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# The application of personality and annoyance scales to auditory studies

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## Introduction

Although the best publicized aspect of the influence of individual differences on auditory studies comes in the reactions to polluting noise, such as that caused by low-flying aircraft, personality effects can be seen in a wide range of auditory studies. In pure psychoacoustical studies, personality effects have been seen to influence the auditory threshold and its variability, and also the relationship between physical intensity and subjective loudness.

Perhaps more studies have been made on the effects of personality differences on psychophysiological measures than on any other aspects of responses to auditory stimulation. These measures have varied in nature from general changes as shown by the startle reaction, the orienting response and galvanic skin response studies, to rather more specific measures as indicated by the auditory evoked responses.

Most of these responses are essentially to a transitory or changing auditory stimulus. A continuous noise can affect the level of arousal of the subject as determined by a variety of performance measures, and these effects can also be influenced by the personality of the individual concerned.

Turning from the domains of the psychoacousticist, the psychophysiologist, and the experimental psychologist, we come to the realm of clinical acoustics. Here again there is a variety of ways in which personality can influence the results of auditory studies. Here, perhaps more than in psychoacoustical studies, the personality of the physician or research worker can have a considerable bearing on the results of a particular study.

The patient's personality can interact with his hearing in a number of ways. Firstly, the personality of severely deaf patients can be modified by their deafness, particularly if this disability dates from early childhood. The personality of the patient can influence whether or not he consults his doctor for treatment of his disability, and whether he becomes prone to a range of symptoms. Patients suffering from certain specific types of deafness show different personality profiles from other patients, and also there are personality differences found in patients with non-organic hearing loss.

Finally we return to annoyance studies. These may be approached in a number of different ways, but all appear to agree on the considerable individual differences found. These occur whether the studies are large-scale social surveys or more limited laboratory studies, scaling annoyance by direct questioning, or by means of sophisticated psychological techniques.

Personality Scales

The vast majority of the studies in the field of human acoustics when commenting on the variability of the results, have tended to dismiss them in general terms of individual differences, or perhaps of the emotional nature of their subjects. Other studies refer to anxious, obsessional or neurotic subjects without endeavouring to quantify these terms, and yet others have used such subjective assessments as are obtained with the Rorschach ink-blot test.

In the past decade, however, a few workers have endeavoured to apply more quantitative assessments of personality to auditory studies. There have been two general approaches to these studies. The first has tended to go for a small number of major or type factors such as neuroticism, introversion, psychoticism or anxiety, using questionnaires endeavouring to assess just one or two of these scales. Some tentative approaches have been made to develop physiological measures of certain of these, but no reliable measure has yet emerged. The second general personality approach has been to apply a blanket administration of a multiscale questionnaire assessing a large variety of traits and then to examine the correlations emerging as significant factors.

Psychoacoustical Studies

Perhaps the most basic psychoacoustical measure is the auditory threshold. However, even with such a basic measure as this it seems impossible to reach accord with regard to the influence of personality. Some Russian work suggested that the absolute sensitivity might be related to the "strength" of the nervous system, which has been equated with ideas of extraversion/introversion. Indeed one study did find a weak correlation between introversion and threshold sensitivity, but this has not been supported by subsequent more large-scale studies. Most recent studies have indicated that the basic type factors of introversion and neuroticism tend to influence the variability of auditory threshold measures rather than their absolute sensitivity.

In self-recording audiometry the results are even more directly under the control of the subject than in standard audiometry, so it is to be expected that personality would have a greater bearing on the results. A number of studies have shown the excursion size to be related to the anxiety and defensiveness of the subject concerned. The personality effects on this procedure could also be related indirectly to their influence on the subject's reaction time. Here the effect of personality seems to be on the rate with which the reaction time is shortened as a function of increasing intensity rather than on the absolute magnitude of the reaction time itself.

Studies on the rate of increase of subjective loudness with physical intensity have sought to implicate a number of personality factors. Some of the factors implicated have been general personality measures such as anxiety or receptivity, which has been

equated with introversion, whereas other workers have used a compendium extracted from the MMPI. Anxiety has also been to some extent implicated in uncomfortable loudness level measures, an indirect approach to the same concept.

Personality measures have not yet been applied to many of the more sophisticated psychophysical concepts, although even here considerable intersubject differences occur. Some studies on cross-masking, however, have shown that hysterics exhibit a greater cross-masking effect than dysthmics.

Psychophysiological Responses

The various physiological responses to auditory stimuli have been more extensively investigated from a personality standpoint than have most aspects of audition. However, many of these studies have been at a most superficial level, and much work remains to be done even in this field. Most of the studies have sought to implicate either anxiety, neuroticism or introversion as the primary factors influencing the individual differences found.

Introversion and neuroticism have been held to influence different aspects of the orienting response. A great variety of studies have sought to apply often poorly quantified scales of anxiety to galvanic skin response studies. Introversion and neuroticism have both been implicated in the effects of the startle reaction to simulated sonic booms, and neuroticism in the pupillary response to auditory stimulation. Perhaps a more promising approach lies in one or two recent studies, which have sought to subdivide the scale of manifest anxiety into its "striated muscle tension" component and the "autonomic arousal" component. These have then been related separately to different psychophysiological measures.

A somewhat different psychophysiological measure is that of the auditory evoked response (AER). No definitive studies have been made on this up to the present, but some early findings appear to implicate both neuroticism and introversion as influencing different aspects of this.

Noise and Arousal

A number of studies performed at Cambridge and Leicester have shown that continuous noise can alter the level of arousal of subjects, and so affect their performance at various tasks. The subjects' degree of introversion has also been shown to influence this level of arousal, and these two factors have been shown to interact. It was initially considered that they interacted in a simple additive manner, but more recent studies have suggested that the true position is rather more complicated.

Clinical implications of personality

It has been shown that the personality of a doctor can influence the type of patients on his list and thus bias any results of disease incidence studies unless adequate random sampling techniques are followed.

The personality aspects of various illnesses are more obvious. This has been less studied in the realms of deafness than in many other disorders. A number of studies have confirmed the personality differences found in patients suffering from Menière's

disease. Others have suggested differences in non-organic vertigo and even in Otosclerosis. Better documented are the personalities of patients suffering from non-organic hearing loss, which have been found to be generally of a neurotic psychosomatic nature.

The personality of the patient can influence his susceptibility to a variety of auditory symptoms such as phonophobia and tinnitus.

Finally we come to the converse, the effects of life-long severe deafness on the personality of the patient. It was thought that congenitally deaf patients were more psychotic than normal-hearing people. Careful recent studies have failed to confirm this and show rather that the problems lie in impulse control, lack of insight, and psychosexual disorders.

Annoyance Studies

Some of the most experienced workers in the field of noise annoyance have commented that individuals complaining of aircraft noise tend to be those who complain of the state of the sewers, atmospheric pollution etc. This would tend to suggest that this annoyance is influenced by the overall effects of the personality of the subject, rather than by particular aspects of the stimulus.

Some studies have shown scales of annoyance to be influenced in different ways by the same personality measures depending upon the approach adopted in the questionnaires, whether direct questions about the detrimental effects of noise, or more subtle questions designed to disguise their true purpose. This raises the entire question of what is being measured by particular annoyance scales, and particularly emphasises the care with which results obtained by the use of these questionnaires must be interpreted.