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Article:

Sirois, F.M., Davis, C.G. and Morgan, M.S. (2006) "Learning to live with what you can't rise above": control beliefs, symptom control, and adjustment to tinnitus. *Health Psychology*, 25 (1). 119 - 123. ISSN 0278-6133

<https://doi.org/10.1037/0278-6133.25.1.119>

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RUNNING HEAD: Perceived control and tinnitus adjustment

Please cite as:

Sirois, F. M., Davis, C. G., & Morgan, M. S. (2006). "Learning to live with what you can't rise above": Control beliefs, symptom control, and adjustment to tinnitus. *Health Psychology*, 25(1), 119-123. doi:[10.1037/0278-6133.25.1.119](https://doi.org/10.1037/0278-6133.25.1.119)

“Learning to live with what you can’t rise above”:

Control beliefs, symptom control, and adjustment to tinnitus¹

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1. Quotation is from the song, Tunnel of Love, by Bruce Springsteen, © 1987.

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Abstract

The relations between three types of perceived control, symptom severity, and two adaptational outcomes, depressive symptoms and psychological well-being, were examined in a sample of 319 people with tinnitus. Consistent with previous studies of control and adjustment to chronic health conditions, general health and symptom control were associated with better psychological adjustment, and retrospective control was associated with worse psychological adjustment. Only symptom control emerged as a significant moderator in the symptom severity-adjustment relationship, such that stronger beliefs in one's ability to control symptoms were most strongly associated with better adjustment among those with more severe tinnitus symptoms. Findings are consistent with coping perspectives and cognitive adaptation theory, and suggest that symptom-related perceptions of control may be an effective coping resource to nurture in chronic health contexts where symptoms are severe.

KEYWORDS: tinnitus, perceived control, adjustment, Internet research.

“Learning to live with what you can’t rise above”:

Control beliefs, symptom control, and adjustment to tinnitus

Theories of cognitive adaptation to adversity suggest that beliefs about control play a central role. According to these theories, maintaining a sense of control may help offset the feelings of helplessness and distress brought on by adverse situations and therefore aid in the restoration of well-being (Taylor, 1983; Thompson, 1981). Issues of control may be particularly important in the context of debilitating chronic health conditions because opportunities for control are limited.

Different control perceptions, however, may not be equally adaptive when dealing with the threat of a chronic health condition (Thompson, Cheek, & Graham, 1988). Moreover, the adaptive value of different control perceptions may also be contingent upon symptom severity (Affleck, Tennen, Pfeiffer, & Fifield, 1987). In this paper, we present the case that both the type of control and severity of the health condition are key elements for understanding how control perceptions relate to adjustment.

The present study examines the role of different control perceptions in adjustment to a chronic health condition known as tinnitus. Characterized by the perception of sound in the absence of external stimuli (Andersson, 2002), tinnitus is in most cases an incurable and often distressing condition that can lead to sleep disturbance, concentration problems, and diminished well-being (Scott & Lindberg, 2000). People with tinnitus report more or less continuous noises of varying sound (e.g., buzzing, ringing, hissing, whistling), intensity, loudness, and pitch, making habituation difficult.

Adding to the challenge of coping with tinnitus noises, the causes of the condition are not well understood and no generally successful treatment exists. Although many people with tinnitus do adjust successfully, many others are disabled by the condition. Rates of depression in

people with tinnitus are high, with some studies involving patient samples reporting that 39 to 48% of tinnitus patients meet diagnostic criteria for major depression (Andersson, 2002). Given the significant range in severity and degree of adaptation to tinnitus, its ambiguous etiology, and the lack of a cure, this condition provides a useful context in which to clarify the theoretical relations among control perceptions, symptom severity, and well-being.

Different Meanings of Control

Understanding the role of control in adjustment to chronic health conditions may depend upon the meaning of control within the situation (Folkman, 1984). Different theoretical approaches have been proposed to distinguish among control perceptions and to help disentangle the effects of various types of control in low control circumstances. Taylor (1983; Taylor, Helgeson, Reed, & Skokan, 1991) has suggested that when opportunities for control are limited, individuals will search for the controllable aspects of the situation and exert their influence in these areas. For example, Thompson and associates (1993) found that it was more important for cancer patients to have perceptions of control over their daily symptoms than it was to perceive control over the course of the disease. Frazier (2003) made distinctions along temporal lines, suggesting that control over past outcomes (what one should have done, who is to blame) is distinct from control over present situations (what can be done about it now), which is distinct from future control (how can this be prevented this from happening again). Although some have argued that past control (also called retrospective control by Thompson, 1981) may be adaptive insofar as it suggests that one might avoid a recurrence (Wortman, 1976), the weight of existing evidence indicates that ongoing concern with past control issues is typically associated with less successful adjustment (Davis, Lehman, Wortman, Silver, & Thompson, 1995; Frazier, 2003). Together, these perspectives suggest that the surrender of control over the uncontrollable aspects

of a chronic illness (disease course, and retrospective concern over causal issues) and the adoption of control over the more manageable aspects of one's health (e.g., symptoms) reflect a situational type of control that may facilitate adjustment.

Folkman (1984) has argued that different types of control influence cognitive appraisals and coping behavior in different ways. That is, general beliefs about the controllability of outcomes may lead a person to consistently perceive ambiguous situations as more manageable and less threatening than would someone lacking such beliefs. This suggests a general belief in control has a direct or main effect on appraisals. Folkman suggests that situational control beliefs may be better represented as coping resources to be drawn upon only under certain conditions, implying a moderated effect. We argue that perceived control over symptoms might be an example of a coping resource that is most effective when symptoms are most severe by fueling confidence and perseverance in thoughts and actions directed towards symptom management.

In terms of chronic health conditions, research supports the idea that the benefits from perceived control may be greatest when symptoms are most severe. For example, Helgeson (1992) noted that perceived control was more strongly related to adjustment in cardiac patients with poor prognosis following myocardial infarction than among those who had a good prognosis. Similarly, Thompson et al.(1993) found that beliefs about symptom control were associated with better psychological adjustment for cancer patients with poor physical functioning, whereas adjustment and control of symptoms were only weakly related for those with a higher level of physical functioning. Overall, these findings illustrate Folkman's (1984) assertion that it is important to ask the question 'Control over what?' to understand the complex relations between control, severity and adjustment.

Severity, Control and Adjustment to Tinnitus

Similar to many other chronic conditions, adjustment to tinnitus is not directly related to the severity of tinnitus. Instead, the psychological processing of the inner noise and not the audiological characteristics of tinnitus determine the disability associated with tinnitus (Henry & Wilson, 2000). Indeed, several studies have demonstrated that the severity of the tinnitus (loudness, pitch, etc.) is only weakly (or not at all) associated with the subjective distress experienced (e.g., Budd & Pugh, 1996; Delb et al., 1999).

Perceived control is one factor implicated in the tinnitus-adjustment relationship. Budd and Pugh (1995) found that greater general perceived control was associated with lower reported severity and better adjustment to tinnitus. Similarly, Delb et al. (1999) found that those with low reported severity scored higher on general perceived control and self-efficacy, and lower on depression than those with high severity. However, in both of these studies the measure of tinnitus severity included subjective reactions to tinnitus. What remains to be determined is how different types of perceived control relate to adjustment to tinnitus when tinnitus severity is assessed separately from tinnitus-related distress.

The goal of the current study was to examine the moderating role of perceived control in the relation between symptom severity and adjustment to a chronic health condition, tinnitus. In accordance with previous theoretical and empirical work we hypothesized that the adaptational benefits of perceived control would depend not only on the level of symptom severity, but also on the type of control assessed. Studies of adjustment to chronic health conditions have compared general to symptom-related control in relation to symptom severity (Affleck et al., 1987; Tennen et al., 1992) but have not also considered the role of retrospective control. Thus, three types of perceived control, general control over health, symptom control, and retrospective control, were evaluated for their role in adjustment to tinnitus. In addition, adaptational outcomes

were assessed using both an affective measure (depressive symptoms) and a measure of eudaimonic well-being (Ryff & Keyes, 1995) recognizing that psychological adjustment involves more than simply an absence of depression.

Methods

Participants

A sample of 319 people with tinnitus was recruited online through tinnitus support message boards, notices posted on campus at Carleton University and in the waiting room of the Ottawa General Hospital Audiology clinic, and via email notices sent by the Tinnitus Association of Canada to its members. The sample was comprised of roughly equal numbers of males (55.2%) and females (41.7%); the remainder did not declare their gender. Mean age of the participants was 46.5 years ($SD = 12.3$), ranging from 14 to 78 years. On average, participants reported that they had had tinnitus for (mean) 8.9 years (median = 5.0 years, $SD = 10.5$).

Procedure and Measures

Participants completed an Internet survey that included questions about tinnitus severity, mood, psychological well-being, and health-specific control beliefs. Six participants completed a mail-in version of the questionnaire and two participants were interviewed in person.

Tinnitus severity. A measure of the severity of tinnitus was created from the responses to 11 items that assessed tinnitus loudness, interference, consistency, and the number of co-existing symptoms or conditions (e.g., hearing loss, other ear disorders). Participants rated the loudness of their (a) typical tinnitus, (b) tinnitus at its worst, and (c) tinnitus when it was least noticeable, each on a scale from 0 (*not noticeable*) to 10 (*very loud*), as well as on a psychoacoustic comparison scale. The psychoacoustic comparison scale, adapted from one used to assess tinnitus loudness by Ottawa General Hospital Audiology Clinic, asked participants to rate the

loudness of their typical, worst, and mildest tinnitus as compared to (1) *the hum of a fan on low speed*, (2) *television static at medium volume*, (3) *a loud air conditioner*, or (4) *an aircraft*. How often tinnitus had been at its worst in the past 2 weeks was also rated on a scale from 0 (*never*) to 4 (*more than 5 times*).

Combined with these ratings were two questions about whether tinnitus interfered with the ability to tell where sounds are coming from, and whether it interfered with the participant's ability to understand speech during meetings/classes (rated on a scale from 0 (*never*) to 3 (*always*)) to assess the level of cognitive-perceptual interference due to tinnitus. Tinnitus chronicity was assessed on a scale from 1 (*hardly ever present*) to 4 (*chronic*). To create a single index of tinnitus severity, each item was first standardized and then summed ($\alpha = .84$).

Perceived control over health was assessed with a six-item subscale from the Control Beliefs Inventory (CBI; Sirois, 2003)¹. Sample items are, "If I set my mind to it, I can improve my health" and "People who take care of themselves stay healthy". A prior validity study with 333 adults with arthritis confirmed that this subscale correlates highly ($r = .73$) with the similar Multidimensional Health Locus of Control scale (MHLC; Wallston, Wallston, & De Vellis, 1978). It has also demonstrated very good internal consistency with alphas ranging from .86 to .91 in other adult samples with chronic health conditions (Sirois, 2003). In the current sample, Cronbach's alpha was .85.

Symptom control was assessed with the 5-item Symptom Control subscale of the CBI. This scale assesses the extent to which one feels that the symptoms of a health issue (in this case, tinnitus) can be managed and controlled. For the current study participants were instructed that the term "symptoms" referred specifically to tinnitus symptoms. Sample items include, "If I make the effort, I can manage my symptoms" and "There are things that I can do to make my symptoms easier to deal with". Previous research with an arthritis sample (Sirois, 2003) has

demonstrated that this subscale correlates $r = .47$ with the Acceptance subscale of the Illness Cognitions Questionnaire; Evers et al., 2001). This scale has demonstrated good internal consistency with alphas ranging from .80 to .89 in other adult populations with chronic health conditions (Sirois, 2003). In the current sample, Cronbach's alpha was .84.

Retrospective control was assessed with three questions which were not part of the Control Beliefs Inventory, but were adapted from prior research on bereavement (Davis et al, 1995, 2000). First, participants were asked "how important it is to you that you know what caused your tinnitus" (response options ranged from 0 for *not at all important* to 3 for *very important* ($M = 1.75$; $SD = 1.04$). Second, participants were asked whether they had ever thought, "If only I had done something different, I might not have gotten tinnitus" (to which 52.8% responded in the affirmative), and if so, were asked how frequently in the past two weeks they had had such "if only" thoughts (response options ranged from 0 for *never* to 4 for *all the time*; those indicating that they had never had "if only" thoughts with regard to their tinnitus were assigned a score of 0 on the subsequent frequency item. $M = 0.80$; $SD = 1.15$). Third, participants were asked "Do you blame yourself for getting tinnitus?" (24.6% responded in the affirmative). Cronbach's alpha for the three item scale was .58.

Adaptational outcomes. A 10-item version of the Center for Epidemiological Studies Depression (CES-D) scale (Radloff, 1977) assessed *depressive symptoms*. The CES-D is commonly used to measure depressive affect and symptomatology in nonclinical general population surveys (e.g., Hertzog, Van Alstine, Usala, Hultsch, & Dixon, 1990). Participants are asked how frequently in the past two weeks they have felt or behaved in the listed way (e.g., you were bothered by things that don't usually bother you), with response options on a 4-point scale ranging from 0 for *less than 2 days*, to 3 for *9-14 days* ($M = 9.48$, $SD = 8.05$, $\alpha = .92$).

Fourteen items selected from the Multidimensional Well-being measure (Ryff & Keyes, 1995) assessed three dimensions of eudaimonic *well-being*: growth (5 items; e.g., “In general, I feel that I continue to learn more about myself as time goes by”), purpose (4 items; e.g., “I have a sense of direction and purpose in life”), and self-acceptance (5 items; e.g., “In general, I feel confident and positive about myself”). Items were rated on a 6-point scale from 1 for *strongly disagree* to 6 for *strongly agree*, with higher scores reflecting higher well-being.

Attempts to recapture the three factors with principal components analysis and with maximum likelihood factor analyses (with both orthogonal and oblique rotations) failed. The data better fit a one factor solution. Therefore, we combined all 14 items into a single measure of psychological well-being ($\alpha = .88$).

Results

Tinnitus Severity, Control, and Psychological Adjustment

The bivariate correlations between tinnitus severity, control and adaptational outcome variables are presented in Table 1. In general, participants reporting more severe tinnitus tended to believe that they had less control over their health and over tinnitus symptoms. They also tended to report lower psychological well-being and more symptoms of depression. Participants reporting greater perceptions of control over their health and their tinnitus symptoms also tended to report greater psychological well-being and fewer symptoms of depression. Participants reporting greater concern with issues of retrospective control tended to report lower scores on well-being and scored higher on the depression scale.

Moderator Effects

The moderating effects of each of the three control constructs were tested with hierarchical regression in six separate analyses (two adaptational outcomes for each of the three

control constructs). Tinnitus severity and the designated control moderator were entered together in the first step, and, consistent with the recommendations of West, Aiken, and Krull (1996), the interaction term, calculated as the product of tinnitus severity and (mean-deviated) control, was entered in the second step. Moderation is supported if the hierarchical regression analysis indicates that the interaction term is significantly related to the outcome variable.

The results of the analyses indicate that the tinnitus severity X general control interaction term was not significant for either depressive symptoms ($\beta = -.09$, $t(282) = -1.53$, $p > .12$) or well-being ($\beta = .04$, $t(299) = 0.74$, $p > .40$)², although there was a main effect of control for both depression ($\beta = -.22$, $t(283) = -3.83$, $p < .001$) and psychological well-being ($\beta = .35$, $t(300) = 6.56$, $p < .001$). Regardless of tinnitus severity greater perceived control over one's health in general was associated with fewer symptoms of depression and greater well-being. In both regressions, more severe tinnitus was associated with more symptoms of depression ($\beta = .24$, $t(283) = 4.30$, $p < .001$), and lower well-being ($\beta = -.18$, $t(300) = -3.39$, $p = .001$).

In the regression of depressive symptoms and psychological well-being on retrospective control, tinnitus severity, and their interaction, we again found significant main effects for retrospective control and tinnitus severity, but no significant interactions ($ts < -1.2$, *ns*). Greater concern with retrospective control was linked with more symptoms of depression ($\beta = .31$, $t(285) = 5.78$, $p < .001$) and lower psychological well-being ($\beta = -.28$, $t(300) = -5.27$, $p < .001$).

In the regression of depressive symptoms and psychological well-being on symptom control, tinnitus severity, and their interaction, we found that in addition to the significant main effects of symptom control and objective severity, the tinnitus severity X symptom control interaction term was significant for both depression ($\beta = -.15$, $t(281) = -2.61$, $p = .01$) and psychological well-being ($\beta = .12$, $t(297) = 2.33$, $p < .05$). Among those with more severe

tinnitus symptoms, greater symptom control was associated with higher psychological well-being and fewer symptoms of depression. Among those with relatively mild tinnitus symptoms, symptom control was not associated with well-being. Estimated means on CES-D for persons with severe (+1 SD of the Mean) and mild symptoms (-1 SD) who perceived high and low symptom control are provided in Figure 1. A comparable pattern (but opposite in direction) was found for well-being.

Discussion

We have argued that the control strategies a person with tinnitus adopts have a great deal to do with his or her ability to enjoy life and avoid depression. Consistent with previous research on retrospective control (Davis et al., 1995; Frazier, 2003) our findings suggest that irrespective of symptom severity, people who focus on retrospective control issues are adjusting less well to the tinnitus. On the other hand, general beliefs about controllability of one's health (which were uncorrelated with retrospective control) were associated with lower levels of depression and greater well-being. Again, such general beliefs about control predict adjustment irrespective of tinnitus severity, suggesting that it is not simply the case that people with milder symptoms are better able to maintain beliefs about personal control, and thus are less distressed. Although people in this study who believed that they could control their tinnitus symptoms were less depressed and enjoyed greater well-being, this link was moderated by the severity of their symptoms. In the face of severe tinnitus, maintaining the belief that one can control one's symptoms appears to make tinnitus less distressing, and seems to allow one to continue to feel happy and confident, and perceive purpose in life and opportunities for growth. These links were weaker among people with milder tinnitus.

Not unexpectedly, beliefs about symptom control were quite strongly correlated with

general beliefs about control over health. We speculate that beliefs about symptom control emerge out of the more general belief about personal control over one's health. People without a general propensity to maintain personal control are probably less likely to be motivated to develop symptom control beliefs. We argued that a belief that one can influence symptoms (or the appraisal of such symptoms) is likely to be particularly important when tinnitus symptoms are severe – something that the data show quite clearly.

In this Internet study, we did not attempt to ascertain whether people who possessed strong symptom control beliefs actually were better able to moderate their symptoms. We suspect that the cognitive and behavioral strategies that these people invoked to control their tinnitus symptoms were effective not so much in alleviating the noise as they were in controlling its meaning or significance. Consistent with this interpretation, several participants in our study told us that they try to keep a positive attitude (focus on the positive) and use active distraction strategies, such as involving themselves in enjoyable activities, keeping busy, exercising, and masking the noise with more pleasant sounds as means of coping when their symptoms are at their worst³. In effect, these individuals engaged in activities that allowed them to feel a sense of control over their tinnitus rather than allowing tinnitus to control them. As one participant stated, "Ignore it. Refuse to let it control me. I control it." By shifting the meaning of tinnitus from something uncontrollable to something conceivably more manageable those with severe tinnitus were perhaps better able to adjust to their condition and maintain a sense of well-being.

Given the cross-sectional nature of the present study, conclusions about the direction of causality among the severity, control types, and adjustment indicators cannot be established. Indeed, Tennen et al. (1992) have suggested that understanding the role of control appraisals in adjustment to health threats requires that both control and adaptational outcomes be assessed

over time. However, in a longitudinal study of the role of perceived control in adjustment to chronic illness, Taylor et al. (1991) found that the link of control perceptions to subsequent depression was stronger than the reverse. Given this finding and the theoretical relations among severity, perceived control, distress and adjustment suggested by coping perspectives (Folkman, 1984) and cognitive adaptation theory (Taylor, 1983), the causal order assumed in the current study is plausible.

Other potential limitations relevant to the use of an Internet-based survey include the limited type of data available and the sample characteristics. For instance, we were not able to directly assess tinnitus severity using state of the art acoustic instruments. Nor were we in a position to obtain behavioral data on coping. Although the demographic and general characteristics of a sample that is obtained online versus in the community may at first appear as an issue regarding the Internet sampling method, we see it as a potential strength because of the diverse sample of people the study was able to include. Some had had tinnitus for less than 6 months whereas other reported that they had had tinnitus for more than 50 years. Some were from communities without access to necessary specialists. In fact, the sheer size of the sample we obtained is one of this study's strengths as it gave us the power to detect interaction effects. With respect to our study, we concur with Krantz and Dalal (2000), who have shown that not only do Internet studies tend to draw larger samples than those obtained from the community, but these samples are also more heterogenous, and in this sense may be *more* representative, than their community-based counterparts.

In summary, people in this study coping most successfully with tinnitus were those who focused least on retrospective control issues and focused more on the belief that they could control their health, and in particular, their tinnitus symptoms. Although symptom control

strategies likely have little impact on loudness or intensity of their tinnitus noises, they appear to affect the subjective appraisal of those symptoms. Reinterpreting symptoms as manageable allows people to maintain a meaningful, purposeful, and enjoyable life. We would argue that making the appropriate shift in focus for control is what is meant by “learning to live with what you can’t rise above”. Understanding the ways in which these control beliefs are developed is an important issue – clinically and theoretically – for future research.

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This research was supported by a research grant from the Social Sciences and Humanities Research Council (Canada) to the second author.

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Footnotes

¹ The CBI was designed to assess four control beliefs: general control over health, control over symptoms, self-efficacy, and chance beliefs. The latter two constructs are not relevant to the present paper, and so will not be discussed further.

² The degrees of freedom differ owing to the fact that more participants were missing data on the CESD (9.1%) than on other instruments (< 5%)

³ Participants were asked directly (in an open-ended question) what they do to cope with their tinnitus. To illustrate the differences in coping strategies chosen by those with severe tinnitus who were high and low in symptom control, a subsidiary (post hoc) analyses was conducted in which we examined the responses of those persons with relatively severe tinnitus who scored high vs. low on symptom control beliefs. Relative to those with low symptom control beliefs, those reporting high symptom control were somewhat more likely to mention cognitive control strategies (e.g., focus on positive) and distracting activities (e.g., exercise), and were less likely to mention “doing nothing”, taking medication, and withdrawing (e.g., “lock myself in my room”).

Table 1. *Zero-order Correlations Between Perceived Control, Symptom Severity, and Adaptational Outcomes.*

Variables	1	2	3	4	5
1. Tinnitus severity	---				
2. Depressive symptoms	.29**	---			
3. PWB score	-.24**	-.65**	---		
4. General health control	-.20**	.27**	.38**	---	
5. Retrospective control	.07	.34**	-.30**	.03	---
6. Symptom control	-.19**	-.27**	.43**	.57**	-.03

Note: PWB = Psychological well-being; higher scores on each variable reflect greater severity, depressive symptoms, well-being, and perceived control; listwise $N = 284$

** $p < .001$ (two-tailed).

Figure Caption

Figure 1. Estimated CES-Depression scores as a function of Symptom Control Beliefs (+/- 1 SD) and Tinnitus Severity (+/- 1 SD).

