



## GENERAL SUMMARY

WHISPERED SPEECH is often regarded as a somehow extraordinary form of verbal accomplishment. Its production and perception are well studied matters, but its communicative role remained a rather neglected issue. It was the aim of my thesis to contribute to an elucidation of this issue, and to investigate whispering especially with respect to its social and psychobiological aspects. During the approach, a wide spectrum of methods was applied. When ever possible, however, the data sampling was based on experimental procedures. The methodological details are given separately in each chapter. Data evaluation yielded results that, in the following, are listed according to the serial succession of chapters.

(1) The loudness of whispered words was highly variable (range: 35 to 50 dB; speaker-microphone-distance: 1m). Nevertheless, a use of whispering was not economical in many cases. At about 35 dB, subjects were able to whisper up to 150 syllables per breath, but this number decreased down to 60 syllables, if the amplitude was increased up to about 50 dB. Over large distances (> 4m), the recognition of whispered numbers was impaired, as compared to normal speech. Such deterioration increased, if stimuli were to be decoded that had been presented with an amplitude of 35 dB or less (25dB; 20dB). A masking effect of environmental noise was stronger in whispered stimuli than in phonated ones. Under such conditions, whispering was an appropriate tool to mediate, or to discriminate, respectively, also prosodically encoded information.

(2) A general inquiry, conducted to clarify the social role of whispering, yielded three sets of differentiated data. These did not differ in relation to the cultural origin of subjects. Taken together, we found: (a) Whispering had a contagious effect, provided a person who was accosted by a whispered address was not feeling socially segregated. (b) Whispering played a clearly positive role in the private domain. Temporarily, it could even strengthen a given pair-bond. (c) In the public, on the other hand, a use of whispering could cause problems. Non-addressees ('co-listeners') admitted, e.g. 'feelings of social segregation', or 'a desire of co-listening'. These effects established two hypotheses which were tested experimentally: one in chapter 3 (H1: "whispering is an 'ingroup'-signal"), the other one in chapter 4 (H2: "whispering induces auditory vigilance").

(3) The experiments testing for 'ingroup'-effects (H1) included a presentation of auditory stimuli that could not be decoded verbally, and in addition, differed in socially relevant parameters. Subjects (n=104) were asked to judge stimuli immediately after presentation. The evaluation of judgements (self-report data collected via questionnaires) documented that whispered stimuli could induce 'feelings of social segregation' or other socially negative feelings. The strongest 'outgroup'-effects were induced by stimuli which simulated a whispered conversation including a phrase of laughter. The results were statistically significant, and confirmed the hypothesis cited above.

(4) Further experiments were designed to test for psychobiological effects of whispering and to examine especially, whether it can raise the auditory vigilance of co-listeners (see issue 2). This effect was confirmed, too. In addition, it was shown that an exposure to whispered stimuli detracted the attention of subjects away from a visual learning task. These results were statistically highly significant, as well.

(5) Data on the ontogenetic development of whispering revealed that first utterances of whispered words or two-word-phrases can be elicited at an age of about 1.5- 2 years of age. They occurred when a person who was familiar to a given child addressed her/him by a whispering voice. Typical self-induced whisper interactions, however, were found only in children who had reached an age of about 4 to 5 years. Such instances played a very positive role in the young, but usually were tabooed by their adult caretakers, later on.

(6) A comparison of various results on whispering, guided by an evolutionary perspective, confirmed the hypothesis that this verbal display can be interpreted as a ritualised form of normal speech (= speech based on a fundamental frequency). The results suggested as well that this ritual was originally developed for very private functions, e.g. as a 'courtship-ritual'.

In summary and on grounds of my findings, I like to characterise 'whispering' as a ritual that can induce psychobiological effects and - used in an adequate situation - can have socially positive consequences.