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A Simple Binomial Trial of Auditory Subliminal Stimulation

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Abstract

A simple test was conducted to determine whether or not subjects' preference for use of two sides of an audio tape could be biased by embedding a subliminal message in the target side. The results showed that subjects selected the side with the embedded message at a level significantly greater than chance ($p<.05$). This finding suggests that people have some ability to extract information from noisy environments at the level described in this study. (Int J Biosocial Med Res., 1996: 14(1): 78-102.)

Key Words: subliminal; psychoacoustics; auditory.

Dixon and Henley [1] have provided persuasive and compelling reasons to investigate subliminal perception. However, recent publications by the author have pointed out the lack of technically adequate or standardized masking techniques, as well as a dearth of basic investigations in auditory-subliminal stimulation.[2,4] The present study addresses both of these issues by utilizing a state of the art masking technique in preparing an auditory subliminal stimulus and subsequently using it in a Bernoulli trial to determine whether or not subjects would select a subliminal message at a level greater than chance. This study is a replication of similar work that was reported previously by Swingle.[3] In the present case 18 subjects participated in a test to determine whether or not their preference for selecting side. "A" or side "B" of an audio cassette tape could be biased by the addition of subliminal messages on the target side of the tape.

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Methods

Twenty-two subjects were recruited from among students in a graduate seminar in psychology and their acquaintances. They were given written instructions that advised them that the experimental audio tape they would be given would contain subliminal "feel good" messages on one side, while the other side would contain the identical masking sound but without subliminal messages. Their task was to select the side that they preferred listening to after having listened to each side of a 12 minute tape at least 10 times. The tapes were digitally mastered and voiced messages were embedded on one side only, using narrow-band masking techniques described previously,[4] with voiced messages being subliminally embedded at a signal- to-noise ratio of -15 dB relative to the masker, which was the sound of surf. All of the tapes, were individually color- and number-coded so that each cassette had unique external markings, and were randomly distributed to subjects, making this a single-blind study. Investigator bias, however, was not a factor in this study as there was no contact between subjects and investigator.

Results

18 subjects (12 female, 6 male) completed the protocol. The remaining four either moved out of the area or did not complete the study. Thirteen of the eighteen subjects chose the side with the embedded subliminal as their preferred side. The cumulative binomial probability (13 or more out of 18) of such an occurrence on a two-choice trial is $p<.05$, which suggests that some factor other than chance is operative.

Discussion

This brief study demonstrates that signal detection of a masked stimulus can occur in the absence of conscious awareness. It should be stressed that the use of digital signal processing and narrow band masking virtually eliminates the possibilities of partial cueing or "signal leakage" that have historically been put forward as alternative explanations for successful experiments in auditory subliminal stimulation. The latter explanation assumed that during masking conditions there would be moments of "overshoot" when the spectral components of the masker would not match the spectral components of speech, thus allowing for retrieval of speech fragments which were assumed to provide sufficient information to explain any possible significant result of a "subliminal" test. Although the logic used to undermine the possibility of subliminal perception was often tortuous, it was apparently more

palatable that the disturbing possibility that the brain might be processing formation without the conscious awareness of the processor.

An additional benefit of the masking technique used in this study is that it eliminates the problem of subjective thresholds, which are concluding variables with most other types of masking, notably those which rely on subjective attenuation of volume in relation to either ambient sound or some other masker. The narrow-band masking used in this study is the only example of non-linear masking as it applies to issues of subliminal perception. Zwicker and Fastl [5] have written extensively on the implications of non-linearity in masking and the consequent importance of critical bands on psychoacoustics. The application of these principles in the present study has addressed many of the unresolved technical issues in this area of investigation. It is not possible to make a case for partial cueing using this methodology. In our present sample, 12 subjects were women and 6 were men. However, the "failure rate," or those that did not choose the side with the embedded subliminal, was disproportionately represented by the males. Only half of the men selected the subliminal side, while 10 of 12 women chose the subliminal side. Unfortunately, the exceedingly small sample of males makes it impossible to determine whether this gender bias in selection is real or artifactual. The issue became a matter of speculative interest after unsolicited information gathered during the debriefing of subjects after the study suggested that those individuals who were successful in identifying the subliminal stimulus used a decidedly different set of selection criteria in making their decision regarding preference than did those who failed to make the discrimination. Specifically, subjects who selected the subliminal side typically reported their selection criteria as being some variant of the following type of process: "I felt more relaxed with this side," "I just had nicer thoughts" when I listened to this side," or "I just felt better listening to this side." In contrast, those individuals who failed to select the side with the subliminal reported their selection process in the following manner: "I couldn't tell the difference between either side," "I thought I heard a voice on this side," or "I listened for a really long time and then I just guessed." Based on these kinds of statements and the empirical results, it could be hypothesized that individuals who are, either attuned to, or able to utilize, internal feeling states as selection criteria in the absence of other cues are able to identify the presence of a subliminally embedded auditory message. In contrast, attempts to logically determine which side contained the embedded message, either from external criteria such as perceived characteristics of the sound, or some other imagined cue, failed to correctly identify the subliminal side. The latter "logical" strategy was reported by several of the male subjects, which may have some implications on future work in this field with respect to gender specific cognitive styles.

It would be misleading to label the results of this study as subliminal "perception," as this implies some subjective awareness. Since the methods

used for masking did not allow for cues, subjects were not able to identify the side with the subliminal on the basis of any conscious "perception," but rather had to pick the side they preferred listening to on the basis of what Dixon [6] has referred to as pre-conscious perception. That is to say, subjects appear to be making their selection on the basis of highly subjective affective criteria which are unsupported by tangible evidence.

None of the subjects was able to provide any information as to the content of the subliminal messages. This, however, is the essence of the concept of "subliminal:" that subjects are processing information about which they have no conscious information. In some cases the subjects did give comments regarding their subjective experience that were consistent with the embedded messages, but in no cases were comments elicited that were identical to the embedded messages.

This type of registration might be explained by the fact that the spectral components of speech, which are known to be preferentially processed,[7] can be discriminated from noise sources without such spectral components. Thus the argument could be made that signal detection does indeed occur, but that the signal discrimination necessary for registration and affective discrimination is substantially less than what is required for emergence of the stimulus into consciousness for logical cognitive appraisal. This notion is also consistent with Dixon's [6] proposition that the subliminal phenomenon is simply a point on a perceptual continuum that extends from no awareness to registration to subjective awareness without identification and ultimately finds its fruition in identification and conscious awareness. The present study appears to support this interpretation of auditory perception' in that the results suggest registration of subjectively unidentified stimuli. An additional observation that deserves further investigation is the possible ability of this type of stimulus to differentiate between decision-making styles. In this case, there appeared to be a distinct difference in outcome between those subjects with confidence in their internal "feeling states" as reliable criteria for selection and those who used an exclusively rational process in which the selection criteria dependent on external evidence. Also worthy of further investigation is the open question of whether or not there is a true gender bias in this type of ambiguous decision-making task.

Finally, the present study should not be misconstrued as evidence that subliminal auditory stimuli can either alter complex cognitive processes or induce higher level learning. This study merely provided some preliminary evidence that voice masked by the techniques described can be discriminated from noise sources without masked voice content.

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