAQ, which was originally described by Geiser (1992), has been used extensively in the field of chronic pain (McCracken, 1998; McCracken, Spertus, Janeck, Sinclair, & Wetzel, 1999; McCracken & Eccleston, 2003) and has been described as the best current measure for assessing acceptance in chronic pain (McCracken & Eccleston, 2006).

The original thirty-four item measure has been refined following two factor analytic studies of its structure (McCracken, 1999; McCracken et al, 2004). The revised version comprises two subscales; *activity engagement* reflecting the extent to which individuals are getting on with life despite pain and *pain willingness* reflecting willingness to experience pain without trying to control or avoid it. Respondents rate their agreement with twenty statements on a six-point scale ranging from *never true* to *always true*. Scores for the engagement subscale are summed and the willingness subscale is reverse scored and summed. Finally the scales are summed to form the total with higher scores indicating higher levels of acceptance. Analysis of the revised scale with a chronic pain population (McCracken et al, 2004) has shown the subscales to possess good internal consistency (α = engagement 0.82 and willingness 0.78).

Due to the often cited similarities between tinnitus and chronic pain, this measure was felt to be an acceptable choice for this preliminary investigation. The CPAQ was adapted for use by tinnitus patients by replacing the word 'pain' where it occurs with the word 'tinnitus'. Due to concerns regarding the factor structure of the *Pain Willingness* subscale Nicholas and Asghari (2006) have recommended that the *Pain Willingness* subscale should be discarded. However, due to the exploratory nature of the current study in a different illness population, it was decided that no items should be discarded from the measure and the adequacy of the subscales should be assessed from the data gathered (see Appendix 16).

2.4.4 Measure of coping

Coping Orientation to Problems Experienced (COPE-Brief Version; Carver, 1997)

The Brief COPE is a short-form version of the original COPE which aims to measure coping responses to stressful situations. It comprises 14 subscales; *self-distraction*, *active coping*, *planning*, *denial*, *substance use*, *using emotional support*, *using instrumental support*, *behavioural disengagement*, *venting*, *positive reframing*, *humour*, *acceptance*, *religion*, and *self-blame*. Each subscale is represented by description of two coping strategies and responses are frequency ratings of the use of each strategy in response to a specified stressor (in this case tinnitus). Ratings are given on a four point scale with higher scores denoting more frequent use.

In development and testing of the brief COPE, Carver (1997) reports that despite containing only two items each, the subscales demonstrated internal consistency values ranging from α

= 0.5 to 0.9 which are greater than the minimally accepted level of $\alpha = .5$ (Nunnally, 1978).

No data were available concerning the psychometric properties of the scale for use with tinnitus patients.

Due to the prevailing lack of clarity concerning the effectiveness of coping strategies in the context of tinnitus, this scale was chosen since it allows for the assessment of individual coping strategies and makes no assumption about their construction as adaptive or maladaptive. The conciseness of this form of the measure was considered an added benefit.

2.4.5 Tinnitus Severity

Tinnitus Handicap Inventory (THI; Newman, Jacobson, & Spitzer, 1996)

The THI is a self-report scale of tinnitus severity encompassing the perceived impact on emotional, social, occupational and physical functioning. It comprises twenty-five items rated on a three-point scale (yes/no/sometimes). Scores are summed with higher scores indicating greater perceived severity. Investigations of the psychometric robustness of the THI have shown good internal consistency ($\alpha = 0.93$) (Newman et al, 1996) and test re-test reliability for the total score and subscales ranging from 0.84-0.94 (Newman, Sandridge, & Jacobson, 1998). Subscales of the THI have been employed in previous research, however, a recent study reporting factor analysis of the measure suggested that the scale possesses a unifactorial structure and therefore the use of total scores only is recommended (Baguley & Andersson, 2003).

2.4.6 Measure of psychological distress

Hospital Anxiety and Depression Scale (HADS; Zigmund & Snaith, 1983)

The HADS is a self-report measure originally developed for the assessment of anxiety and depression in medical outpatients. The measure comprises fourteen statements which are rated on a four-point scale (0-3). Higher scores relate to greater anxiety and depression with recommended cut-off points of 8-10 indicating borderline caseness and scores of 11 and above indicating caseness. The HADS is considered to be suitable for assessing distress in individuals with physical conditions due to the predominance of cognitively focussed items which reduce the potential for confounding the physical effects of a health condition with symptoms of distress.

Although the HADS has been employed in previous research with tinnitus patients, no internal consistency values have been reported. However, an extensive review of studies examining the validity of the HADS reported support for the two-factor structure and Cronbach's alpha scores ranging from $\alpha = 0.68 - 0.93$ for anxiety and $\alpha = 0.67 - 0.90$ for depression (Bjellund, Dahl, Haug, & Neckelmann, 2002). The HADS was therefore chosen for the current study due to its conciseness, its robust psychometric properties and its suitability for screening for psychological distress in populations with physical health problems.

2.5 Piloting the measures

The questionnaire pack was piloted by two individuals who represented the older and younger ends of the age spectrum of tinnitus patients. This allowed feedback on ease of understanding and the acceptability of the completion time. No difficulties were encountered with completion and the piloting exercise indicated a completion time of approximately thirty minutes.

3.0 Results

3.1 Data Analysis

Following checks to ensure reliability of data entry, the analysis was undertaken using Statistics for the Social Sciences (SPSS) version 14.0. Initially, the data were examined to determine whether the criteria for use of parametric tests were met. In order to satisfy the assumptions of parametric correlation analyses, data should be interval data and must be approximately normally distributed (Pallant, 2005). The Shapiro-Wilk test for normal distribution and visual inspection of histograms demonstrated that only four variables (*age, personal and treatment control, emotional representation*) showed normal distribution. Furthermore, many of the variables were binary and therefore did not provide interval data. For these reasons, Spearman's Rho, a non-parametric correlation analysis was employed.

Due to the use of multiple statistical comparisons, the likelihood of Type I errors occurring was increased. A Bonferroni correction was considered too stringent a measure to control for this problem due to the increased likelihood of type II errors (Perneger, 1998). Therefore, where multiple comparisons were used, the alpha level was set at $p \leq 0.01$.

3.1.1 Principal Component Analysis of the IPQ-R Cause Subscale

To derive causal factors for use in further analysis, the data from the *cause* subscale were subjected to principal component analysis (Appendix 13). The analysis yielded two

interpretable factors: *psychological cause (stress/worry, mental attitude, family problems/worries, overwork, emotional state, personality)* and *physical cause (germ/virus, diet/eating habits, poor medical care in the past, smoking, ear disease)*. These factors explained 15.4% and 10.7% of the item variance respectively. The remaining items, *chance/bad luck, hereditary, pollution, my own behaviour, ageing, alcohol, accident/ injury, altered immunity, loud noise* and *head injury* were discarded due to their predominant loading onto a factor with no other items or their split loading across several factors. The reliability of the *psychological* and *physical cause* factors was calculated using Cronbach's alpha and were 0.768 and 0.508 respectively. The items comprising the *psychological* and *physical cause* factors were summed to enable direct comparison with other IPQ-R subscales.

3.1.2 Reliability Analyses

Cronbach's alpha was calculated to determine the internal consistency of the predictor and outcome measures (see table 3). This revealed that most measures demonstrated good levels of internal consistency. The IPQ-R subscales generally showed good reliability ($\alpha = 0.768 - 0.909$) with the exception of *Identity* ($\alpha = 0.685$). Nine of the fourteen COPE subscales met reliability criteria ($\alpha = 0.700 - 0.925$) however five COPE subscales, *self-distraction, denial, behavioural disengagement, venting* and *positive reframing* did not ($\alpha = 0.334 - 0.677$). The reliability for the subscales and totals of the CTAQ ($\alpha = 0.848 - 0.902$), HADS ($\alpha = 0.850 - 0.919$) and THI ($\alpha = 0.922$) were all good.

Table 3. Reliability analyses for the IPQ, Brief COPE, CTAQ, HADS and THI measures.

Measure	Cronbach's α
IPQ-R Identity	.685
IPQ-R Timeline (chronic/acute)	.900
IPQ-R Consequences	.850
IPQ-R Personal control	.848
IPQ-R Treatment control	.792
IPQ-R Illness coherence	.909
IPQ-R Timeline (cyclical)	.873
IPQ-R Emotional representations	.886
IPQ-R Psychological Cause	.768
IPQ-R Physical Cause	.508
COPE self distraction	.671
COPE active coping	.742
COPE denial	.611
COPE substance use	.925
COPE emotional support	.844
COPE instrumental support	.790
COPE behavioural disengagement	.334
COPE venting	.677
COPE positive reframing	.469
COPE planning	.824
COPE humour	.825
COPE acceptance	.760
COPE religion	.802
COPE self blame	.700
CTAQ engagement	.875
CTAQ willingness	.848
CTAQ total	.902
HADS anxiety	.884
HADS depression	.850
THI total	.922

3.2 Characteristics of the sample

3.2.1 Demographic data

One hundred and eighty participants with chronic tinnitus returned completed questionnaires. The return rate varied from 12% (clinic) to 87% (advertisement) for different recruitment sources. The characteristics of those participants who declined participation at clinics were not assessed. Two cases were excluded from analysis due to missing data and two due to declared Ménière's disease. Therefore, one hundred and seventy six cases comprising 99 (56.25%) males and 77 (43.75%) females with a mean age of 59.5 (S.D. 12.43, range 22-85 years) were retained for statistical analysis. Within this sample, 90 (51.5%) participants were recruited from NHS clinics and 83 (47.2%) via advertisement. Ninety (51.1%) participants were unemployed, 86 (48.9%) were employed and more reported living with a partner (80.7%) than alone (19.3%). Chi-squared tests and independent sample t-tests were employed to assess whether any significant differences existed within the sample according to recruitment source and gender. No significant difference was found between males and females for age, marital status, employment status or recruitment source. Similarly, no significant differences were found in marital and employment status between advertisement and clinic respondents. The mean age of advertisement respondents was seven years higher than that of clinic respondents and this difference reached statistical significance ($t = 3.543$, $p = 0.001$). The results are presented in tables 4 and 5.

Table 4. Demographic characteristics by gender.

Variable	Male	Female	X ²	t	Significance
Age (mean)	60.94	57.64		1.744	.083*
Marital status (%)					
Living with a partner	82 (82.8)	60(77.9)	.669		.413
Living alone	17 (17.2)	17 (22.1)			
Employment Status (%)					
Employed	48 (48.5)	38 (49.4)	.013		.909
Unemployed	51 (51.5)	39 (50.6)			
Recruitment source (%)					
Advertisement	51 (57.1)	39 (45.3)	2.374		.123
Clinic	47 (42.9)	36 (54.7)			

* 2 tailed

Table 5. Demographic variables by recruitment source

Variable	Advert	Clinic	X ²	t	Significance
Age (mean)	62.7	56.2		3.543	.001*
Marital status (%)			1.505		.220
Living with partner	76 (15.6)	64 (22.9)			
Living alone	14 (84.4)	19 (77.1)			
Employment Status (%)			1.269		.260
Employed	40 (44.4)	44 (53)			
Unemployed	50 (55.6)	39 (47)			

* 2 tailed

3.2.2 Biomedical Data

The mean duration of tinnitus reported was 11.34 years (S.D. 13.54, range 0.5-65 years). 35.2% of participants reported unilateral tinnitus (21.6% left ear, 13.6% right ear), 35.2% bilateral tinnitus, 13.6% tinnitus located in the head and 15.9% reported tinnitus in multiple locations. Approximately equal numbers of participants reported sudden (52.8%) and gradual (47.2%) onset. The majority of respondents (44.9%) described their tinnitus as high pitched, 25% reported medium pitch, 19.9% multiple pitches and only 1.7% reported low pitch. The most endorsed rating for tinnitus loudness was quite loud (41.5%), followed by moderate (31.8), very loud (11.4%), quite quiet (4.0%) and very quiet (1.1%). Most participants described their tinnitus as constant (90.4%) as opposed to intermittent (9.6%). Approximately two thirds of the sample (66.7%) regarded themselves as having impaired hearing however only 38.4% reported that they used or were waiting for a hearing aid. The majority of participants (73.7%) did not report any other ear problems or diagnoses whilst 59.6% identified that they had other concomitant health problems. Chi-squared tests and Mann-Whitney U tests were employed to assess whether any significant differences existed within the sample according to gender and the source of recruitment. No significant differences were found for any of the biomedical variables according to gender with the exception of pitch. Post-hoc tests revealed that more females reported low-medium pitched tinnitus than males and that more males reported high pitched tinnitus than females. Similarly, most of the biomedical variables did not differ significantly according to recruitment source with the exception that advertisement respondents reported a significantly

longer duration of tinnitus and reported significantly more concomitant ear problems than clinic respondents. The results of these analyses can be seen in tables 6 and 7.

Table 6. Biomedical data total frequencies and by gender.

Variable	Males	Females	X²	U	Sig.
Duration (mean)	12.6	9.7		-1.781	.075*
Location of sounds (%)			.627		.960
Left ear	21 (21.1)	17 (22.1)			
Right ear	14 (14.1)	10 (13)			
Both ears	36 (36.4)	26 (33.8)			
Head	14 (14.1)	10 (13)			
Multiple locations	14 (14.1)	14 (18.2)			
Mode of tinnitus onset (%)					
Sudden	53 (53.5)	40 (51.9)	.044		.834
Gradual	46 (46.5)	37 (48.1)			
Tinnitus pitch (%)			7.885		.036
Low	1 (1.1)	2 (2.9)			
Medium	19 (20.9)	25 (35.7)			
High	53 (58.2)	26 (37.1)			
Multiple pitches	18 (19.8)	17 (24.3)			
Tinnitus loudness (%)				-.193	.847
Very quiet	2 (2.3)	0 (0)			
Quite quiet	4 (4.6)	3 (4.2)			
Moderate	30 (34.5)	26 (36.6)			
Quite loud	40 (46)	33 (46.5)			
Very loud	11 (12.6)	9 (12.7)			
Tinnitus Constancy (%)			.749		.387
Constant	85 (90.4)	62 (86.1)			
Intermittent	9 (9.6)	10 (13.9)			
Hearing problems (%)			1.258		.262
Yes	66 (66.7)	45 (58.4)			
No	33 (33.3)	32 (41.6)			
Using/awaiting hearing aid (%)			1.249		.264
Yes	38 (38.4)	23 (30.3)			
No	61 (61.6)	53 (69.7)			
Other ear problems (%)			1.595		.207
Yes	26 (26.3)	27 (35.1)			
No	73 (73.7)	50 (64.9)			
Other health problems (%)			1.196		.274
Yes	59 (59.6)	39 (51.3)			
No	40 (40.4)	37 (48.7)			

* 2 tailed

Table 7. Biomedical data by recruitment source.

Variable	Advert	Clinic	X²	U	Sig.
Duration (mean)	13.61	8.99		-2.154	.031*
Location of sounds (%)			2.490		.655
Left ear	20 (22.2)	18 (21.7)			
Right ear	11 (12.2)	13 (15.7)			
Both ears	32 (35.6)	27 (32.5)			
Head	15 (16.7)	9 (10.8)			
Multiple locations	12 (13.3)	16 (19.3)			
Mode of tinnitus onset (%)			.011		.917
Sudden	47 (52.2)	44 (53)			
Gradual	43 (47.8)	39 (47)			
Tinnitus pitch (%)			2.522		.492
Low	1 (1.2)	2 (2.7)			
Medium	22 (25.9)	21 (28.8)			
High	40 (47.1)	38 (52.1)			
Multiple pitches	22 (25.9)	12 (16.4)			
Tinnitus loudness (%)				-1.382	.167
Very quiet	2 (2.4)	0 (0)			
Quite quiet	5 (6)	2 (2.8)			
Moderate	30 (35.7)	25 (34.7)			
Quite loud	39 (46.4)	33 (45.8)			
Very loud	8 (9.5)	12 (16.7)			
Tinnitus Constancy (%)			.454		.500
Constant	80 (89.9)	64 (86.5)			
Intermittent	9 (10.1)	10 (13.5)			
Hearing problems (%)			.512		.474
Yes	60 (66.7)	51 (61.4)			
No	30 (33.3)	32 (38.6)			
Using/awaiting hearing aid (%)			.001		.979
Yes	32 (35.6)	29 (35.4)			
No	58 (64.4)	53 (64.6)			
Other ear problems (%)			4.661		.031
Yes	33 (36.7)	18 (21.7)			
No	57 (63.3)	65 (78.3)			
Other health problems (%)			.477		.490
Yes	53 (58.9)	44 (53.7)			
No	37 (41.1)	38 (46.3)			

* 2 tailed

3.2.3 Distress within the sample

Overall, mean scores for anxiety (6.99) and depression (4.69) (HADS) were below recommended clinical cut-off levels. HADS scores which are indicative of borderline anxiety and depression were observed in 19% and 14% of the sample respectively, whilst 20% demonstrated scores indicative of caseness for anxiety and 10% demonstrated caseness for depression.

Descriptive data were collected regarding history of emotional difficulties, and presence of life events prior to and at the time of onset. Just over half the participants (53.4%) reported emotional difficulties prior to tinnitus onset and 32.4% reported having sought professional help for this reason. Approximately a third of respondents (35.8%) reported that they were experiencing current stressful life events and 42.6% reported stressful life events at tinnitus onset. Chi-squared tests were employed to assess whether any significant differences existed within the sample according to gender and recruitment source. The only significant difference to emerge from these analyses was that clinic respondents reported more current stressful life events than advertisement respondents. The results of these analyses are shown in tables 8 and 9.

Table 8. Emotional difficulties history and life events history by gender.

Variable	Males (%)	Females (%)	X²	Sig.
History of emotional difficulties			.944	.331
Yes	50 (50.5)	44 (57.9)		
No	49 (49.5)	32 (42.1)		
Professional help for emotional difficulties			.326	.568
Yes	34 (34.3)	23 (30.3)		
No	65 (65.7)	53 (69.7)		
Current stressful life events			.290	.590
Yes	34 (34.7)	29 (38.7)		
No	64 (65.3)	46 (61.3)		
Stressful life events at time of tinnitus onset			2.799	.094
Yes	37 (37.4)	38 (50)		
No	62 (62.6)	38 (50)		

Table 9. Emotional difficulties history and life events by recruitment source.

Variable (%)	Advert	Clinic	X²	Sig.
History of emotional difficulties			.011	.918
Yes	49 (54.4)	44 (53.7)		
No	41 (45.6)	38 (46.3)		
Professional help for emotional difficulties			.052	.820
Yes	30 (33.3)	26 (31.7)		
No	60 (66.7)	56 (68.3)		
Current stressful life events			8.183	.004
Yes	23 (25.8)	38 (46.9)		
No	66 (74.2)	43 (53.1)		
Stressful life events at time of tinnitus onset			.156	.693
Yes	40 (44.4)	34 (41.5)		
No	50 (55.6)	48 (58.5)		

3.3 Determining the relevance of background variables

Due to the extensive background variables measured (demographic, biomedical and emotional difficulties/life events history) preliminary analyses were undertaken to assess their impact on the outcome variables. Mann-Whitney U tests and correlation analyses were conducted on binary and continuous background variables respectively. The results of these analyses and those variables retained for further analysis can be seen in Appendices 14 and 15.

3.4 Addressing Research Questions and Hypotheses

3.4.1 What relationships exist between illness representations of tinnitus, coping strategies and the outcomes anxiety, depression and tinnitus severity?

Illness representations subscales have been shown to exhibit predictable patterns of interrelationships in studies of other health problems (Heijmans 1998; Heijmans; 1999; Weinman et al, 1996). Specifically, strong *illness identity* has been related to lower perceived *control*, greater chronic *timeline* and more serious *consequences*. Also lower perceived *control* has been associated with higher scores on the *consequences* subscale. The interrelationships among illness representation variables have not previously been reported in research with tinnitus patients (Reynolds et al, 2004), therefore this was the first analysis to be undertaken. Spearman's Rho correlations for these relationships are reported in table 10.

Table 10. Relationships between IPQ-R subscales: Spearman’s Rho

	1	2	3	4	5	6	7	8	9	10
1	1.00									
2	-.037	1.00								
3	.416 ^b	.201 ^a	1.00							
4	-.069	-.385 ^b	-.108	1.00						
5	-.120	-.487 ^b	-.185	.646 ^b	1.00					
6	-.054	.025	.003	.382 ^b	.151	1.00				
7	.139	-.194	-.037	.183	.142	.423	1.00			
8	.302 ^b	.098	.498 ^b	-.158	-.104	.063	.035	1.00		
9	.285 ^b	-.201	.060	.136	.127	.016	.164	.260 ^b	1.00	
10	.093	-.016	.076	-.074	-.020	-.096	.006	.081	.056	1.00

^a p ≤ 0.01(two tailed), ^b p ≤ 0.001 (two-tailed)

1-illness identity, 2-timeline (acute/chronic), 3-consequence, 4-personal control, 5-treatment control, 6-illness coherence, 7-timeline cyclical, 8-emotional reps, 9-psychological cause, 10-physical cause

Patients with higher levels of *illness identity* perceived the *consequences* of the tinnitus to be more serious and reported higher levels of emotional distress due to tinnitus and were more likely to attribute the *cause* to psychological reasons. Although *illness identity* did not relate to chronicity and control, longer perceived *timeline* for tinnitus was associated with lower perceived *personal* and *treatment control* as predicted. Perceptions of serious *consequences* were highly positively associated with reports of emotional distress due to tinnitus. Patients reporting higher levels of perceived *personal control* also reported greater beliefs in the ability of treatment to control the symptom and a greater understanding of the symptom. *Psychological cause* as a possible reason for tinnitus was associated with a higher level of

emotional distress due to tinnitus, however perceptions of *physical cause* were unrelated to any other representation construct.

3.4.1.1 Hypothesis 1(a).

The outcomes will be significantly positively related to the illness representation constructs identity, consequences and duration and significantly negatively related to constructs of control and illness coherence.

This hypothesis was tested using correlation analysis to determine the relationships between cognitive illness representations (measured using the IPQ-R), anxiety and depression (HADS), emotional representations (IPQ-R) and tinnitus severity (THI) (table 11). The results showed that the illness representations constructs *identity* and *consequence* were significantly and positively related to all of the outcome measures partially supporting the hypothesis. Furthermore, personal control was inversely related to emotional representations as predicted. There were no significant relationships between either of the *timeline* subscales, *treatment control* or *illness coherence* and the outcomes, therefore these aspects of the hypothesis were not supported. Perceptions of *psychological cause* were positively associated with increased distress and tinnitus severity. Conversely perceived *physical cause* was unrelated to all three outcomes.

Table 11. Relationships between illness representation subscales, psychological distress and tinnitus severity: Spearman’s Rho.

	1	2	3	4	5	6	7	8	9
Tinnitus Severity									
HADS-A	.541 ^b	.113	.633 ^b	-.147	-.161	-.029	.067	.315 ^b	.073
HADS-D	.318 ^b	.139	.432 ^b	-.112	-.166	-.087	-.112	.236 ^a	.066
Emot. Rep	.302 ^b	.098	.498 ^b	-.158 ^a	-.104	-.142	.035	.260 ^b	.081

^a p ≤ 0.01 (two tailed), ^b p ≤ 0.001 (two tailed)

1-illness identity, 2-timeline (acute/chronic), 3-consequence, 4-personal control, 5-treatment control, 6-illness coherence, 7-timeline cyclical, 8-psychological cause, 9-physical cause

3.4.1.2 Hypothesis 1 (b).

Illness representations constructs will be associated with the coping strategies employed by patients.

Correlation analyses were undertaken to explore the relationships between the illness representations dimensions and coping strategies (table 12). The results showed that greater *illness identity* was associated with increased use of *self-distraction, active coping, emotional and instrumental support, venting, and planning*. This pattern was repeated for perceived

serious *consequences* and this dimension was also associated with increased levels of reported *self-blame*. Longer perceived *timeline* was associated with less use of *emotional support* and *venting* but significantly more *acceptance*. Higher levels of perceived *personal control* were associated with more *active coping*, *emotional* and *instrumental support* and less *behavioural disengagement*. *Treatment control* was also negatively associated with *behavioural disengagement* and positively associated with more *active coping*. Higher levels of *illness coherence* were associated with lower levels of denial. *Timeline cyclical* showed no associations with coping strategies. *Psychological cause* attributions were associated with more venting, planning, religion and self-blame. Identification with *physical causes* was not related to use of any coping strategies.

Table 12. Relationships between illness representation dimensions (IPQ-R) and coping strategies (COPE): Spearman’s Rho

	Illness Identity	Timeline(ac/chr)	Consequences	Personal control	Treatment cont	Coherence	Timeline (cyc)	Psych. Cause	Physical Cause
1	.230 ^a	-.082	.200 ^a	.075	.012	-.013	.076	.179	.073
2	.346 ^b	-.082	.382 ^b	.290 ^b	.269 ^a	.021	.074	.179	-.055
3	.146	-.058	.181	-.135	-.059	-.275 ^a	.049	.072	.012
4	.160	-.045	.184	.058	.040	.075	.140	.141	-.012
5	.277 ^b	-.212 ^a	.322 ^b	.237 ^b	.054	.188	.030	.159	-.059
6	.305 ^b	-.174	.296 ^b	.228 ^a	.170	.062	.086	.176	-.051
7	.001	.176	.115	-.305 ^b	-.333 ^b	-.185	-.050	-.034	.041
8	.241 ^a	-.232 ^a	.333 ^b	.059	.079	.036	.021	.258 ^a	.101
9	.057	.005	.059	.150	.170	-.080	.077	.168	-.114
10	.320 ^b	-.114	.377 ^b	.102	.133	.017	.002	.295 ^a	-.087
11	.048	-.059	.060	.067	-.034	.136	.181	-.018	-.040
12	-.138	.237 ^a	-.193	.053	-.031	.105	.026	-.128	-.028
13	.150	-.157	.027	.075	.052	.001	.161	.217 ^a	-.055
14	.148	-.068	.204 ^a	.027	.064	.017	.122	.355 ^b	.013

^a p ≤ 0.01 (two tailed), ^b p ≤ 0.001(two tailed).

1-self distraction, 2-active coping, 3-denial, 4-substance use, 5-emotional support, 6-instrumental support, 7-behavioural disengagement, 8-venting, 9-positive reframing, 10-planning, 11-humour, 12-acceptance, 13-religion, 14-self blame

3.4.1.3 Hypothesis 1(c).

Coping strategies will be significantly associated with psychological distress and tinnitus severity.

Correlation analyses were undertaken in order to explore the relationships between reported coping strategy use and outcomes (table 13). The results showed that higher tinnitus severity was associated with greater use of coping strategies with the exception that *behavioural disengagement, positive reframing* and *humour* showed no significant relationship. Similarly, greater anxiety was associated with more frequent use of coping strategies with the exception of *denial, substance use, behavioural disengagement, positive reframing* and *humour*.

Elevated depression scores also were associated with increased use of coping strategies excepting *self-distraction, denial, substance use, emotional support, behavioural disengagement, positive reframing* and *humour*. Finally, increased tinnitus specific distress (emotional representations) was positively related to most coping strategies excepting use of *emotional support, behavioural disengagement, positive reframing* and *humour*. Common to all outcomes was a significant negative relationship with acceptance coping.

Table 13. Relationships between coping variables and outcome measures: Spearman’s Rho.

	Tinnitus Severity	HADS- Anxiety	HADS- Depression	Emot. Reps
Self distraction	.284^b	.273^b	.146	.284^b
Active coping	.376^b	.238^b	.249^a	.327^b
Denial	.309^b	.139	.216^a	.254^b
Substance use	.266^a	.145	.176	.201^b
Emotional support	.338^b	.198^a	.189	.144
Instrumental support	.419^b	.211^a	.222^a	.252^b
Behavioural disengagement	.126	.070	.157	.087
Venting	.470^b	.417^b	.430^b	.342^b
Positive reframing	.104	.087	.004	.086
Planning	.387^b	.265^b	.260^a	.338^b
Humour	-.016	-.122	-.101	-.064
Acceptance	-.311^b	-.276^b	-.333^b	-.297^b
Religion	.206^a	.258^a	.080	.208^b
Self blame	.416^b	.391^b	.361^b	.370^b

^a p ≤ 0.01 (two tailed), ^b p ≤ 0.001 (two tailed).

3.4.2 Are illness representations and coping predictive of anxiety, depression and tinnitus severity?

3.4.2.1 Hypothesis 2(a).

Illness representations constructs and coping will predict a significant proportion of the variance in psychological distress and tinnitus severity.

Multiple regression analyses using the enter method (simultaneous entry of independent variables) were employed to investigate hypothesis 2a. To determine which variables would serve as independent variables in the regression models, correlations and Mann Whitney U tests (appendix 14) were undertaken to assess the impact of the independent variables on each of the dependent variables (tinnitus severity, anxiety, depression and emotional representations). The criterion for inclusion of independent variables was set at $p \geq 0.1$ in order to avoid exclusion of variables which may increase in significance once entered in the regression model. Correlation analyses did not reveal any unacceptable multicollinearity. Four separate models were computed to assess the impact of the independent variables on each of the outcome variables. The independent variables were entered in separate groups (i.e. background variables, illness representations constructs and coping strategies) to identify the unique contribution of theoretically related constructs.

The first regression, (table 14) showed that the model as a whole accounted for 73.3% of the variance in tinnitus severity. At step 1, background variables accounted for 31.1% of the

variance with ‘high pitched tinnitus’ contributing significantly. At step 2, cognitive representations contributed a further 28.7% with *identity* and *consequences* showing significance. In the final step, coping variables predicted an additional 13.5% of the variance with *instrumental support*, *venting* and *acceptance* demonstrating significance.

Table 14. Results of multiple regression analysis predicting tinnitus severity (THI)

Independent Variables	Adj. R ²	F	β	t
Step 1.	.311	7.648^b		
High pitched tinnitus			.152	3.317 ^b
Step 2.	.598	14.684^b		
Illness Identity			.213	3.772 ^b
Consequence			.271	4.440 ^b
Step 3.	.733	15.398^b		
Instrumental support			.200	3.124 ^a
Venting			.185	3.100 ^a
Acceptance			-.140	-2.711 ^a

β- Standardised regression coefficient; ^a p ≤ 0.01 (two tailed); ^b p ≤ .001 (two tailed)

(note – only variables contributing significantly to the explanation of the dependent variable are included in the table)

The second regression (table 15) produced a model which accounted for 42.9% of the variance in anxiety scores. At step 1, the background variables accounted for 21.7% of the variance explained with ‘high pitched tinnitus’ emerging as significant. Addition of the cognitive representations added a further 11.3% to the variance explained with ‘*treatment*

control' making a significant contribution. The coping variables added a further 9.9% to the variance explained with *venting* emerging as significant.

Table 15. Results of multiple regression analysis predicting anxiety (HADS-A).

Independent Variables	Adj. R ²	F	β	t
Step 1.	.217	5.071^b		
High pitched tinnitus			.207	3.037^a
Step 2.	.330	6.179^b		
Treatment control			-.261	-3.310^a
Step 3.	.429	5.247^b		
Venting			.277	3.307^b

β- Standardised regression coefficient; ^a p ≤ 0.01 (two tailed); ^b p ≤ .001 (two tailed)

(note – only variables contributing significantly to the explanation of the dependent variable are included in the table)

The third regression model (table 16) accounted for 47.6% of the variance in depression scores. Background variables contributed 18.5% with *high pitch* showing significance. Cognitive representations added 14.3% to the variance explained with *identity* showing significance. Coping strategies added a further 14.8% to the variance explained with *venting* and *acceptance* making significant contributions.

Table 16. Results of multiple regression analysis predicting depression (HADS-D)

Independent Variables	Adj. R ²	F	β	t
Step 1.	.185	6.560^b		
High pitched tinnitus			.181	2.853^a
Step 2.	.328	6.991^b		
Identity			.200	2.663^a
Step 3.	.476	6.801^b		
Venting			.301	3.752^b
Acceptance			-.195	-2.779^a

β- Standardised regression coefficient; ^a p ≤ 0.01(two tailed) ; ^b p ≤ .001 (two tailed)

(note – only variables contributing significantly to the explanation of the dependent variable are included in the table)

The final regression model (table 17) accounted for 44.3% of the variance in emotional representations scores. The background variables contributed 12.1% however no individual variable contributed at the specified significance level (p ≤ 0.01). Cognitive representations added 25.7% to the variance explained with *consequences* showing significance. Coping strategies added a further 6.7% to the variance explained but again no individual variables made a significant contribution.

Table 17. Results of multiple regression analysis predicting emotional representations (IPQ-R)

Independent Variables	Adj. R ²	F	β	t
Step 1.	.121	3.469 ^b		
Step 2.	.378	7.689 ^b		
Consequence			.386	4.509 ^b
Step 3.	.443	5.737 ^b		

β- Standardised regression coefficient; ^a p ≤ 0.01(two tailed); ^b p ≤ .001 (two tailed)

(note – only variables contributing significantly to the explanation of the dependent variable are included in the table)

3.4.2.2 Hypothesis 2(b).

Coping strategies will mediate the influence of illness representations on tinnitus severity, anxiety and depression.

In order to test whether coping variables act as mediators a series of further regressions were undertaken following the protocol described by Baron and Kenny (1986). This process involves four steps. The first three steps ensure that the independent variables significantly impact on the proposed mediator and outcome variable and that the independent variables and proposed mediator together predict the outcome variable. If the relationships investigated are all significant, the outcomes of steps two and three are examined to determine whether adding the proposed mediator to the model reduces the impact of the independents on the outcome variable. Following the protocol described, the potential

mediating role of the coping variables was examined in relation to the three outcomes where coping made a significant contribution to the model.

In the first analysis, *instrumental support*, *venting* and *acceptance* were tested for a potential role in mediating the relationship between the independent variables and tinnitus severity. Both instrumental support and venting were associated with the independent variables at step one (*instrumental support*; $F = 3.360 (10, 137) p < 0.000$) (*venting*; $F = 3.036 (10, 137) p < 0.000$). Acceptance however was not associated with the independents at the required significance level and was therefore rejected as a potential mediator at this step. Steps two and three were confirmed by previous analysis (see table 14). Therefore the impact of adding *instrumental support* and *venting* (individually) was examined. Adding these variables to the model in a third step did not alter the significance of the contribution of the cognitive variables to the model therefore their role as potential mediators was refuted.

Next, venting was investigated as a potential mediator in the model explaining anxiety. Step one revealed that the independent variables impacted significantly on venting ($F = 2.568 (14, 133) p = 0.003$). Steps two and three were confirmed according to the criteria by previous analysis (see table 15). Examination of the model at steps two and three with venting added in isolation revealed that whilst *psychological cause* was significant at step 2 ($p = 0.007$), the addition of *venting* at step three caused this variable to lose its significance ($p = 0.023$) suggesting that *venting* may mediate the relationship between perceptions of psychological causal attributions relating to tinnitus and tinnitus severity.

Finally, *venting* and *acceptance* were investigated as possible mediators in the model explaining depression. At step one both the independent variables significantly impacted on *venting* (*venting*; $F = 3.686 (12,135) p < 0.000$) but not acceptance therefore acceptance was rejected as a potential mediator. Steps two and three were confirmed by previous analysis (see table 16). Comparison of steps two and three after the addition of *venting* in isolation revealed that it did not attenuate the impact of the cognitive variables therefore refuting its role as a mediator.

3.4.3 What relationships exist between acceptance, anxiety, depression and tinnitus severity?

3.4.3.1 Hypothesis 3.

The acceptance constructs 'Activity engagement' and 'Tinnitus willingness' will be significantly and negatively associated with anxiety, depression and tinnitus severity.

To test the hypothesis, correlation analyses were conducted between the acceptance measure (CTAQ) and the outcomes (table 18). The results of the correlation analysis showed that both acceptance subscales and the total score for this measure were highly significantly and negatively correlated with all four outcome measures. This suggests that patients who are more accepting of the condition report lower levels of psychological distress and less impact of tinnitus on their life thus supporting the hypothesis.

Table 18. Bivariate relationships between acceptance (CTAQ), tinnitus severity (THI) and psychological distress (HADS, IPQ-R): Spearman’s Rho

	CTAQ activity engagement	CTAQ willingness to experience tinnitus	CTAQ total
Tinnitus Severity	-.607 ^b	-.552 ^b	-.668 ^b
HADS anxiety	-.451 ^b	-.338 ^b	-.467 ^b
HADS depression	-.595 ^b	-.403 ^b	-.547 ^b
Emotional Reps	-.564 ^b	-.517 ^b	-.609 ^b

^a p ≤ 0.01 (two tailed), ^b p ≤ 0.001 (two tailed).

3.4.4 Is acceptance predictive of anxiety, depression and tinnitus severity?

3.4.4.1 Hypothesis 4.

The acceptance constructs ‘Activity engagement’ and ‘Tinnitus willingness’ will predict a significant proportion of the variance in psychological distress and tinnitus severity.

Multiple regression analyses were employed to investigate the above hypothesis. Checks for multicollinearity revealed that the CTAQ engagement and willingness subscales were highly correlated with the total score (r = 0.861 and 0.899 respectively) therefore, CTAQ total was excluded from the regression. Initially, the acceptance subscales alone were entered into regression models to test their impact on the outcome variables. When the acceptance variables were entered as the sole predictors, the analyses showed that these variables

predicted 50.8%, 24.6%, 46.2% and 42.9% of the variance in tinnitus severity, anxiety, depression and emotional representations respectively. Examining the impact of each variable separately indicated that *activity engagement* significantly predicted all four outcomes but that *willingness to experience tinnitus* was only predictive of tinnitus severity and emotional representations. The results of the regression models for each of the three outcome measures are reported in tables 19 to 22.

Table 19. Results of multiple regression analysis predicting tinnitus severity (THI).

Independent Variables	Adj R ²	F	β	t
Step 1.	.508	82.060 ^b		
Activity engagement.			.473	-6.890 ^b
Tinnitus willingness.			.331	-4.813 ^b

β- Standardised regression coefficient; ^a p ≤ 0.01 (two tailed); ^b p ≤ .001 (two tailed)

Table 20. Results of multiple regression analysis predicting anxiety (HADS-A).

Independent Variables	Adj R ²	F	β	t
Step 1.	.246	27.393 ^b		
Activity engagement.			-.405	-4.843 ^b
Tinnitus willingness.			-.147	-1.757 (ns)

β- Standardised regression coefficient; ^a p ≤ 0.01 (two tailed); ^b p ≤ .001 (two tailed)

Table 21. Results of multiple regression analysis predicting depression (HADS-D).

Independent Variables	Adj R ²	F	β	t
Step 1.	.462	70.579 ^b		
Activity engagement.			-.645	-9.121 ^b
Tinnitus willingness.			-.065	-.923 (ns)

β- Standardised regression coefficient; ^a p ≤ 0.01 (two tailed); ^b p ≤ .001 (two tailed)

Table 22. Results of multiple regression analysis predicting emotional representations (IPQ-R).

Independent Variables	Adj R ²	F	β	t
Step 1.	.429	61.764 ^b		
Activity engagement.			-.441	-6.047 ^b
Tinnitus willingness			-.299	-4.098 ^b

β- Standardised regression coefficient; ^a p ≤ 0.01 (two tailed); ^b p ≤ .001 (two tailed)

Following this step, the acceptance variables were entered into regression models which first controlled for the influence of the background variables, cognitive representations and coping to assess whether acceptance could explain a unique portion of the variance in outcomes.

The results of these analyses (tables 23-25) showed that acceptance did not contribute a significant proportion of unique variance in the model explaining anxiety. However, when the acceptance variables were added to the models explaining tinnitus severity, depression and emotional representations, significant and unique contributions emerged. Specifically,

the acceptance variables accounted for a further 4.6% of the variance in tinnitus severity, with *tinnitus willingness* showing significance. Acceptance variables contributed a further 12.1% of variance in depression explained with *activity engagement* showing significance. Finally, an additional 10% of the variance in emotional representations was explained by acceptance with *activity engagement* showing significance. Therefore in most cases the explanatory power of the models was enhanced by the addition of acceptance variables.

Table 23. Results of multiple regression analysis predicting tinnitus severity (THI)

Independent Variables	Adj. R ²	F	β	t
Step 1.	.311	7.648^b		
High pitched tinnitus			.156	3.720^b
Step 2.	.598	14.648^b		
Identity			.191	3.711^b
Timeline			.151	2.770^a
Consequence			.171	.2.861^a
Step 3.	.733	15.398^b		
Venting			.167	3.054^a
Self-blame			.128	2.634^a
Step 4.	.779	18.265^b		
Tinnitus willingness			-.188	-3.231^a

β- Standardised regression coefficient; ^a p ≤ 0.01 (two tailed); ^b p ≤ .001 (two tailed)

Table 24. Results of multiple regression analysis predicting depression (HADS-D)

Independent Variables	Adj. R ²	F	β	t
Step 1.	.185	6.560 ^b		
High pitched tinnitus			.162	2.914 ^a
Step 2.	.328	6.991 ^b		
Identity			.183	2.749 ^a
Step 3.	.476	6.801 ^b		
Venting			.245	3.454 ^b
Step 4.	.597	9.726 ^b		
Activity engagement			-.474	-5.801 ^b

β- Standardised regression coefficient; ^a p ≤ 0.01 (two tailed); ^b p ≤ .001 (two tailed)

Table 25. Results of multiple regression analysis predicting emotional representations (IPQ-R)

Independent Variables	Adj. R ²	F	β	t
Step 1.	.123	3.597 ^b		
Step 2.	.383	8.055 ^b		
Consequence			.217	2.655 ^a
Step 3.	.449	6.020 ^b		
Step 4.	.549	7.920 ^b		
Activity engagement			-.334	-3.830 ^b

β- Standardised regression coefficient; ^a p ≤ 0.01 (two tailed); ^b p ≤ .001 (two tailed)

(note – only variables contributing significantly to the explanation of the dependent variable are included in the table)

4.0 Discussion

4.1 Support for the hypotheses

4.1.1 What relationships exist between illness representations of tinnitus, coping strategies psychological distress and tinnitus severity?

Consistent with research investigating other conditions (Rutter & Rutter, 2002; Hagger & Orbell, 2003), stronger *illness identity* related to increased perceptions of serious *consequences*. The finding that individuals reporting greater symptom frequency perceive more impact on life due to tinnitus is logical and consistent with the associations between both *identity* and *consequences* and tinnitus specific emotional responses (*emotional representations*). Greater *illness identity* and stronger *emotional representations* were also strongly associated with *psychological cause* attributions, suggesting that this attribution is associated with negative affect.

Also consistent with previously observed patterns, longer perceived *timeline* was related to more serious perceived *consequences*. This finding is expected since the longer a condition is expected to continue, the more impact on life will be exerted. Longer *timeline* was also associated with weaker perceptions of *personal* and *treatment control*. This may reflect experience or expectations of the symptom as one which is largely uncontrollable or possibly acknowledgment of the chronic nature of tinnitus, leading to relinquishment of efforts to control the symptom.

4.1.1.1 Hypothesis 1(a).

The outcomes will be (i) significantly positively related to the illness representation constructs identity, consequences and duration and (ii) significantly negatively related to constructs of control and illness coherence.

Positive relationships between *identity, consequences* and the four outcomes were identified. This suggests that reporting more symptoms and stronger perceptions of serious *consequences* are associated with greater distress. Neither of the *timeline* subscales showed direct relationships with the outcomes. Although no specific hypothesis concerning cyclical *timeline* was generated, the habituation model (Hallam, Rachman, & Hinchcliffe, 1984) states that changeable or unpredictable tinnitus is less conducive to habituation and more likely to cause distress. The lack of relationship between the cyclical *timeline* subscale and the outcomes may be attributable to most respondent's (90.4%) description of their tinnitus as constant rather than intermittent suggesting that this subscale may lack relevance to this group. In light of the absence of a relationship between duration and outcomes, it is noteworthy that perceived chronicity was associated with more *acceptance* coping, which in turn related to lower distress. It may be speculated that recognition of the symptom as chronic promotes engagement in *acceptance* coping which directly relates to more favourable outcomes regarding distress and impact on life.

The expected negative relationships between *personal control, treatment control* and *illness coherence* with the outcomes were generally not found. However, *personal control* was

inversely related to emotional representations and both tinnitus severity and depression showed inverse non-significant trends with *treatment control* ($p < 0.05$). The lack of relationship between control and outcomes is consistent with the findings of Reynolds et al (2004) who used the original IPQ. However, this conflicts with the consistently found relationships between these constructs in studies of other conditions (Hagger & Orbell, 2003) and the existing evidence of a relationship between perceptions of control and distress in tinnitus patients in studies utilising different assessment tools (Scott, Lindberg, Melin, & Lyttkens, 1990; Budd & Pugh, 1995; Unterrainer et al, 2003; Sirois, Davis, & Morgan, 2006). The agreement with Reynolds' et al (2004) findings may indicate that the IPQ/IPQ-R tap an aspect of control different to that addressed in previous work. Alternatively, the study may have been underpowered to detect small effects, a problem shared by Reynolds et al (2004) whose study utilised a much smaller sample ($n=55$).

Although the role of causal attributions was not specified in the hypothesis, an interesting finding was the association between perceived psychological causes and poorer outcomes. It may be speculated that psychological causes might be perceived to be within the control of the individual to a greater extent than, for example, biological or environmental factors and therefore may be associated with more guilt or shame. The finding that attribution to *psychological cause* was strongly related to *self-blame* as a coping strategy, whereas identification with *physical cause* was not, provides tentative support for this suggestion.

4.1.1.2 Hypothesis 1(b).

Illness representations constructs will be associated with the coping strategies employed by patients.

Meta-analytic review across a range of health conditions (Hagger & Orbell, 2003) has supported the assertion of the SRM that illness representations are associated with coping strategies. Specifically, *illness identity*, *serious consequences* and *chronic timeline* were associated with avoidant and emotionally expressive coping strategies. Conversely, perceived *control* has been positively related to active problem-focussed coping and cognitive reappraisal.

The results of the present study showed that *illness identity*, *consequences* and *timeline* did not relate to avoidant strategies (*behavioural disengagement* and *denial*) in the way observed in other conditions. The only construct to relate to an avoidant strategy was *illness coherence* which related to less use of *denial*. In contrast, strong *illness identity* and perceived serious *consequences* strongly associated with increased *self-distraction*, *active coping*, *emotional and instrumental support*, *venting* and *planning* with *consequences* also relating to increased *self-blame*. Similarly, attribution of tinnitus to psychological causes was related to more use of *venting* and *planning*. These associations seem to reflect a tendency for patients with higher levels of reported symptoms and perceived *consequences* to engage in more active types of coping. These strategies may serve a function in which distressed patients attempt different coping methods to find something which will ameliorate the symptom (Andersson

et al, 2004). This speculation may be supported by the finding that *emotional representations* related strongly to increased use of nearly all of the coping strategies with the exception of emotional support, behavioural disengagement, positive reframing and humour which showed no relationship and acceptance which was negatively related.

Patients who acknowledged the chronic nature of tinnitus were less likely to utilise *emotional support* or *venting* as a coping strategies. This may reflect a state of resignation or acceptance which is supported by the increased identification with *acceptance* coping in those who perceive tinnitus to have a greater perceived duration.

Consistent with previous findings, perceived *personal* and *treatment control* were related to increased use of *active coping* and less use of *behavioural disengagement* (Hagger & Orbell, 2003). Furthermore, *personal control* was associated with increased use of *emotional* and *instrumental* support. Whilst the finding that an increased sense of control is associated with more active efforts to address the condition is logical, this association does not necessarily indicate an adaptive response to the condition. Indeed, several previous studies have noted a near absence of relationships between coping strategies and decreased distress (Budd & Pugh, 1996a; Budd & Pugh, 1996b; Andersson, Kaldo, Stromgren, & Strom, 2004). Similarly, in the present study, the use of *active coping* and *seeking support* was strongly related to increased distress.

4.1.1.3 Hypothesis 1(c).

Coping strategies will be significantly associated with psychological distress and tinnitus severity.

Strong associations were identified between many of the coping strategies and outcomes with nine of the fourteen strategies showing positive correlations with at least three of the four outcome measures. This is consistent with previous research which has shown a lack of inverse associations between use of coping strategies and distress (Budd & Pugh, 1996a; Budd & Pugh, 1996b) and frequent positive associations between use of coping strategies and reported distress (Andersson et al, 2004). This implies that the use of most coping strategies does not confer benefit with respect to lowering distress in tinnitus patients.

Behavioural disengagement was unrelated to all of the outcome measures. Previous research has found conflicting evidence concerning the relationship between avoidant styles of coping and outcomes (e.g. Sullivan, Katon, Russo, Dobie, & Sakai, 1994; Budd & Pugh, 1996b). However, the poor internal consistency of this subscale ($\alpha = 0.334$) in the present study is a likely explanation for this finding.

One type of coping which has been associated with reduced tinnitus severity in previous research is strategies which seem to reflect acceptance (Andersson et al, 2004). This has been upheld in the present study since use of *acceptance* coping was strongly negatively correlated with all four outcome measures and, consistent with previous findings (Andersson et al,

2004), was the only strategy to show such a relationship. The pattern observed seems to indicate a positive role for *acceptance* coping whilst most other strategies are associated with increased levels of distress. It is possible that acceptance coping reflects the disengagement from coping efforts aiming to control or manage the condition which are likely to bring attention to the stimulus thus hindering habituation. This suggestion is in-line with a previous argument that tinnitus patients may adapt by avoiding maladaptive coping strategies (Budd & Pugh, 1996b).

4.1.2 Are illness representations and coping predictive of anxiety, depression and tinnitus severity?

4.1.2.1 Hypothesis 2(a)

Illness representations constructs and coping will predict a significant proportion of the variance in psychological distress and tinnitus severity.

Regression analyses showed that illness representations constructs and coping strategies each explained significant and unique portions of the variance in the models for tinnitus severity, anxiety and depression. In each case, illness representations added significantly to the model after controlling for background variables and coping constructs added significantly beyond the impact of background and illness representations variables. Whilst illness representations contributed significantly to the variance explained in the model for emotional representations, no individual coping strategies added significantly to this model.

Common to the models explaining tinnitus severity, anxiety and depression was the emergence of high pitched tinnitus as a significant predictor at the first step. This finding is inconsistent with previous results indicating that pitch is not predictive of tinnitus severity (Unterrainer, Greimel, Leibetseder & Koller, 2003). However the finding is consistent with the habituation model of adaptation to tinnitus (Hallam et al, 1984) which states that the characteristics of the stimulus will impact upon an individual's ability to habituate to the sound. The present study therefore presents some evidence that subjective perceptions of tinnitus pitch may have an independent role in predicting distress.

The illness representations showing significance in the models were; *identity*, a predictor in the model explaining tinnitus severity and depression, *treatment control*, a predictor in the model for anxiety and *consequences*, which was significant in the models for tinnitus severity and emotional representations. Overall therefore, the role of cognitive illness representations in predicting emotional distress in tinnitus patients was supported. These findings offer support for previous research indicating that perceived *consequences* predicted distress in tinnitus patients who were broadly comparable to the present sample in terms of age, gender, tinnitus duration and presence of other health problems (Reynolds et al, 2004). In this case, perceived *consequences* were predictive of anxiety and depression, whereas in the present study this variable predicted tinnitus severity and emotional representations. However, the two studies are not methodologically identical. The present study controlled more background variables, employed tinnitus severity as an outcome measure rather than a predictor, included coping constructs and used the IPQ-R which enabled assessment of a broader range of illness representations constructs. These differences as well as the strength

of a greater sample size in the present study may account for the finding of a broader range of cognitive variables which showed influence in predicting psychological distress.

The present research represents the first attempt to assess the impact of coping variables on distress in tinnitus patients after controlling for cognitive illness representations. The proportion of variance explained by coping variables in each model was relatively small, but unique contributions were made by coping variables in all models excepting the model for emotional representations. The strategy which emerged most consistently was *venting* which was significant in the models for tinnitus severity, anxiety and depression. *Acceptance* coping showed significance in the models for tinnitus severity and depression and *instrumental support* was also associated with tinnitus severity. These findings are consistent with the correlational relationships observed in previous research (Budd & Pugh, 1996a; Budd & Pugh, 1996b; Andersson et al, 2004) and point to the lack of effectiveness of using *venting* and *instrumental support* and a potential beneficial role for *acceptance* coping.

Whilst the variance accounted for by the model explaining tinnitus severity was relatively high at 73.3%, the variance explained in anxiety, depression and emotional representations was lower at 42.9%, 47.6% and 44.3% respectively. This implies that a substantial proportion of the variance in each model remains unaccounted for and that there may be other relevant factors which have been omitted in the present study. One clear limitation of the SRM model used in the present study is its focus on purely intrapersonal factors. Previous tinnitus research addressing the role of marital cohesion and spousal responses has provided evidence that these relationship factors may also play a role (Sullivan et al, 1994; Pugh,

Stephens, & Budd, 2004). Therefore, unexplained variance may be attributable to such social factors and requires further study.

4.1.2.2 Hypothesis 2(b)

Coping strategies will mediate the influence of illness representations on psychological distress and tinnitus severity.

The role of coping variables as mediators in the relationship between cognitive representations and outcomes was generally refuted. Only *venting* showed a potential but small mediating influence between *psychological cause* attributions and anxiety. The lack of a mediating role of coping variables is consistent with studies of other health conditions (Scharloo, Kaptein, Weinman, Hazems, Williams, Bergman, & Rooijmans, 1998; Moss-Morris, Petrie, & Weinman, 1996). One explanation for the failure of studies to identify coping strategies as mediators is the inadequacy of the conceptualisation of coping constructs and the measures employed to assess them (De Ridder, 1997). Another possibility is that the feedback loop of the SRM which postulates that illness outcomes will modify illness representations may complicate the mediation process if it exists (Hagger & Orbell, 2003). On the other hand, rather than mediating the relationships between illness representations and outcomes, coping may serve a moderating function (Hagger & Orbell, 2003). It should also be acknowledged that the role and utility of coping strategies may change over the course of the condition, therefore heterogeneity of tinnitus duration within samples and cross-sectional designs may obscure relationships that are pertinent to different

stages of adaptation. Since the SRM postulates directional causal relationships between illness representations, coping and outcomes, these pathways will only be adequately tested using prospective longitudinal designs (Rutter & Rutter, 2002).

4.1.3 What relationships exist between acceptance, anxiety, depression and tinnitus severity?

4.1.3.1 Hypothesis 3.

The acceptance constructs 'Activity engagement' and 'Tinnitus Willingness' will be significantly and negatively associated with psychological distress and tinnitus severity.

Correlation analyses demonstrated that acceptance was highly significantly and negatively correlated with all four outcome measures suggesting that patients who are more accepting of tinnitus report lower levels of anxiety, depression, tinnitus specific emotional distress and less impact of tinnitus on life. These findings are consistent with research carried out in chronic pain populations which has consistently found acceptance to be a strong predictor of both psychological and functional outcomes (e.g. McCracken, 1998; McCracken & Eccleston, 2003).

4.1.4 Is acceptance predictive of anxiety, depression and tinnitus severity?

4.1.4.1 Hypothesis 4.

The acceptance constructs 'Activity engagement' and 'Tinnitus willingness' will predict a significant proportion of the variance in psychological distress and tinnitus severity.

As sole predictors in the regression analyses, the acceptance variables explained between 24.6% and 50.8% of the variance in the outcomes, with *activity engagement* showing significance in all four models and *tinnitus willingness* contributing in the models explaining tinnitus severity and emotional representations. Further analyses revealed that after controlling for background variables, illness representations and coping, the addition of acceptance variables added significant and unique variance to the models for tinnitus severity, depression and emotional representations.

The variable *activity engagement* was most consistently predictive, retaining an influence in the models for depression and emotional representations, whilst *tinnitus willingness* was predictive in the model for tinnitus severity. Nicholas and Asghari (2006) have recently criticised research on acceptance in chronic pain for failure to control for demographic and cognitive variables and have argued that the role of acceptance in this condition may not be as strong as first thought. Therefore, a strength of the present study is the control of a range of background variables as well as cognitive and coping constructs. The finding that acceptance

predicts unique variance after controlling for these factors therefore lends weight to its role in predicting distress in this population.

The finding that *activity engagement* significantly contributed to the explanation of variance in depression and emotional representations seems to indicate that engaging in everyday life despite tinnitus is an adaptive and functional way to adapt to the condition. Certainly, this would fit within the habituation model of adjustment (Hallam et al, 1984) since activities which distract attention from the stimulus should promote habituation. Similarly, it may simply reflect the withdrawal from activities which is associated with depression, promoting continued attention to the tinnitus thus hindering the habituation process. *Tinnitus willingness* which showed a predictive role in the model for tinnitus severity is reflective of relinquishing efforts to control or avoid tinnitus. This may be associated with disengaging from coping efforts to combat the condition as discussed previously.

4.2 Clinical Implications

4.2.1 Identifying psychological distress

Although the prevalence of psychological distress was not a focus of the present study, it is worth noting that a substantial 39% of the sample demonstrated scores indicative of clinically significant psychological distress (borderline or above) which is in line with previous findings (McKenna, Hallam, & Hinchcliffe, 1991; Reynolds et al, 2004). Given this high

prevalence, there is a strong case for developing adequate systems for detecting and treating patients suffering high levels of distress.

4.2.2 Intervention Strategies

Psychological variables predicted between 41.2% and 46.8% of the outcomes and consistently predicted more of the variance in outcomes than background variables. This highlights the importance of psychological factors in intervening to ameliorate the distress experienced by a substantial number of tinnitus sufferers. Specifically, the findings of the present study suggested that the cognitive constructs *illness identity*, *consequences* and *treatment control* may all be important in explaining distress in tinnitus patients.

Illness identity refers not only to the number of symptoms experienced but also the attribution of these symptoms to the tinnitus itself. Given the attribution of many unrelated symptoms such as sore-throat and stiff joints to the tinnitus, it is unsurprising that this factor is related to the perceived impact of tinnitus on life. It is conceivable that psycho-educational work focusing on the nature and effects of tinnitus could reduce the perception that tinnitus causes or impacts on other symptoms thereby reducing the emotional salience. Similarly, perceptions of *control* and *consequences* could be targeted using cognitive techniques. The SRM has its roots in cognitive-behavioural theory positing causal relationships amongst cognition, behaviour and affect. Therefore it has been recommended that interventions designed to modify illness representations should be based on cognitive-behavioural principles (Petrie & Weinman, 1997). Existing research has supported the effectiveness of

Cognitive Behavioural Therapy (CBT) treatment programmes for tinnitus patients (Andersson, Stromgren, Strom, & Lyttkens, 2002; Kroner-Herwig, Frenzel, Fritsche, Schilkowsky, & Esser, 2003), however further studies would be necessary to discover whether such treatment approaches are effective in modifying illness representations of tinnitus.

The findings suggest that coping efforts were broadly associated with poorer psychological outcomes. Specifically, seeking *instrumental support* and use of *venting* were associated with increased distress in regression analyses. The direction of the relationships cannot be determined by cross-sectional research, however, the association is indicative that use of the strategies is not beneficial. Conversely, use of *acceptance* coping, as well as the acceptance variables *tinnitus willingness* and *activity engagement* were associated with more favourable psychological outcomes. These findings concerning coping and acceptance seem to indicate a potential role for acceptance rather than coping based interventions. Cognitive approaches which address acceptance such as Acceptance and Commitment Therapy (Hayes, Luoma, Bond, Masuda, & Lillis, 2006) may therefore be beneficial to this client group. Clearly, further research is necessary to investigate this possibility, however findings from research in chronic pain provide initial evidence that acceptance rather than coping based treatment programmes conferred more benefit to patients (McCracken & Eccleston, 2003).

4.3 Methodological Critique

4.3.1 Design

The time and resource constraints on the research necessitated use of a cross-sectional design, thus causal attributions concerning the relationships observed cannot be made.

4.3.2 Sample

To recruit a sufficient sample ensuring adequate statistical power, participants were approached from a number of sources, thus introducing potential bias. It is conceivable that patients approached by their treating clinician may have felt more compelled to volunteer than those responding to an advertisement. However, statistical differences between the clinic and advertisement recruited groups were minimal suggesting that this may not have been the case. Further selection bias may have also been inherent due to the nature of the study, such that those who were particularly receptive to the potential role of psychological factors in tinnitus may have been more likely to consent to participate. In this sense, the sample may not be representative of tinnitus sufferers as a wider group. Since the characteristics of non-responders were not monitored this possibility cannot be refuted.

Another artefact of the sampling method concerns the heterogeneity of the respondents with respect to access and use of treatment. Participants recruited via advertisement may not have had contact with a tinnitus professional and NHS respondents were seen by a range of

clinicians offering varied approaches to treatment. Attempting to control for this factor would be challenging since the symptom duration and management strategies tried by patients before consulting a professional may vary as much as the treatment offered by professionals. A prospective design which assessed patients at or around symptom onset and then compared patients undergoing a standardised treatment protocol with waiting-list controls could be an effective means of coping with this issue, however, such a design was beyond the scope of the present study.

4.3.3 Measurement

Reliance on cross-sectional self-report data has inherent weaknesses, notably the biases of representing views at one time point and potential social desirability. Eliciting additional objective data, for example on functional outcomes (number of health professional visits, time off work) may have bolstered the validity of the data. However, these methods invite their own problems such as reliance on patient memory and potential irrelevance due to the predominance of retired participants.

Similarly, reliance on subjective indicators of symptom intensity was a limitation. Ideally, audiological measures such as loudness matching would have been employed to control for these factors, however resource constraints did not allow this. In light of the findings suggesting an important role for tinnitus pitch in the present study such measures would be beneficial in order to validate these findings.

Although the measures employed were selected according to conceptual and psychometric suitability, they are also open to criticism. The COPE can be criticised due to its low internal reliability for some subscales. Although favoured for its brevity, a more robust measure may have been beneficial. Tinnitus specific measures were considered but were prohibitively lengthy. Since coping strategies appear not to associate with improved outcomes, and are more usually related to increased distress (Budd & Pugh, 1996a; Budd & Pugh, 1996b; Andersson et al, 2004), the construct may lack utility in this population. This is logical in the case of tinnitus since the object of adaptation is habituation to the stimulus whilst conscious engagement in coping strategies necessitates attention being brought to the condition which is counterproductive to this process. It may be that certain strategies do confer a benefit, but only when engaged in without explicitly considering them in relation to managing the tinnitus. If this is the case, attempting to measure coping efforts which are consciously engaged in as a combative approach to manage the condition will yield misleading results. A more valid endeavour may be to seek proxy ratings on the behaviour of patients, for example from spouses.

Several measures are available to assess perceived tinnitus severity. Unsurprisingly within such a broad construct, these vary markedly in the emphasis placed on various aspects of severity such as impact on auditory perception, health, lifestyle, sleep and psychological/emotional impact (for a review see Kennedy et al, 2004). The THI was chosen for the present study based on evidence supporting its psychometric robustness (Baguley, Humphriss, & Hodgson, 2000) and its brevity. However, factor analysis of the scale (Baguley & Andersson, 2003) has yielded a uni-factorial structure which raises the question of whether the measure

truly taps the separate domains it endeavours to. Therefore, whilst the measure functions as a robust measure of overall tinnitus related distress which is useful for clinical practice, other specific measures may be necessary to tease out the separate constructs contained within it if these are of interest in future research.

The CPAQ is a relatively new measure which has already been subject to revision within its short history (McCracken et al, 2004). More recently, Nicholas and Asghari (2006) have questioned the factor structure of the measure having found support for the *activity engagement* subscale but finding that the *pain willingness* subscale split into three separate factors. On this basis they suggest that the *pain willingness* subscale should be abandoned. The current study is the first to employ this measure with tinnitus patients but has found evidence for a bi-factorial structure of the measure in this sample. Similarly, the IPQ-R is a relatively recent development of the original IPQ. Investigations of its psychometric properties (Moss-Morris et al, 2002) have indicated that the changes made to the original IPQ have improved the robustness of the tool, however its applicability to different health conditions will emerge over time as more research is conducted using this measure.

The HADS is commonly regarded as a measure which is suitable for medical patients due to its minimal focus on somatic symptoms of anxiety and depression. However, a recent review (Martin, 2005) suggests that rather than the generally accepted two-factor structure measuring anxiety and depression, the HADS possesses a three-factor structure. That is, whilst the validity of the depression subscale has consistently been supported, the anxiety subscale has been shown to split into two scales representing negative affectivity and

autonomic arousal. It is argued that items on the autonomic arousal factor are likely to be sensitive to somatic influence of illness and therefore the suitability of the HADS for individuals with physical health conditions has been called into question (Martin, 2005).

4.3.4 Analysis

Since *a priori* sample size calculation for the regression models was not possible, post-hoc power analysis using GPOWER (Faul & Erdfelder, 1992) was undertaken to verify that the sample size conferred adequate statistical power. This calculation was based on the regression model from the analyses which would confer the lowest amount of power, that is, the model using the highest number of independent variables and lowest number of participants after accounting for missing data. The analysis showed that this model containing 30 independent variables and 158 observations with an alpha level set at $p < 0.01$ could detect an effect size of 0.25 or larger with power of 0.8022. With the alpha level set at $p < 0.05$ (considered to represent trends in the present study), an effect size of 0.18 (approximately medium according to convention) could be detected with adequate power of 0.794. Therefore, the sample size was adequate to detect an effect halfway between a medium and large effect size at a stringent alpha level of 0.01 and medium effect sizes at an alpha level of 0.05. In order to obtain adequate power to detect small to medium effect sizes at an alpha level of $p < 0.01$ a much larger sample would be needed (small effect; $n=1662$, medium effect; $n=245$).

4.4 Future Research Opportunities

In order to recruit sufficient participants, it was necessary to sacrifice adequate control of treatment variables. Furthermore, the large number of independent variables inevitably reduced the statistical power of the models such that small and medium effects could not be adequately detected. Future work would benefit from larger samples which are more representative of the help-seeking tinnitus population to attempt to replicate the findings of this study and potentially identify smaller effects which may have been missed. Such studies would be enriched by the consideration of a broader range of outcome variables. The present study focussed solely on psychological distress and tinnitus severity, however outcomes such as indicators of functioning (e.g. health professional visits, time off work) and well-being are also of potential interest.

Research to date examining the psychological factors associated with tinnitus distress has been predominantly cross-sectional in design. Prospective longitudinal research would not only allow adequate testing of the causal relationships proposed by the SRM but would also facilitate investigation of the nature of adjustment to tinnitus over time. Prospective longitudinal designs would also enable further investigation of the role of coping within the SRM. Many studies have investigated the SRM, however, the relational role of coping within the model has been largely neglected. Future work would benefit from analysis to determine whether coping variables serve a mediating or moderating function in the model (Hagger & Orbell, 2003).

Finally, whilst the models generated explained substantial percentages of the variance in the outcome measures, the remainder is unaccounted for by the independent variables studied in this case. A possible step forward in explaining this remaining variance would be to integrate the research on intrapersonal and interpersonal factors to examine the relationships between the two.

5.0 Conclusion

The results of the present study suggest that some cognitive illness representations constructs are associated with distress experienced by patients with chronic tinnitus. In particular, *illness identity*, *consequences* and *treatment control* showed predictive value in the regression models. The results also support previous findings that many coping efforts are associated with increased distress in tinnitus patients. Regression analysis revealed a consistent association between *venting* and outcome measures and also showed a role for *instrumental support* and *acceptance* coping. However, the hypothesis that coping variables would act as mediators in the model was generally not supported.

Investigation of the construct acceptance, reflecting engagement in activities despite tinnitus and willingness to experience the symptom, revealed results consistent with research into chronic pain, suggesting that this may be a fruitful area for further study.

The present study thereby provides support for associations between illness representations, coping and acceptance in relation to tinnitus distress, however the cross-sectional design

precludes conclusions on the causal direction of the relationships observed. Larger sample sizes are needed in future research to enable detection of small and medium effects which was not possible in the present study. Prospective research controlling for the impact of treatment is also required to further investigate the impact of illness representations and acceptance on a broader range of outcomes over time. Clarification of the role of these variables in explaining adaptation to tinnitus may inform more specified psychological interventions to support this client group.

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Section 3

Critical Appraisal

1.0 Choice of research area

The idea for this research arose from my long-standing general interest in the psychological and functional impacts of physical health conditions. During my employment as an Assistant Psychologist in a pain management service, I developed a particular interest in physical symptoms which are not necessarily indicative of underlying pathology and are subjectively experienced in the absence of objective markers of the condition. My interest in tinnitus began whilst conducting a literature search on hearing impairment, when I came across a paper reviewing the psychological aspects of tinnitus (Andersson, 2002). Until this point, although I had a basic understanding of tinnitus, I had not been aware of it as a chronic condition that is associated with significant distress in some patients. This paper ignited my interest in the condition and prompted me to conduct a literature review on tinnitus during my first year of training (DClinPsy). This literature review was broad in its scope, considering psychological reactions to tinnitus and audiological and psychological factors which are associated with tinnitus severity.

The process of conducting the initial literature review was helpful in developing my knowledge of the condition and the existing body of research, highlighting where gaps existed in the literature. This experience also confirmed my interest in the subject. Furthermore, reading about the prevalence of the condition suggested that this would be a feasible area in which to conduct doctoral research, which was an important consideration in the early stages. At this point, I decided to make contact with clinicians in the field to canvas views on potential areas of research with clinical relevance and to determine more

specifically the feasibility of recruiting sufficient numbers of patients to the research. I also decided to observe some tinnitus clinics held in local services in order to gain a better appreciation of the kind of issues faced by this client group and also the nature of the service offered to them.

Having conducted an initial literature review, the next stage of the process was to submit a research proposal to the university as part of the course requirements. Meeting with representatives of the course staff team was helpful in highlighting areas of theoretical and conceptual weakness. For example, at this stage I had a general interest in the concept of acceptance as a process in adaptation to chronic illness but had not adequately addressed the operationalisation of this broad term. This process also prompted me to begin considering the measures that would be appropriate to capture the constructs of interest. Following this meeting and discussion with my research supervisor, the proposal was refined and presented to my peer group and local clinicians whose feedback indicated that the proposed study was both of interest and clinical relevance.

2.0 Literature Review

The literature review produced as part of the thesis has been an evolving piece of work which has spanned two years. The initial review undertaken at the end of the first year of training was a challenging task since another potential area of interest was explored and rejected prior to the tinnitus review. The consequence was that the time left to undertake the work was somewhat limited. However, I felt satisfied that I had determined an area both of interest and

clinical relevance providing the opportunity for undertaking research within the constraints of the course programme and consequently my decision felt justified. The initial review was rewritten and refined several times before submission. Whilst this was in part frustrating, the benefits of the process were clear. For example, the initial review had been broad in its scope and whilst this allowed me to become more familiar with the tinnitus literature in general, the review lacked the specificity, direction and degree of critical appraisal required. The subsequent review was undertaken with a more systematic approach to literature searching and a more highly specified subject area was chosen allowing a greater depth of analysis.

3.0 Conducting the research

3.1 Planning

3.1.1 Achieving an adequate sample

A key aspect of planning the research was determining how many participants would be needed to confer adequate statistical power for the analysis. Due to a lack of similar research, the initial power calculation was based on a correlation rather than regression analysis. The results indicated that 100 participants would be necessary, however, the uncertainty surrounding the number of independent variables which would be entered into the regression analysis left me with a prevailing anxiety that this number may be insufficient.

The process of establishing the feasibility of recruiting adequate numbers of participants was one of the most challenging aspects of the research. Early contact was made with local clinicians to canvas their interest and willingness to assist with recruiting participants. The clinicians who were approached were very supportive and all expressed willingness to be involved. In some centres it was difficult to ascertain how many patients were likely to be seen over the period designated for recruitment. Understandably, clinicians existing work demands and part-time hours were obstacles to efficient correspondence. Originally, it was planned that the recruitment would be conducted via NHS clinics only. However, concern that numbers achieved would be inadequate prompted me to consider other avenues for recruitment.

Having discovered that a large service was routinely collecting data which were similar to that required by my own study, the potential for using this existing source of data was considered. Whilst this apparently presented a helpful means of maximising recruitment, scrutiny of the detail of this possibility revealed that it was not practical. In particular, the data obtained were not anonymised; therefore the process of anonymising these data and seeking retrospective consent for its use in research presented a barrier. Furthermore, whilst the service was collecting data relating to most aspects of the design of the present study, there were minimal demographic data and no data relevant to acceptance. Therefore, use of these data would have entailed a substantial change to the design and sacrifice of an aspect which constitutes a novel addition to the existing literature. Consequently, this opportunity was rejected and other means of enhancing recruitment were considered.

The final decision regarding additional recruitment was to advertise the study via the journal of a tinnitus support organisation. Although it was difficult to estimate the response to the advert, its national distribution suggested that it may provide an effective means of backup to boost the numbers obtained via clinics.

3.1.2 Determining the recruitment process

When considering the procedure for recruitment, my original preference was to be present at clinics to provide support and answer any questions which arose. However, clinics were generally mixed, seeing only two or three tinnitus patients over half a day, therefore I realised that personally undertaking recruitment would be impractical. Whilst the clinicians agreed to undertake recruitment, I was aware that this constituted an additional duty for already busy professionals and therefore endeavoured to simplify the process as far as possible. This was achieved in part by providing all of the necessary information and contact details for the researcher in the research pack, which negated the need for clinicians to explain the study or answer questions. Furthermore, the anonymity of responses removed the need for a consent procedure as this was implied by voluntary return of the questionnaires. Therefore, the role of the clinicians was simply to ensure that patients met the inclusion criteria and offer them an envelope containing the research materials to take away and consider.

3.1.3 Obtaining ethical approval

Another part of the planning process was to obtain ethical approval from the Local Research Ethics Committee (LREC) and management approval from the relevant Research and Development Departments (R&D) of the NHS trusts involved. The process of gaining LREC approval was laborious but facilitated by guidance from an adviser within the researcher's employing trust who was familiar with the process. Applying for R&D approval was somewhat more complex, since each department had differing requirements and regulations for the procedure. Some specified a need for the researcher to hold an honorary contract and Criminal Records Bureau Disclosure and another mandated that my supervisor must be named chief investigator. Having determined the different requirements for each trust, the frustrating part of this process was waiting for responses which took some time and was often attributed to backlog of work. I was pleased that I had not waited to obtain LREC approval before applying for R&D approval since doing this would have resulted in a substantial delay on the start of data collection and would have therefore limited the response obtained.

3.2 Data Collection

Having planned the protocol and obtained ethical approval, the process of data collection was probably the most straightforward aspect of the research. The barriers to data collection and strategies to facilitate the process are discussed in the following section.

3.2.1 Barriers to data collection

Producing the research packs was time consuming and costly, however the university was flexible in covering the additional budget needed to produce extra research packs. There were a number of other minor barriers to data collection including a delay to the start of data collection in one clinic, the loss of one of the recruiting clinicians and a service restructure which dramatically reduced the number of tinnitus patients being seen in one clinic. However, barriers were anticipated and were in part the reason for recruiting via advertisement and therefore did not constitute a particular problem. Recruiting via the advertisement went smoothly and no difficulties were encountered. Although it had been difficult to judge the potential response to the advertisement, approximately half of the sample was recruited via this method. Several of the participants who responded to the advert made positive comments about the research and I found this encouragement motivating.

3.2.2 Strategies to facilitate data collection

A number of strategies were employed to maximise the response rate. Firstly, a two-pronged approach to data collection was employed, targeting both NHS clinics and members of a national tinnitus organisation. The advert was published in two separate issues of the journal in question, prompting a new wave of responses the second time it was published. The protocol was made as brief as possible and stamped-addressed envelopes were provided to return questionnaires as means of encouraging participation. During the recruitment process it soon became apparent that the response to the advert was greater than any of the single

clinics, therefore research packs from the clinics were recalled for re-use and more packs were created to satisfy the greater demand. In addition, regular contact was maintained with the recruiting clinicians in order to ensure that recruitment was progressing without any major barriers.

3.3 Statistics

The statistical analysis began in March 2006 and was far more complex and lengthy than expected. I had not anticipated the length of time required to enter, check and recode data before any analysis could proceed. In reality, my statistical knowledge had not been used for a number of years and therefore much of the knowledge and skills required for the analysis had to be refreshed or learned from scratch. This was a painstaking process which resulted in redoing the analysis on many occasions. There is no doubt that I was naïve in my assessment of the scope of this task. However, I was eager to learn and master this task and acquired the relevant information from textbooks, the internet and was also fortunate in having intermittent support from a statistician which was invaluable. Despite stressful moments, I gained a real sense of achievement when I remembered or learned and understood new aspects of statistical analysis and it was exciting to see the results emerging from the data.

3.4 Writing up

I endeavoured to begin the process of writing up the thesis as early as possible, since I prefer to be ahead of schedule and work more effectively when I am not under time pressure. I was

also aware that in order to receive feedback on drafts of the work I would need to submit these allowing adequate time for my supervisors to read them and give comments. I began taking research leave in January 2007 and generally took this in week long blocks since I work more effectively in intensive blocks rather than sporadically. I was fortunate that my commitments on clinical placements allowed me to take time out in this way. Although I worked intensively and effectively during my research leave, I tended to be unboundaried about my working hours often working far into the evenings and during weekends. This was fairly frustrating and at times I felt that the research was taking over to the exclusion of other aspects of life. However, this feeling was balanced by the encouragement of making progress and thinking that this would be a short-term sacrifice and would be worth the effort. I was also spurred on at these times by the encouragement of my partner, friends and family. In general the process of writing up the literature review and research report felt like a process that drew on familiar skills. Writing the critical appraisal, conversely, was a new and interesting experience. In some ways the difference in style made this part of the thesis feel strange and out of place, causing me to doubt the suitability of the content. However, writing this section was also refreshing, allowing a more personal and reflective dimension to emerge. Furthermore, this process allowed me to take stock of the scale of the whole process and made me feel very proud of the achievement of getting through the research.

4.0 The supervisory process

Supervision was particularly useful in the early stages of the research in guiding me through the process of designing the research and making key decisions about the protocol and

section of measures. Undoubtedly, I benefited from the knowledge and experience of my research supervisor who was able to point me to relevant papers and theories. The main barriers to supervision were around arranging meetings which were sometimes short and often irregularly and widely spaced due to other commitments.

Whilst trainees are encouraged to arrange field supervision, this is more fitting in cases where the trainee is working in the department where recruitment will take place or where a clinical psychologist is involved in enabling recruitment of participants. Since I was not based in a tinnitus service, nor was there a psychologist working in a tinnitus service locally, the role of a field supervisor in my research was initially uncertain. However, I decided that although I would need to establish recruitment methods independently, a field supervisor could offer me support in terms of providing feedback on written work. Therefore, I approached a local clinician who worked in a pain management service and arranged supervision for this purpose. Since I was not working on placement with this supervisor, face-to-face contact was difficult to arrange and contact was predominantly via email. The feedback given by the field supervisor on written work was fairly minimal. With hindsight, arranging supervision within the department where I was working may have helped to promote opportunities for formal and informal contact.

5.0 Dissemination of findings

I am committed to disseminating the findings of the research to the academic and clinical community via peer reviewed publication and possibly conference presentation. Therefore, I

will be submitting the literature review and a refined research report to be considered for publication in a relevant journal as soon as possible following completion. I am also committed to the dissemination of the research findings to inform the research participants and the services involved in recruitment of the outcome. Not only is it ethical to do so, but several participants expressed interest in discovering the outcome and it seems a fitting way to thank them for the time and effort they gave to the research. Therefore, I shall be producing an information sheet summarising the findings which will be available to services and participants on request. In addition, I have been invited to write an article for the journal which carried the recruitment advertisement which I have agreed to.

6.0 Conclusions and learning outcomes

Although I have previously undertaken clinically relevant research, this was my first experience of undertaking research within the NHS which carries its own challenges. Completing this research has been a valuable and interesting experience which has enabled me to refresh existing skills and develop new ones. A range of learning outcomes have been achieved as a result of the research process. In particular I feel that I have:

- Refreshed skills in systematic literature searching and critical appraisal of literature allowing me to identify methodological and conceptual weaknesses in existing research and to identify directions for future work.

- Developed a range of key research skills including research design, selection of appropriate measures, organising data collection, statistical analysis and interpretation of findings which will be transferable to future projects.
- Become more aware of the realities of conducting research in the NHS with the need to manage time effectively and maintain good communications in order to achieve the required response rate. Equally, I feel that had I been employed within the service where the recruitment was being undertaken this would have allowed greater ease of communication and management of the project. This gives me hope that conducting research on a similar scale in the future within services where I am employed on a full-time basis and where time constraints are less severe will be a more manageable and potentially less stressful process.
- Developed an in-depth knowledge of a specific area of research which has felt different and positive in comparison to much of the training experience where a more superficial level of knowledge is developed across many areas.
- Become more conscious of the application of the components of the self-regulation model in clinical practice when working with clients who are in the process of adapting to chronic conditions. In particular, the knowledge that I have developed has prompted me to address the constructs within the model during assessments and to think more explicitly about the relationships between beliefs held about the condition and the coping methods being utilised and the resulting outcomes.

7.0 References

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Appendices

Appendix 1. Notes for contributors, Clinical Psychology Review



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CLINICAL PSYCHOLOGY REVIEW

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Appendix 2. Summary table of papers included in the literature review.

Reference	Sample a. sample size b. % male c. mean age d. mean tinnitus duration e. country	Sample selection method (tinnitus patients only)	Measures	Key findings
Andersson (1996)	a. 30 tinnitus patients, 44 patients with hearing loss, b. 47%, c. 57.1, d. 8.8, e. Sweden	Patients registered at 3 hospitals – some had received treatment, others had not.	Life Orientation Test, Tinnitus Effect Questionnaire	Optimism significantly related to lower tinnitus severity (specifically – emotional distress, auditory and perceptual difficulties, irrational beliefs and insomnia).
Andersson et al (2000)	a. 146, b. 47%, c. 56.4, d. 10.5, e. Sweden	Retrospective approach to audiology clinic patients.	Anxiety Sensitivity Index, TRQ	Anxiety sensitivity positively correlated with tinnitus severity - effect stronger in females. Anxiety sensitivity predicted variance in tinnitus severity beyond effect of audiological variables.
Andersson et al (2004)	a. 157, b. 57.3%, c. 46, d. 6.6, e. Sweden	Advertisement via newspaper, and internet for web based study.	Tinnitus Coping Strategies Questionnaire, TRQ, Anxiety Sensitivity Index, HADS	Coping strategy use positively related to severity even when effects of distress and anxiety sensitivity controlled.
Andersson et al (2005)	a. 256, b. 57%, c. 51, d. 10.3, e. Sweden	Retrospectively approached audiology patients treated by clinical psychologist.	TRQ, HADS, Insomnia Severity Index, Multidimensional Perfectionism Scale	Anxiety and depression associated with tinnitus severity in both genders. Personal standards (perfectionism subscale) related to tinnitus distress in men. Organisation (Perfectionism subscale) related to distress in women.
Budd & Pugh (1995)	a. 109, b. 70%, c. 54.4, d. 6.8, e. Wales	Consecutive outpatients at a tinnitus clinic	BDI, STAI (state only), Locus of Control of Behaviour, Severity-likert scale	Anxiety, depression and locus of control correlated with tinnitus severity. 'Internals' reported lower tinnitus severity. Anxiety and depression mediated by impact of locus of control on severity.
Budd & Pugh (1996a)	a. 116, b. 69%, c. 54.7, d. 7.1, e. Wales	Consecutive outpatients at a tinnitus clinic	BDI, STAI (state only), Tinnitus Coping Style Questionnaire, Severity-likert scale	Coping style correlated significantly with tinnitus severity, anxiety and depression
Budd & Pugh (1996b)	a. 108, b. 56%, c. 55, d. 6.6, e. Wales	Consecutive outpatients at a tinnitus clinic	BDI, STAI (state only), Tinnitus Coping Style Questionnaire, Severity-likert scale	Maladaptive coping style but not effective coping style correlated with tinnitus severity and emotional distress
Erlandsson & Hallberg (2000)	a. 122, b. 49%, c. 59.7, d. 10.4, e. Sweden	Consecutive outpatients at a tinnitus clinic	Tinnitus Severity Gradings (10 item questionnaire), Tinnitus handicap/support scale	Impaired concentration, feeling depressed, perceived negative attitudes, hypersensitivity to sound, average hearing level and tinnitus duration together accounted for 65% of variance in quality of life as represented by responses to 2 questions.

Erlandsson & Persson (2006)	a. 70 (16 at follow up) b. 64%, c. 49, d. 7.9, e. Sweden	Consecutive outpatients at a tinnitus clinic	SCID-II, BDI, STAI, Montgomery Asberg Depression Rating Scale, Hopelessness Scale	Subgroup of patients with average/above average psychopathology at time one were followed up n=18. 8 Ss diagnosed with personality disorder. No change observed in distress profile of PD patients at time 3, one and half years later. Significant decreases in distress observed in remainder of subgroup who were not diagnosed with PD
Erlandsson et al (1992)	a. 163, b. 49%, c. 60 d. not stated, e. Sweden	Consecutive outpatients at a tinnitus clinic	Tinnitus Severity Questionnaire, Tinnitus handicap/support scale	Perceived attitudes of others was significantly related to tinnitus severity.
Folmer et al (1999)	a. 436, b. 74%, c. 50.6 d. not stated, e. USA	Screening questionnaire to new patients at a Health Sciences University	Tinnitus Severity (12 questions), Depression (1 question), Loudness (VAS)	Patients self-identifying as currently depressed scored significantly higher for tinnitus severity. No significant difference in loudness between depressed & non-depressed patients
Granqvist et al (2001)	a. 102, b. 60%, c. 58, d. 10.5, e. Sweden	Retrospective approach to former audiology clinic patients who had received clinical psychology input	TRQ, Family Support Scale (from West Haven-Yale Multidimensional Pain Inventory), Adult Attachment Scale	Avoidant attachment related to both tinnitus severity and perceived punitive family responses. Avoidant attachment also predicted tinnitus severity independently of family support.
Halford & Andersson (1991)	a. 112, b. 39%, c. 70% 50-75 yrs, d. 82% - 4+ yrs, e. UK	Support group members affiliated with a national tinnitus support organisation	STAI, STSS, Depressive Tendency Questionnaire	Anxiety trait and depressive tendency significantly related to tinnitus severity. Magnitude of the correlation coefficients low.
Hallberg et al (1993)	a. 52 patients tinnitus, 28 NIHL, b. 100%, c. range 40-60 yrs d. 9, e. Sweden	Randomly selected patients at the Department of Occupational Audiology	Hearing Measurement Scale, Strategies for Handling Stress Questionnaire, Communication Strategies Scale, Acceptance of Illness Scale, Hearing Handicap and Support Scale, Tinnitus Handicap and Support Scale, Multidimensional Scale of Perceived Social Support, Tinnitus annoyance & Perceived handicap VAS	36% of variance in tinnitus annoyance predicted by sleep disturbance and auditory perceptual difficulties. 60% of variance in perceived handicap (mixed sample) explained by factors represented by the variables 'acceptance of hearing problems', 'social support related to tinnitus' and 'years of education'
Henry & Wilson (1995)	a. 81, b. 64%, c. 59, d. 37%-0.5 yrs 21%-5-10 yrs 12%-10-20 yrs 30%-20+ yrs e. Australia	Regular attenders at Veteran's Hospital Audiology Dept	TRQ, Tinnitus Cognitions Questionnaire, Tinnitus Coping Strategies Questionnaire, BDI, Automatic Thoughts Questionnaire	Ss with high tinnitus severity (n=50) had elevated BDI scores and engaged in more tinnitus related dysfunctional thinking than those with low distress (n=31). No differences in coping or general negative cognitions between the two groups.

Holgers et al (2000)	a. 79 b. not stated c. 57 (men) 52 (women) d. not stated, e. Sweden	Consecutive audiology outpatients.	Nottingham Health Profile, TSQ	18 Ss met criteria for AWT+ (defined by time off work/medical visits). Four main predictors of AWT+ were two items from the NHP - "the days seem to drag", "I find it hard to reach for things", lack of physical exercise and pure tone average over both ears.
Holgers et al (2005)	a. 127 b. not stated c. not stated d. not stated e. Sweden	Consecutive audiology outpatients	Nottingham Health Profile, TSQ, SCID-P interview	30 Ss met the criteria for AWT+. Main predictors for AWT+ were 3 items from the NHP - "I find it hard to reach for things", "I feel that life is not worth living" and "I sleep badly at night". The probability of being AWT+ was 93% if each of these questions was answered affirmatively. All NHP subscales, TSQ scores and pure tone average differed significantly between the AWT+ and AWT- groups but hearing parameters were not strong predictors in the regression model. There was high comorbidity of anxiety and depression in the AWT+ group and these patients reported problems in two or more sectors of life which was higher than those identified by AWT- patients
Kirsch et al (1989)	a. 77 tinnitus patients, 34 chronic headache patients, 65 normal controls b. 42%, c. 50, d. 4.2, e. USA	Patients reporting tinnitus during an examination with an Otolaryngologist.	STAI, BDI, Psychosomatic Symptom Checklist, Holmes and Rahe Life Events Checklist Scale, VAS loudness and coping ability, Personal Views Survey	Self-rated coping ability significantly correlated with psychological distress including when perceived loudness was controlled for. Low copers were more distressed and showed a similar psychological distress profile to a group of headache patients. High copers were less distressed, showed a higher level of hardness and more similarity to a normal control group. No differences in stressful life events between the tinnitus groups.
Langenbach et al (2005)	a. 48 (34 in analysis) b. 63.6% c. 47.3 d. 1.6 weeks, e. Germany	First-time presenters at a University Ear Nose and Throat Clinic	Freiburger Personality Inventory, Symptom Checklist - 90 revised, TQ	Reports of insomnia attributed to tinnitus, anxiety and life satisfaction scores around onset of tinnitus predicted 56% of variance in tinnitus severity at 6 month follow-up. No correlation between sociodemographic variables and distress.
Lee et al (2004)	a. 167, b. 57.5%, c. 53, d. 4.7, e. Korea	Medical centre out-patients with tinnitus.	Dysfunctional beliefs/catastrophic thoughts questionnaire, THI, STAI, Anxious Thoughts and Tendencies (AT&T), Self Consciousness Scale (SCS), Coping Strategies Questionnaire	Audiological characteristics of tinnitus (perceived loudness, duration and hours per day) and Personality traits (self consciousness, anxious tendencies and trait anxiety) significantly correlated with cognitive characteristics (catastrophic thought and dysfunctional beliefs). Severity and Traits did not relate directly to distress but cognitive characteristics were significantly related to distress. Thus suggested that severity and trait characteristics impact on severity via their impact on cognitive characteristics.

Meric et al (1998)	a.281, b.59%, c.49.5, d.5, e.France	Ear Nose & Throat department outpatients	MMPI, TRQ, THQ, STSS	Various Mini-mult scores correlated with severity as measured by total or factor 1 THQ and total TRQ. The STSS did not correlate with any mini-mult dimension.
Pugh et al (1994)	a.91 patients, spouses b.54% (patients) c.57.4, d.8.7, e.Wales	Married or cohabiting outpatients at a tinnitus clinic.	10 question severity measure including loudness, annoyance, frequency of awareness and impact on daily activities, Significant other response scale, Marital Adjustment Test, Tinnitus Coping Style Questionnaire, HADS	Marital satisfaction negatively associated with anxiety and depression. 'Punishing responses' related to increased anxiety and depression, maladaptive coping and tinnitus severity. Relationships between punishing responses and maladaptive coping were direct but anxiety and depression mediate relationship between punishing responses and tinnitus severity. Patient-rated but not spouse-rated 'Solicitous responses' associated with anxiety and depression but only in males. Partial correlations reveal maladaptive coping as a mediating variable. Spouse and patient-rated solicitous responses correlated directly with maladaptive coping style and increased tinnitus severity.
Reynolds et al (2004)	a.55, b.47.3%, c.54.9, d.8.4, e.UK	Audiology outpatients who were receiving or had completed standard treatment; audiological assessment, fitting of hearing aids/masking devices, counselling and relaxation.	TQ, IPQ, HADS	"Consequences" (IPQ) predicted 13.6% of the variance in anxiety and 34.6% of the variance in depression scores. High anxiety group scored significantly higher than low anxiety group for intrusiveness, sleep and psychological factors on the TQ. No significant differences were observed in TQ and IPQ scores between the high and low depression groups (however only 5 Ss fell into the high depression group).
Scott & Lindberg (2000)	a.201 non-help seekers (TNH), 117 help seekers (TH), 317 age/gender matched controls b.56.7% (TNH), 54.3% (TH) c.TNH 52.35, TH 54.8, Control 56.25, d.61%-5+ yrs, e.Sweden	TNH - National population register, TH - consecutive audiology clinic outpatients	Life Orientation Test, Trait Anger Scale (STAS-T), STAI, Negative Mood Scale (NM), Daily Hassles Scale, Epidemiological Studies Depression Scale (CES-D)	Help seekers demonstrated elevated scores on all psychological and somatic scales. Non help seekers scores were closer to those of control Ss than to help seekers. There was a small significant difference in the duration of tinnitus between the two groups and also a significant difference in the grade of tinnitus.

Scott et al (1990)	a.3075, b.53%, c.62.3 d. 51% - 5 yrs+, 42% - 6 months+, e.Sweden	Patients from 52 hearing centres	Unstandardised questionnaire measure covering multiple aspects of tinnitus including descriptors of tinnitus, changes over time, perceived controllability and maskability and somatic and psychological symptoms.	The best predictors of discomfort from and adaptation to tinnitus were controllability and degree of maskability by external sounds. The most important predictor of worsened subjective loudness was duration. Factors which most strongly predicted increased discomfort from and decreased tolerance to tinnitus were depression and insomnia
Sirois et al (2006)	a.319, b.55.2%, c.46.5, d.8.9, e.Canada	Advertisement via online support message boards, emails to members of a national support organisation notices posted at a University and the waiting room of an audiology clinic.	Severity Questionnaire (11 items on loudness, interference, consistency, and number of comorbid conditions), Control Beliefs Inventory, Retrospective control (3 items - how important to know what caused your tinnitus, if only I'd done something differently I might not have got tinnitus, do you blame yourself for getting tinnitus), CES-D, Multidimensional Well-being Measure	Perceptions of control over general health and perceptions of symptom control were significantly related to better psychological adjustment. The opposite was true of retrospective control. Symptom control also emerged as a moderator of the intensity-adjustment relationship i.e. stronger beliefs in ability to control symptoms were more predictive of better adjustment in Ss with more intense symptoms.
Stobik et al (2005)	a.53, b.77%, c.49.7, d.not stated, e.Germany	Inpatients and outpatients admitted to a rehabilitation clinic specialising in neurology and neurological psychosomatic disorders	Impairment Severity, Structured Tinnitus Interview, VAS of loudness, disturbance and limitation of daily activities, TQ, SCL- R-90, Disorder Coping Questionnaire, Inventory of interpersonal problems, Social data Questionnaire	Patients with decompensated tinnitus reported more pronounced social difficulties, more depression, and a higher level of somatic comorbidity.
Sullivan et al (1988)	a.40 tinnitus, 14 hearing impaired control b.78% (72% control) c.49.4 (49 control) d.7, e.USA	New patients attending a general otolaryngology clinic.	National Institute of Mental Health Diagnostic Interview Schedule, SCL-90, Chronic Illness Problem Inventory, Revised Ways of Coping Checklist	Tinnitus patients had greater prevalence of lifetime and current depression than controls with hearing loss only. Depressed tinnitus patients (n=24) scored higher on the SCL and Chronic Illness Problem Inventory than non-depressed tinnitus patients (n=16) or controls. Depressed tinnitus patients had more somatic symptoms than non-depressed Ss. Non depressed tinnitus patients did not differ from controls apart from showing a higher level of somatisation. It is argued that tinnitus severity is significantly influenced by the presence of major depression

Sullivan et al (1994)	a.92 (+ 49 spouse pairs) b.52% c.62.1 d.100% - 6 mnth+, e.USA	Advertisement via membership of a national support organisation and via letters to community Otolaryngologists	Loudness (matching method), Hamilton Depression Rating Scale, Revised Ways of Coping Checklist, Dimensions of Stress Scale (salience of stressor, control over stressor)	Greater levels of role dysfunction were associated with appraisal of tinnitus as salient (after gender, loudness and depressive severity were taken into account). Lower levels of role dysfunction were associated with avoidant coping and seeking social support. Patient ratings showed a negative correlation between marital cohesion and role dysfunction. Spouse ratings showed a correlation between punishing responses to illness behaviour and greater role dysfunction. Effects of marital cohesion and punishing responses on disability were more pronounced in subjects with higher levels of depression.
Unterrainer et al (2001)	a.153, b.51%, c.51.6, d.5.95, e.Germany	General hospital outpatients and patients from a Head and Neck practice.	THI-12 (emotional-cognitive and functional-communicative subscales)	Lower levels of education were associated with higher level of emotional-cognitive related handicap. None of the other socioeconomic markers showed an association with degree of handicap. The variance in handicap explained by socioeconomic variables was very small (5.6% of the emotional-cognitive subscale/ 1.4% of the functional-communicative subscale).
Unterrainer et al (2003)	a.149, b.52%, c.51.6, d.5.93, e.Germany	Patients from the Head and Neck dept of a General Hospital and patients from an Ear Nose and Throat practice.	THI-12 (emotional-cognitive and functional-communicative subscales), VAS of loudness and pitch, General Depression Scale, CES-D (short), German health-related Locus of Control instrument (internality, social externality, fatalistic externality)	Depression and subjective loudness were the best predictors of severity followed by internal locus of control (patients identifying high levels of internal locus of control showing lower levels of severity). Perception of tinnitus as an illness, pitch, duration and comorbidity had no predictive value.
Zoger et al (2006)	a.80+144(high risk), b.62.5%(59.7% high risk), c.median 50(48 high risk), d. median 3.75(2 high risk), e.Sweden	Patients referred to an Audiological Physician with tinnitus as the main complaint.	NHP, SCID-P interview, HADS, Comprehensive Psychopathological Rating Scale (subscales for anxiety, depression and obsessive compulsive disorder), TSQ.	Anxiety and depressive disorders diagnosed using both psychiatric interview and HADS in tinnitus patients at high risk for developing 'severe tinnitus suffering'. Highly significant correlations found between these disorders and tinnitus severity.

Abbreviations – Tinnitus Reaction Questionnaire – TRQ, Subjective Tinnitus Severity Scale – STSS, Tinnitus Handicap Questionnaire – THQ, Tinnitus Handicap Inventory – THI, Tinnitus Severity Questionnaire – TSQ, Tinnitus Questionnaire – TQ, Visual Analogue Scale – VAS, Minnesota Multiphasic Personality Inventory – MMPI, Hospital Anxiety and Depression Scale – HADS, Beck Depression Inventory – BDI, State Trait Anxiety Inventory – STAI, Centre for Epidemiological Studies – Depression – CES-D, Symptom Checklist – SCL, Nottingham Health Profile – NHP, Noise induced hearing loss - NIHL

Appendix 3. Email confirmation of ethical approval from the University of Leicester

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Appendix 4. Letter of ethical approval from the Research Ethics Committee

21 August 2006

Re-issued 07 September 2006 to remove old documentation

Miss Jessica E. N. Moreland
Trainee Clinical Psychologist
University of Leicester
Department of Clinical Psychology
104 Regent Road
Leicester
LE1 7LT

Dear Miss Moreland

Full title of study: An investigation of illness representations, acceptance and coping in patients with chronic tinnitus.
REC reference number: 06/Q2502/56

Thank you for your letter of 03 August 2006, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

Ethical review of research sites

The Committee has designated this study as exempt from site-specific assessment (SSA). There is no requirement for other Local Research Ethics Committees to be informed or for site-specific assessment to be carried out at each site.

Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Application	Version 2	03 August 2006
Investigator CV	Version 1	12 April 2006
Protocol	Version 2	03 August 2006
Peer Review	P.Wang D/Version 1	02 April 2006
Statistician Comments	D/Version 1	30 April 2006
Questionnaire: Non Validated Brief Tinnitus Questionnaire	Version 1	28 April 2006
Questionnaire: Brief Cope Questionnaire (Validated)		Undated
Questionnaire: Hospital Anxiety and Depression Scale (validated)	HADS	Undated
Questionnaire: Tinnutis Handicap Inventory (named tinnitus questionnaire) (validated)	THI	Undated
Questionnaire: Chronic Tinnitus Questionnaire (validated)	CTAQ	Undated
Questionnaire: Illness Perception Questionnaire Revised (validated)	IPQ-R	Undated
Advertisement	Version 1	30 April 2006
Letter of invitation to participant	(Advert) Version 1	30 April 2006
Letter of invitation to participant	(Clinic) Version 2	03 August 2006
Participant Information Sheet: (Advert)	Version 1	30 April 2006
Participant Information Sheet: (Clinic)	Version 2	03 August 2006
Response to Request for Further Information	D/Version 1	03 August 2006
Supervisor CV	N. Robertson	25 April 2006

Research governance approval

You should arrange for the R&D department at all relevant NHS care organisations to be notified that the research will be taking place, and provide a copy of the REC application, the protocol and this letter.

All researchers and research collaborators who will be participating in the research must obtain final research governance approval before commencing any research procedures. Where a substantive contract is not held with the care organisation, it may be necessary for an honorary contract to be issued before approval for the research can be given.


Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

06/Q2502/56	Please quote this number on all correspondence
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With the Committee’s best wishes for the success of this project

Yours sincerely

pp. 

Chair

Email: sarah.gill@derwentsharedservices.nhs.uk

Enclosures:	<i>Standard approval conditions (SL-AC2)</i>
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Copy to:	Leicestershire Partnership NHS Trust Leicestershire Partnership Trust, George Hine House Gipsy Lane Leicester R&D Department University Hospitals of Leicester
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Appendix 5. Approval letters from NHS Trust Research and Development Departments.

Please reply to:

Research and Development
E11 Curie Court
Queen's Medical Centre
University Hospital
Derby Road
Nottingham
NG7 2UH

Telephone:

0115 9709049

Fax:

0115 8493295

E-mail:

janet.boothroyd@nuh.nhs.uk

Miss Jessica E. N. Moreland
Department of Clinical Psychology
104 Regent Road
Leicester
LE1 7LT

13 September 2006

Dear Miss Moreland

**ID: 06ET001 An investigation of illness representations, acceptance and coping in
patients with chronic tinnitus.**

The R&D Department have considered the following documents:

- . NHS REC application form version 5.1
- . R&D Application form, version 1.0
- . Protocol, version 2 dated 03/08/06
- . Questionnaire : non validated brief tinnitus questionnaire
- . Questionnaire: brief cope questionnaire (validated) updated
- . Questionnaire: Hospital Anxiety and Depression scale - HADS updated
- . Questionnaire : Tinnitus Handicap inventory (named tinnitus questionnaire) (validated) - THI updated
- . Questionnaire : Chronic Tinnitus Questionnaire (validated) - CTAQ updated
- . Questionnaire: illness Perception questionnaire revised (validated) - IPQ-R updated
- . Advertisement version 1 dated 30/04/06
- . Letter of invitation to participant (clinic) version 1 dated 30/04/06
- . Letter of invitation to participant (Advert) version 1 dated 30/04/06
- . Letter of invitation to participant (Clinic) version 2 dated 03/08/06
- . Participant information sheet: (Advert) version 1 dated 30/04/06
- . Participant Information sheet, (Clinic) version 1 dated 30/04/06
- . Participant Information sheet, (Clinic) version 2 dated 30/04/06

Your study now has R&D approval, on the understanding and provision that you will follow the conditions set out below.

Conditions of Approval

That you:

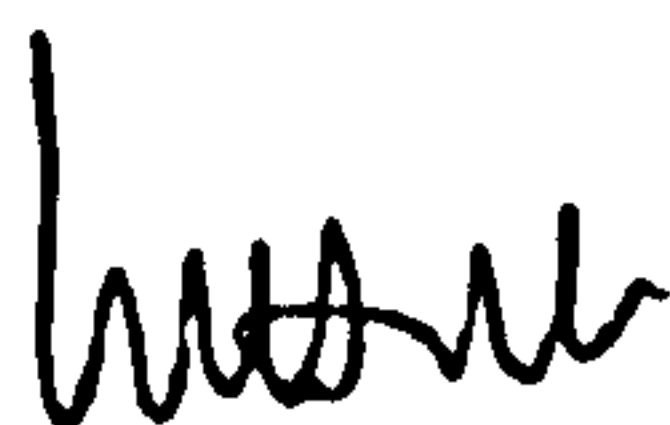
1. Accept the responsibility of Chief/Principal Investigator as defined in the current Research Governance Framework.
2. Request written approval from the R&D department for any change to the approved protocol/study documents you wish to implement
3. Ensure all study personnel, not employed by the Queens Medical Centre, University Hospital NHS Trust Nottingham or the City Hospital NHS Trust Nottingham, hold honorary Contracts with this Trust, before they have access to any facilities, patients, staff, their data, tissue or organs.
4. Report any Serious Adverse Event involving the Trust to the R&D department,

using the Trust 'policy for research safety reporting in human subjects'. Policy available from the R&D Department.

5. Complete the R&D Research Governance interim and final reports as requested.
6. Comply with the regulatory requirements and legislation relating to: Data Protection, Trust Caldicott Guidelines, Health and Safety and the use of Human Tissue for research purposes.
7. Comply with the current Research Governance Framework, available at www.doh.gov.uk or via the R&D office or Research Governance Web-site.
8. Agree to conduct this research project in accordance with ICH Good Clinical Practice and/or the MRC Guidelines for Good Clinical Practice (as appropriate)
9. Must not start your project until you have received written approval from the relevant ethics committee.

Please note that the R&D department has a database containing study related information, and personal information about individual investigators e.g. name, address, contact details etc. This information will be managed according to the principles established in the Data Protection Act.

Yours sincerely



Professor Ian Hall

Research and Development Director

cc Nottingham Research Ethics Committee

SDAH R + D OFFICE
ISSUED
05 SEP 2006

COPY

Derby Hospitals



NHS Foundation Trust

Research and Development Office

TRUST APPROVAL LETTER

Derby City General Hospital
Uttoxeter Road
Derby
DE22 3NE

Tel: 01332 340131
Minicom: 01332 254944
contactus@derbyhospitals.nhs.uk
www.derbyhospitals.nhs.uk

Dr Noelle Robertson
Leicestershire Partnership Trust
104 Regent Road
Leicester
LE1 7JT

Dear Dr Robertson

Re: An investigation of illness representation, acceptance and coping in patients with chronic tinnitus. (Ref. DHRD/2006/055).

Further to the Research Ethics Committee approval for the above study, I am pleased to confirm Trust management approval for you to proceed in accordance with the agreed protocol, the Trust's financial procedures for research and development and the Research Governance Framework (which includes the Data Protection Act 1998 and the Health & Safety at Work Act 1974).

Please supply the following to Dr Teresa Grieve, Assistant Director of R&D:

- the actual start and end dates of this study (**before the study commences**).
- details of any publications arising from this research project.
- a final report and a report every six months if the study duration is greater than six months.
- notification of any adverse event or changes to the protocol or if the trial is abandoned.

Please note that approval for this study is dependent on full compliance with all of the above conditions.

I would like to take this opportunity to wish you every success with this study.

Yours sincerely,

Prof. Richard Donnelly MD, PhD, FRCP, FRACP
Director of Research & Development

Cc Jessica Moreland ✓

Research Service
Education and Workforce Development

Tel: 01246 513632
e-mail: daniel.wolstenholme@chesterfieldroyal.nhs.uk

Calow
Chesterfield
S44 5BL

6 September 2006

Jessica Moreland
Trainee Clinical Psychologist
University of Leicester
104 Regent Road
Leicester LE1 7LT

Tel: 01246 277271
Minicom: 01246 512611
www.chesterfieldroyal.nhs.uk

Dear Jessica

Re: An investigation of illness representations, acceptance and coping in patients with chronic tinnitus 06/Q2502/56

I write to confirm that the above named project received hospital management approval on Friday 11 August. Research Ethics approval was granted on Monday 21 August 2006.

Your signed honorary contract has now been received.

Therefore you may now commence the study on the understanding that you will comply with the following:

- Audit requests - In order to comply with the standards of Good Clinical Practice (ICHGCP) and the Research Governance Framework (DoH), it may be necessary to audit your study as it progresses. To assist you we have compiled the enclosed Investigator Site File, listing the documents which should be included to demonstrate compliance (not all may be relevant to your study).
- Monitoring information - You will be sent an annual letter requesting a progress report and/or outcomes/findings of your project.
- Summary of findings - Dissemination of results will be monitored in accordance with the project protocol.
- Unexpected results - In accordance with Trust policy, all serious unexpected adverse events should be reported to the Trust Patient Safety Team, the Ethics Committee and the study sponsor.
- Policies and procedures - You will agree to abide by the Trust policies and procedures -
 - You will manage data in line with the Data Protection Act and will be responsible for identifying and reporting Health and Safety issues that may arise during the course of the project.
 - You will comply with systems that facilitate compliance with financial probity in this trust and other organisations.
 - You will alert the trust to any concerns regarding suspected misconduct or fraud resulting from a research project.

If you require further advice on any of these issues, do not hesitate to contact me.

I hope your study progresses successfully.

Yours sincerely



Daniel Wolstenholme
Research and Development Adviser

Enc

DIRECTORATE OF RESEARCH AND DEVELOPMENT

Director: Professor D Rowbotham
Assistant Director: John Hampton
Co-ordinator: J Horsley
Direct Dial: 0116 2588239
Fax No: 0116 2584226
E-mail: jill.horsley@uhl-tr.nhs.uk

Leicester General Hospital
Gwendolen Road
Leicester
LE5 4PW

Tel: 0116 249 0490
Fax: 0116 258 4666
Minicom: 0116 258 8188

25 August 2006

Miss Jessica E. N. Moreland
Trainee Clinical Psychologist
Department of Clinical Psychology
[University of Leicester]
104 Regent Road
Leicester, LE1 7LT

Dear Miss Moreland

ID: 10108 **An investigation of illness representations, acceptance and coping in patients with chronic tinnitus.**

LREC Ref: NLI

MREC Ref: 06/Q2502/56

Sponsor Leicestershire Partnership NHS Trust
Funder University of Leicester

Please note that Trust Indemnity ceases 30/12/2007

We have now been notified by the Ethics Committee that this project has been given a favourable opinion by the Ethics Committee (please see the attached letter, dated 21.8.06, from LNR REC 2).

Since all other aspects of your UHL R+D notification are complete, I now have pleasure in confirming full approval of the project on behalf of University Hospitals of Leicester NHS Trust.

This approval means that you are fully authorised to proceed with the project, using all the resources, which you have declared in your notification form.

The project is also now covered by Trust Indemnity, except for those aspects already covered by external indemnity (e.g. ABPI in the case of most drug studies).

We will be requesting annual and final reports on the progress of this project, both on behalf of the Trust and on behalf of the Ethical Committee.

Please make sure if you or other researchers have an honorary contract with the Trust that this stays within date whilst working on the research study.

If you want to extend the study's end date, 30.12.07, you will have to submit an annual report available through the R&D website which will be forwarded and noted by the Trust and the relevant Ethics Committee. This allows you to continue working on the study under the previous arrangements covered by Trust Indemnity. Please note ethics approval is only granted until the proposed end date as reflected in A3 of the COREC form. You are no longer indemnified past this date unless you have submitted the annual report form detailing this extension.

In the meantime, in order to keep our records up to date, could you please notify the Research Office if there are any significant changes to the start or end dates, protocol, funding or costs of the project.

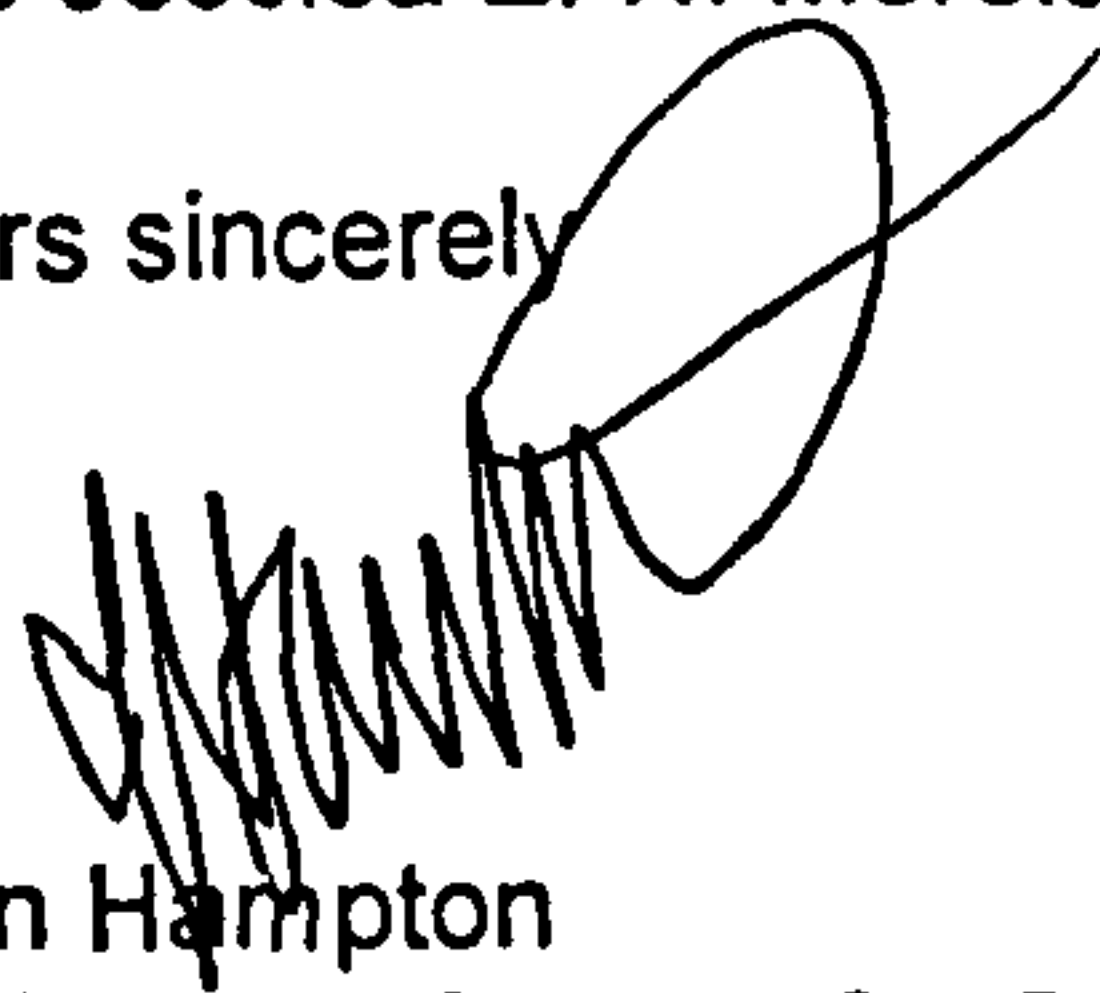
I look forward to the opportunity of reading the published results of your study in due course.

Below is a list of the Researchers Approved to work on this Application within UHL:

Miss Ena Martin

Miss Jessica E. N. Moreland

Yours sincerely

A handwritten signature in black ink, appearing to read 'John Hampton', written over the words 'Yours sincerely'.

John Hampton

Assistant Director for Research and Development

Appendix 6. Advertisement placed in ‘Quiet’, Journal of the British Tinnitus Association.



Are you interested in contributing to tinnitus research?

You are invited to take part in a study looking at how beliefs about tinnitus influence coping with the condition and the distress that is experienced.

The study aims to provide a greater understanding of the psychological impact of tinnitus which could inform the provision of appropriate support for patients and contribute to improvements in future care.

The study is open to people who are 16 or over and have had tinnitus for 6 months or longer with sounds usually lasting more than 5 minutes. The study involves completing a set of questionnaires taking approximately 30-40 minutes.

If you are interested in taking part or require further information, please contact me;

Jessica Moreland - Trainee Clinical Psychologist
Department of Psychology
104 Regent Road, Leicester, LE1 7LT

Tel: 07811 859989

Email: jenm2@le.ac.uk

Thank you.

Appendix 7. Patient invitation letter for participants recruited from clinics.

Date

Dear Sir/Madam

Re: "An investigation into illness representations, acceptance and coping in patients with chronic tinnitus"

You are invited to take part in a research study on tinnitus, which is being undertaken by a Trainee Clinical Psychologist from the University of Leicester.

If you are interested in taking part, please read the enclosed information sheet, which will tell you in more detail, what the study is about and answers some of the questions you may have. Please take your time to decide whether you wish to take part and feel free to contact the researcher, Jessica Moreland, using the contact details on the information sheet should you require any further information.

Also enclosed in this envelope is a questionnaire pack. If you decide that you would like to participate in the study, complete the questionnaires, ensuring that all questions are answered and return the pack in the pre-paid envelope provided. The deadline for return of questionnaires is 28.02.07

Thank you for your interest in this research.

Yours sincerely

Responsible Clinician

Appendix 8. Patient invitation letter for participants recruited by advertisement.

Date

Dear Sir/Madam,

Re: "An investigation into illness representations, acceptance and coping in patients with chronic tinnitus"

Thank you for your interest in this research study into tinnitus. In this pack, you will find detailed information about the aims of the study and what taking part in the study involves. The information is provided to answer many of the questions you may have. Please take your time to decide whether you wish to take part and feel free to contact me using the contact details on the information sheet should you require any further information.

Also enclosed in this envelope is a questionnaire pack. If you decide that you would like to participate in the study, complete the questionnaires, ensuring that all questions are answered and return the pack in the pre-paid envelope provided. The deadline for return of questionnaires is 28.02.07

I should like to take this opportunity to thank you for your time.

Yours sincerely

Jessica Moreland
Trainee Clinical Psychologist

Appendix 9. Patient information sheet for participants recruited from clinics.

Information Sheet

An investigation of illness representations, acceptance and coping in patients with chronic tinnitus

You are invited to take part in a study which is being undertaken by a Trainee Clinical Psychologist at the University of Leicester. Before you decide whether or not you would like to take part, it is important that you read the following information which answers some important questions about taking part in research. Take your time to think about your decision and feel free to consult others. If you require further information, please contact the researcher, Jessica Moreland, using the contact details at the end of this information sheet.

What is the study about?

Research has shown that psychological factors such as beliefs, thoughts and feelings about physical health problems can have a significant impact on the amount of distress patients feel and how they cope with their condition. Although it is known that a significant number of tinnitus patients experience distress, the research into the impact of psychological factors for tinnitus patients is under-developed. This study will investigate the extent to which psychological factors such as beliefs, thoughts and feelings about tinnitus impact on the amount of distress experienced and the ways in which people who have tinnitus cope with their condition

What are the expected benefits of the research?

This is an under-researched area and it is hoped that publication of this study will contribute to a greater understanding of factors which influence the impact of tinnitus on patient's lives. The results could potentially promote the need for greater provision of psychological support for tinnitus patients and more targeted support in this area.

What does the study involve?

The study involves completing one set of questionnaires which should take approximately 30-40 minutes. These questionnaires will then be returned in the envelope provided before the end of February 2007.

Do I have to take part?

Participation is entirely voluntary and your decision will have no impact on any treatment you receive. If you return the questionnaire pack, this will be taken as your consent to participate. If you choose not to participate, do not return the questionnaires.

How can I find out the results of the study?

From July 2007 to July 2008, participants can request a summary of the main findings of the study by written request at the address provided above.

Who can take part?

- Participants must have chronic tinnitus – that is tinnitus which has been present for 6 months or longer and with sounds typically lasting more than five minutes.
- Participants must be 16 years of age or older.
- Participants must not have a diagnosis of Ménière's disease.

Will my data be kept confidential?

If you choose to take part in the study you will not need to record your name on the questionnaires which you complete, therefore all data will remain anonymous throughout the research process. All data will be stored securely in password protected computer files locked filing cabinets and paper questionnaires will be shredded upon completion of the research. The data will be stored electronically for analysis and following completion of the research will be kept securely at the University of Leicester for five years after which time it will be deleted.

What are the potential disadvantages of taking part?

The questionnaires include some potentially sensitive questions about the distress caused by tinnitus, its impact on patient's lives, ways of coping, beliefs about the condition and acceptance of tinnitus. For this reason, it is important that you have access to support should you feel you need it after participating in the study.

Suggested sources of support are:

- The clinician involved in treating your tinnitus
- The British Tinnitus Association
Tel: 0800 018 0527 (free of charge)
Minicom: 0114 258 5694 Website: <http://www.tinnitus.org.uk>

What if there is a problem?

If you have a concern about any aspect of this study, you can in the first instance contact the researcher who will do their best to answer your questions (07811 8599898). If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital.

Thank you for taking the time to read this information.

**Jessica Moreland
Trainee Clinical Psychologist**

**School of Psychology – Clinical Section
104 Regent Road
Leicester
LE1 7LT
Tel: 07811 859989
Email: jenm2@le.ac.uk**

Appendix 10. Patient information sheet for participants recruited by advertisement.



University of Leicester

School of Psychology - Clinical Section
104 Regent Road,
Leicester, LE1 7LT, UK
Mobile: 07811 859989 (direct contact)
Email jenm2@le.ac.uk

Tel: 0116 223 1639 (messages only)
Fax: 0116 223 1650

Information Sheet

An investigation of illness representations, acceptance and coping in patients with chronic tinnitus

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What is the study about?

Research has shown that psychological factors such as beliefs, thoughts and feelings about physical health problems can have a significant impact on the amount of distress patients feel and how they cope with their condition. Although it is known that a significant number of tinnitus patients experience distress, the research into the impact of psychological factors for tinnitus patients is under-developed. This study will investigate the extent to which psychological factors such as beliefs, thoughts and feelings about tinnitus impact on the amount of distress experienced and the ways in which people who have tinnitus cope with their condition

What are the expected benefits of the research?

This is an under-researched area and it is hoped that publication of this study will contribute to a greater understanding of factors which influence the impact of tinnitus on patient's lives. The results could potentially promote the need for greater provision of psychological support for tinnitus patients and more targeted support in this area.

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The study involves completing one set of questionnaires which should take approximately 30-40 minutes. These questionnaires will then be returned in the envelope provided before the end of February 2007.

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Participation is entirely voluntary and your decision will have no impact on any treatment you receive. If you return the questionnaire pack, this will be taken as your consent to participate. If you choose not to participate, do not return the questionnaires.

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What are the potential disadvantages of taking part?

The questionnaires include some potentially sensitive questions about the distress caused by tinnitus, its impact on patient's lives, ways of coping, beliefs about the condition and acceptance of tinnitus. For this reason, it is important that you have access to support should you feel you need it after participating in the study.

Suggested sources of support are:

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Thank you for taking the time to read this information.

**Jessica Moreland
Trainee Clinical Psychologist**

**School of Psychology – Clinical Section
104 Regent Road
Leicester
LE1 7LT
Tel: 07811 859989
Email: jenm2@le.ac.uk**

Appendix 11. Copy of the questionnaire booklet.

Questionnaire Booklet

- ❖ **This booklet contains 6 questionnaires printed on both sides of the paper.**
- ❖ **Please do not write your name anywhere on this booklet.**
- ❖ **Please ensure that you have completed all questions.**
- ❖ **When completed, please return this booklet by post in the pre-paid envelope provided.**

Brief Tinnitus Questionnaire

Please tick the relevant box or provide additional information as is indicated for each question. Thank you.

Part One: Personal Details

1.

Sex:

Male

☐

Female

☐
2.

Age:
3.

Occupational status:

Full time employment

☐

Part time employment

☐

Self-employed

☐

Volunteer

☐

Unpaid Carer

☐

Retired

☐

Unemployed

☐

Student

☐

Other

☐

(please specify)
4.

Marital Status

Married

☐

Single

☐

Cohabiting

☐

Divorced/separated

☐

Widowed

☐
5.

Many people experience emotional difficulties (e.g. anxiety, depression etc.) at some point during their lives. Did you experience emotional difficulties at any point before the onset of your tinnitus?

Yes

☐

No

☐

If yes, did you receive professional help e.g. from a GP, Psychiatrist, Psychologist or other professional?

Yes

☐

No

☐

6.

Do you have any other medical or physical health problems including balance problems or dizziness?

Yes

☐

No

☐

If yes, please specify

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7. Are there any stressful events (e.g. bereavement, ill health, unemployment, relationship difficulties etc.) causing you difficulties currently?

Yes ☐ No ☐

Part Two: Experience of Tinnitus

If you experience several different types of tinnitus please base your answers on the sounds which you find most intrusive or troublesome.

8. Approximately how long ago did your tinnitus begin? _____

9. Were you experiencing any stressful events (e.g. bereavement, ill health, unemployment, relationship difficulties etc.) around the time that your tinnitus began?

Yes ☐ No ☐

If yes, please specify.....
.....

10. How would you describe the onset of your tinnitus?

Sudden ☐ Gradual ☐

11. Where do you hear your tinnitus?

Left ear ☐ Right ear ☐ Both ears ☐ Head ☐

12. How would you describe the sound of your tinnitus (tick all that apply)

Constant ☐ Intermittent ☐
High pitch ☐ Medium pitch ☐ Low pitch ☐

13. Generally, how would you rate the loudness of your tinnitus (circle as appropriate)

Very quiet	Quite Quiet	Moderate	Quite Loud	Very Loud
1	2	3	4	5

14. Please use the following table to indicate what types of support or strategies you have tried in the past or are using currently to manage your tinnitus and how useful you have found these strategies to be. (Tick boxes as appropriate).

Strategy	Used Now	Used in the past	Helpful	Not Helpful
Finding out more about tinnitus				
Using an aid e.g. noise generator, pillow speaker				
Relaxation exercises				
Medication				
Diet change				
Alternative therapies e.g. homeopathy, acupuncture, aromatherapy etc				
Seeking support from others with tinnitus				
Seeking support from friends or family				
Seeking support from professionals				
None				
Other:				
Other:				
Other:				

Part Three: Hearing Difficulties

15. Do you have any difficulties with your hearing?

Yes ☐ No ☐

16. Do you wear, or are you waiting for a hearing aid(s)?

Yes ☐ No ☐

17. Do you have any other ear problems or diagnoses (e.g. Meniere’s, sensitivity to noise)

Yes ☐ No ☐

If yes, please specify.....
.....

TINNITUS PERCEPTION QUESTIONNAIRE

YOUR VIEWS ABOUT YOUR TINNITUS

Listed below are a number of symptoms that you may or may not have experienced since your tinnitus. Please indicate by circling *Yes* or *No*, whether you have experienced any of these symptoms since your tinnitus began, and whether you believe that these symptoms are related to your tinnitus.

	I have experienced this symptom <i>since my tinnitus</i>		This symptom is <i>related to my tinnitus</i>	
	Yes	No	Yes	No
Pain				
Sore Throat				
Nausea				
Breathlessness				
Weight Loss				
Fatigue				
Stiff Joints				
Sore Eyes				
Wheeziness				
Headaches				
Upset Stomach				
Sleep Difficulties				
Dizziness				
Loss of Strength				
Noise in the ears/ head				

We are interested in your own personal views of how you now see your current tinnitus.

Please indicate how much you agree or disagree with the following statements about your tinnitus by ticking the appropriate box.

	VIEWS ABOUT YOUR TINNITUS	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
IP1	My tinnitus will last a short time					
IP2	My tinnitus is likely to be permanent rather than temporary					
IP3	My tinnitus will last for a long time					
IP4	This tinnitus will pass quickly					
IP5	I expect to have this tinnitus for the rest of my life					
IP6	My tinnitus is a serious condition					
IP7	My tinnitus has major consequences on my life					
IP8	My tinnitus does not have much effect on my life					

	VIEWS ABOUT YOUR TINNITUS	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
IP9	My tinnitus strongly affects the way others see me					
IP10	My tinnitus has serious financial consequences					
IP11	My tinnitus causes difficulties for those who are close to me					
IP12	There is a lot which I can do to control my symptoms					
IP13	What I do can determine whether my tinnitus gets better or worse					
IP14	The course of my tinnitus depends on me					
IP15	Nothing I do will affect my tinnitus					
IP16	I have the power to influence my tinnitus					
IP17	My actions will have no affect on the outcome of my tinnitus					
IP18	My tinnitus will improve in time					
IP19	There is very little that can be done to improve my tinnitus					
IP20	My treatment will be effective in curing my tinnitus					
IP21	The negative effects of my tinnitus can be prevented (avoided) by my treatment					
IP22	My treatment can control my tinnitus					
IP23	There is nothing which can help my tinnitus					
IP24	The symptoms of my tinnitus are puzzling to me					
IP25	My tinnitus is a mystery to me					
IP26	I don't understand my tinnitus					
IP27	My tinnitus doesn't make any sense to me					
IP28	I have a clear picture or understanding of my tinnitus					
IP29	The symptoms of my tinnitus change a great deal from day to day					
IP30	My symptoms come and go in cycles					
IP31	My tinnitus is very unpredictable					
IP32	I go through cycles in which my tinnitus gets better and worse.					
IP33	I get depressed when I think about my tinnitus					
IP34	When I think about my tinnitus I get upset					
IP35	My tinnitus makes me feel angry					
IP36	My tinnitus does not worry me					
IP37	Having this tinnitus makes me feel anxious					
IP38	My tinnitus makes me feel afraid					

CAUSES OF MY TINNITUS

We are interested in what you consider may have been the cause of your tinnitus. As people are very different, there is no correct answer for this question. We are most interested in your own views about the factors that caused your tinnitus rather than what others including doctors or family may have suggested to you. Below is a list of possible causes for your tinnitus. Please indicate how much you agree or disagree that they were causes for you by ticking the appropriate box.

	POSSIBLE CAUSES	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
C1	Stress or worry					
C2	Hereditary – it runs in my family					
C3	A Germ or virus					
C4	Diet or eating habits					
C5	Chance or bad luck					
C6	Poor medical care in my past					
C7	Pollution in the environment					
C8	My own behaviour					
C9	My mental attitude e.g. thinking about life negatively					
C10	Family problems or worries caused my tinnitus					
C11	Overwork					
C12	My emotional state e.g. feeling down, lonely, anxious, empty					
C13	Ageing					
C14	Alcohol					
C15	Smoking					
C16	Accident or injury					
C17	My personality					
C18	Altered immunity					
C19	Ear Disease					
C20	Head Injury					
C21	Loud Noise					

In the table below, please list in rank-order the three most important factors that you now believe caused YOUR tinnitus. You may use any of the items from the box above, or you may have additional ideas of your own.

The most important causes for me:-

1. _____
2. _____
3. _____

CTAQ

Directions: Below you will find a list of statements. Please rate the truth of each statement as it applies to you by circling a number. Use the following rating scale to make your choices. For instance, if you believe a statement is "Always True", you would circle the 6 next to that statement.

0 Never True	1 Very Rarely True	2 Seldom True	3 Sometimes True	4 Often True	5 Almost Always True	6 Always True
--------------------	-----------------------------	---------------------	------------------------	--------------------	-------------------------------	---------------------

1. I am getting on with the business of living no matter what my level of tinnitus is	0	1	2	3	4	5	6
2. My life is going well, even though I have tinnitus	0	1	2	3	4	5	6
3. It's O.K. to experience tinnitus	0	1	2	3	4	5	6
4. I would gladly sacrifice important things in my life to control this tinnitus better	0	1	2	3	4	5	6
5. It's not necessary for me to control my tinnitus in order to handle my life well	0	1	2	3	4	5	6
6. Although things have changed, I am living a normal life despite my tinnitus	0	1	2	3	4	5	6
7. I need to concentrate on getting rid of my tinnitus	0	1	2	3	4	5	6
8. There are many activities I do when I experience tinnitus	0	1	2	3	4	5	6
9. I lead a full life even though I have tinnitus	0	1	2	3	4	5	6
10. Controlling tinnitus is less important than other goals in my life	0	1	2	3	4	5	6

0 Never True	1 Very Rarely True	2 Seldom True	3 Sometimes True	4 Often True	5 Almost Always True	6 Always True
---------------------------	------------------------------------	----------------------------	-------------------------------	---------------------------	--------------------------------------	----------------------------

11. My thoughts and feelings about tinnitus must change before I can take important steps in my life	0	1	2	3	4	5	6
12. Despite the tinnitus, I am now sticking to a certain course in my life	0	1	2	3	4	5	6
13. Keeping my tinnitus level under control takes first priority whenever I am doing something	0	1	2	3	4	5	6
14. Before I can make any serious plans, I have to get some control over my tinnitus	0	1	2	3	4	5	6
15. When my tinnitus increases, I can still take care of my responsibilities	0	1	2	3	4	5	6
16. I will have better control over my life if I can control my negative thoughts about tinnitus	0	1	2	3	4	5	6
17. I avoid putting myself in situations where tinnitus might increase	0	1	2	3	4	5	6
18. My worries and fears about what tinnitus will do to me are true	0	1	2	3	4	5	6
19. It's a relief to realise that I don't have to change my tinnitus to get on with my life	0	1	2	3	4	5	6
20. I have to struggle to do things when I have tinnitus	0	1	2	3	4	5	6

Brief COPE

These items deal with ways you've been coping with the stress in your life since you started to experience tinnitus. There are many ways to try to deal with problems. These items ask what you've been doing to cope with this one. Obviously, different people deal with things in different ways, but I'm interested in how you have tried to deal with it. Each item says something about a particular way of coping. I would like to know to what extent you've been doing what the item says. How much or how frequently. Don't answer on the basis of whether it seems to be working or not—just whether or not you're doing it. Tick the box which indicates the response which seems to fit best. Try to rate each item separately in your mind from the others. Make your answers as true for you as you can.

	Not at all	A little bit	A medium amount	A lot
1. I've been turning to work or other activities to take my mind off things.				
2. I've been concentrating my efforts on doing something about the situation I'm in.				
3. I've been saying to myself "this isn't real."				
4. I've been using alcohol or other drugs to make myself feel better.				
5. I've been getting emotional support from others.				
6. I've been giving up trying to deal with it.				
7. I've been taking action to try to make the situation better.				
8. I've been refusing to believe that it has happened.				
9. I've been saying things to let my unpleasant feelings escape.				
10. I've been getting help and advice from other people.				
11. I've been using alcohol or other drugs to help me get through it.				
12. I've been trying to see it in a different light, to make it seem more positive.				
13. I've been criticizing myself.				
14. I've been trying to come up with a strategy about what to do.				

	Not at all	A little bit	A medium amount	A lot
15. I've been getting comfort and understanding from someone.				
16. I've been giving up the attempt to cope.				
17. I've been looking for something good in what is happening.				
18. I've been making jokes about it.				
19. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.				
20. I've been accepting the reality of the fact that it has happened.				
21. I've been expressing my negative feelings				
22. I've been trying to find comfort in my religion or spiritual beliefs.				
23. I've been trying to get advice or help from other people about what to do.				
24. I've been learning to live with it.				
25. I've been thinking hard about what steps to take.				
26. I've been blaming myself for things that happened.				
27. I've been praying or meditating.				
28. I've been making fun of the situation.				

Tinnitus Questionnaire

The purpose of these questions is to identify problems your tinnitus may be causing you. Please answer by circling 'yes', 'no' or 'sometimes' as appropriate for each question.

1. Because of your tinnitus, is it difficult for you to concentrate?	YES	NO	SOMETIMES
2. Does the loudness of your tinnitus make it difficult for you to hear people?	YES	NO	SOMETIMES
3. Does your tinnitus make you angry?	YES	NO	SOMETIMES
4. Does your tinnitus make you confused?	YES	NO	SOMETIMES
5. Because of your tinnitus, do you feel desperate?	YES	NO	SOMETIMES
6. Do you complain a great deal about your tinnitus?	YES	NO	SOMETIMES
7. Because of your tinnitus, do you have trouble falling asleep at night?	YES	NO	SOMETIMES
8. Do you feel as though you can not escape your tinnitus?	YES	NO	SOMETIMES
9. Does your tinnitus interfere with your ability to enjoy social activities (e.g. going out to dinner or to the cinema)?	YES	NO	SOMETIMES
10. Because of your tinnitus, do you feel frustrated?	YES	NO	SOMETIMES
11. Because of your tinnitus, do you feel that you have a terrible disease?	YES	NO	SOMETIMES
12. Does your tinnitus make it difficult for you to enjoy life?	YES	NO	SOMETIMES
13. Does your tinnitus interfere with your job or household responsibilities?	YES	NO	SOMETIMES
14. Because of your tinnitus do you find that you are often irritable?	YES	NO	SOMETIMES
15. Because of your tinnitus, is it difficult for you to read?	YES	NO	SOMETIMES
16. Does your tinnitus make you upset?	YES	NO	SOMETIMES
17. Do you feel that your tinnitus problem has placed stress on your relationships with members of your family and friends?	YES	NO	SOMETIMES
18. Do you find it difficult to focus your attention away from your tinnitus and on to other things?	YES	NO	SOMETIMES
19. Do you feel that you have no control over your tinnitus?	YES	NO	SOMETIMES
20. Because of your tinnitus, do you often feel tired?	YES	NO	SOMETIMES
21. Because of your tinnitus, do you feel depressed?	YES	NO	SOMETIMES
22. Does your tinnitus make you feel anxious?	YES	NO	SOMETIMES
23. Do you feel that you can no longer cope with your tinnitus?	YES	NO	SOMETIMES
24. Does your tinnitus get worse when you are under stress?	YES	NO	SOMETIMES
25. Does your tinnitus make you feel insecure?	YES	NO	SOMETIMES

HOSPITAL ANXIETY AND DEPRESSION SCALE

Instructions: Read each item and place a firm tick in the box opposite the reply which comes closest to how you have been feeling in the past week. Don't take too long over your replies: your immediate reaction to each item will probably be more accurate than a long thought out response.

I feel tense or 'wound up':		A	I feel as if I am slowed down:	D	
Most of the time		3	Nearly all of the time	3	
A lot of the time		2	Very often	2	
Time to time, occasionally		1	Sometimes	1	
Not at all		0	Not at all	0	
I still enjoy the things I used to enjoy:	D		I get a sort of frightened feeling like 'butterflies in the stomach':		A
Definitely as much	0		Not at all		0
Not quite so much	1		Occasionally		1
Only a little	2		Quite often		2
Not at all	3		Very often		3
I get a sort of frightened feeling like something awful is about to happen:		A	I have lost interest in my appearance:	D	
Very definitely and quite badly		3	Definitely	3	
Yes, but not too badly		2	I don't take as much care as I should	2	
A little, but it doesn't worry me		1	I may not take quite as much care	1	
Not at all		0	I take just as much care as ever	0	
I can laugh and see the funny side of things:	D		I feel restless as if I have to be on the move:		A
As much as I always could	0		Very much indeed		3
Not quite so much now	1		Quite a lot		2
Definitely not so much now	2		Not very much		1
Not at all	3		Not at all		0
Worrying thoughts go through my mind:		A	I look forward with enjoyment to things:	D	
A great deal of the time		3	As much as I ever did	0	
A lot of the time		2	Rather less than I used to	1	
From time to time but not too often		1	Definitely less than I used to	2	
Only occasionally		0	Hardly at all	3	

I feel cheerful:	D		I get sudden feelings of panic:		A
Not at all	3		Very often indeed		3
Not often	2		Quite often		2
Sometimes	1		Not very often		1
Most of the time	0		Not at all		0
I can sit at ease and feel relaxed:		A	I can enjoy a good book or radio or TV programme:	D	
Definitely		0	Often	0	
Usually		1	Sometimes	1	
Not often		2	Not often	2	
Not at all		3	Very seldom	3	

This is the end of the questionnaire booklet. Please ensure that you have completed all of the questions before returning the booklet in the envelope provided.

Thank you for your time in participating in this study.

Appendix 12. Description of the IPQ-R subscales.

The revised IPQ-R comprises nine subscales which are described as follows. *Identity* assesses the number of a set of core physical symptoms the participants attribute to being due to their illness. *Timeline (acute/ chronic)* and *Timeline (cyclical)* are composed of six and four items respectively and assess patient's perceptions of illness chronicity and changeability/ transience. *Consequences* is a six-item subscale assessing the degree to which patients perceive the consequences of their condition to be severe. *Personal control* and *Treatment control* are six and five-item subscales which assess perceptions of the control or curability of the condition which may be achieved by personal efforts or via treatment. *Illness Coherence* comprises five items addressing the degree of understanding patients feel they have relating to their condition. *Emotional Representation* is a six-item subscale assessing the degree of emotional distress experienced by patients which is attributed to the condition. Finally, the *Cause* subscale lists twenty-one potential causes for health conditions which are rated on a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. In the present study, following the protocol described by Reynolds, Gardner and Lee (2004) the tinnitus specific item *noise in the ears/ head* was added to the *identity* subscale and *ear disease, head injury* and *loud noise* were added to the *cause* subscale.

Appendix 13. Principal Components Analysis of the Cause Subscale (IPQ-R).

Perceived Cause	Psychological Cause	External Cause
stress or worry	.676	-.162
Hereditary	.131	-.202
germ or virus	.098	.538
diet or eating habits	.249	.498
chance or bad luck	.059	.053
poor medical care	.138	.484
Pollution	.113	.352
my own behaviour	.459	.145
my mental attitude	.700	.016
family problems or worries	.653	-.075
Overwork	.568	-.045
my emotional state	.725	-.017
Ageing	.272	-.053
Alcohol	.116	.051
Smoking	-.001	.601
accident or injury	-.294	.399
my personality	.593	-.144
altered immunity	.370	.377
ear disease	-.002	.570
head injury	-.128	.470
loud noise	-.042	.168

Appendix 14. Results of Mann Whitney U tests and Spearman's Rho correlation analyses to determine the relevance of background variables in relation to the outcome measures.

	THI		HADS-A		HADS-D		Emotional Reps	
	U	p	U	p	U	p	U	p
Sex	-1.697	.09	-.311	.756	-.635	.526	-2.568	.01
Occup status	-1.086	.277	-.711	.477	-.268	.789	-1.074	.283
Marital status	-1.092	.523	-1.409	.159	-.024	.981	-.114	.909
Recruitment source	-.638	.275	-.213	.831	-.409	.682	-.350	.726
Emot probs history	-4.256	.000	-2.991	.003	-2.651	.008	-3.269	.001
Prof help for emot probs	-3.179	.001	-2.830	.005	-1.204	.229	-1.849	.064
Current stress	-3.278	.000	-1.786	.074	-2.567	.010	-2.152	.031
Stress at onset	-2.907	.004	-1.687	.092	-2.719	.007	-2.151	.031
Mode of onset	-.468	.640	-1.062	.288	-.937	.349	-.659	.510
Constancy	-.313	.755	-.880	.379	-.498	.619	-.057	.955
Hearing probs	-1.285	.221	-.817	.414	-.817	.414	-1.073	.283
Hearing aid	-.421	.674	-1.813	.070	-1.776	.076	-.649	.516
Other ear probs	-.771	.441	-.454	.650	-.466	.641	-.364	.716
Other med probs	-1.294	.196	-1.229	.219	-1.880	.060	-1.241	.215
Low/Med pitch	-.847	.397	-1.276	.202	-1.485	.138	-.134	.893
High pitch	-2.116	.034	-1.791	.073	-1.826	.068	-.502	.616
Multiple pitches	-1.067	.286	-.128	.898	-.014	.989	-.897	.369
Left ear	-2.418	.016	-1.539	.124	-2.237	.025	-1.400	.161
Right ear	-.614	.539	-.061	.951	-.465	.642	-.505	.614
Both ears	-.038	.970	-.999	.318	-2.211	.027	-.952	.341
Head	-1.408	.159	-.549	.583	-1.458	.145	-1.284	.199
Multiple locations	-1.949	.051	-2.463	.014	-3.671	.000	-1.143	.253

	HADS ANXIETY		HADS DEPRESSION		TINNITUS SEVERITY		EMOTIONAL REPS	
	R	p	r	p	r	p	r	p
Age	-0.163	0.032	-0.114	0.136	-.144	0.065	-.172	.024
Tinnitus Duration	-0.103	0.178	-0.078	0.308	-.087	0.267	.222	.020
Loudness	0.239	0.003	0.338	0.000	0.414	0.000	-.177	.005

Appendix 15. Background variables retained for inclusion in regression analysis.

Tinnitus Severity (THI)	HADS – Anxiety	HADS – Depression	Emotional Representations
History of emotional problems	History of emotional problems	History of emotional problems	History of emotional problems
	History of professional help for emotional problems	History of professional help for emotional problems	History of professional help for emotional problems
Current stressful life events	Current stressful life events	Current stressful life events	Current stressful life events
Stressful life events at tinnitus onset	Stressful life events at tinnitus onset	Stressful life events at tinnitus onset	Stressful life events at tinnitus onset
High pitched tinnitus	High pitched tinnitus	High pitched tinnitus	
Tinnitus in left ear	Tinnitus in left ear		
Tinnitus in both ears			
Loudness of tinnitus	Loudness of tinnitus	Loudness of tinnitus	Loudness of tinnitus
Multiple locations	Multiple locations	Multiple locations	
Concomitant health problems			
Age	Age		Age
	Sex		
Use of hearing aid		Use of hearing aid	
			Duration

Appendix 16. Principal Components Analysis of the CPAQ.

CPAQ Item Number	Activity Engagement	Tinnitus willingness
1	.737	.408
2	.771	.305
3		
4		.566
5	.493	.342
6	.719	.449
7		.417
8		
9	.828	.350
10	.560	
11	.361	.567
12	.752	
13		.690
14	.327	.673
15	.704	
16		.591
17		.584
18		.601
19	.598	
20	.453	.503

This was the first study to the author's knowledge to investigate acceptance in tinnitus patients using the CPAQ questionnaire. Principal components analysis (Appendix 16) supported the two-factor structure of the tool for tinnitus patients the exception of two items (item 3 'it is ok to experience tinnitus' and item 8 'there are many activities I do when I experience tinnitus') which did not load heavily onto either factor. The value of item 8 has been questioned previously in relation to its use with chronic pain patients due to its ambiguity (Nicholas & Asghari, 2006). Arguably the statement is considerably more ambiguous for tinnitus patients than for those experiencing chronic pain due to the comparative irrelevance of physical limitations in this group. Therefore, the recommendation of Nicholas & Asghari (2006) to abandon this item was strengthened by this result.