

of many other processes that one can name as being potentially put into action by strategic therapists and that have little to do with hypnosis and suggestion short of radically redefining these concepts to such an extent as to essentially render these terms meaningless.

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Effects of Subliminal Suggestions on Task Performance

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■ *The effects of subliminal auditory suggestions on task performance were studied in 60 subjects. Most of the studies on subliminal perception have been on visual stimulation and to date only a few experiments have been done in the auditory field. There are some unpublished reports mentioned in a book by Swingle (1992) about experiments with a word production and a lever pressing task. The results of these studies provide evidence for an effect of subliminal auditory stimulation. In the present study 60 subjects, randomly assigned to three groups, were told to play a computer game while subliminal auditory suggestions oriented towards enhancement or deterioration were presented. Results showed a significant difference between the two relevant experimental groups. As a covariate, suggestibility was tested with a modified form of the Creative Imagination Scale (Wilson & Barber, 1976).*

Introduction

The existence of the phenomenon of subliminal perception is widely accepted (see, e.g., Dixon, 1981), and a number of reliable effects have been found in the field of visual subliminal stimulation. The effect of auditory stimulation, however, is still disputed. Despite this there is considerable interest in research about auditory subliminal stimulation: This derives partly from the commercial distribution of subliminal audiotapes for selfhelp purposes and their questionable effectiveness. It is asserted that these tapes enhance the ability to achieve certain goals, to solve problems, to improve task performance, and to effect a number of psychological and physiological changes by simply listening to a specific tape regularly. The major hypothesis to explain such an effect is a yet unknown mental process, which allegedly is able to receive and handle subliminal information that is emotionally and motivationally relevant. The information may be masked by music or a noise (e.g., of a waterfall or white noise). After a prolonged time of regular subliminal exposure (one hour daily for 4 weeks, say), the "new" information is supposed to replace "old" information that was responsible for a

problem. If effective, this "replacing" can possibly also be harmful. For the information that is unconsciously received and processed may be in contradiction to the conscious purposes of the individual and could lead to psychological problems or mental disorders (Dixon & Henley, 1991).

Besides a substantial body of clinical research in the area of visual subliminal stimulation (see the meta-analyses by Hardaway & Bornstein, 1990) clinical use of subliminal audiotapes has been made successfully with overweight (Cassell & Costello, 1991), substance abuse (Monahan, 1991) and depression (Reid, 1990).

Only a few experiments studying the influence of auditory subliminal stimulation on task performance have been made. Zuckerman (1960) found that subliminal suggestions can influence task performance in a word production task. Silverman (1976), who presented visual subliminal suggestions to professional dart players while they played, found a significant difference between the influence of positive, enhancing and negative, restricting suggestions. Swingle (1992) describes a series of replications of the Zuckerman study that yielded significant results. Other types of tasks that are mentioned by Swingle are lever pressing and performance in aerobic work-outs. In the present study the task subjected to subliminal influence was a computer game.

Method

Subjects: Sixty university students volunteered to participate in a one hour session without payment. Their age range was 18 to 38 years, and all had normal hearing. The sample (36 women and 24 men) was randomly divided into three groups of 20 subjects each.

Measures: After the subjects were introduced to the nature of the experiment, they were given a shortened form of a common mood scale (Befindlichkeitsfragebogen, v. Zerßen, 1980), which consists of 10 pairs of adjectives (e.g. "happy - sad"). After a brief warm-up, the subjects were instructed to play a computer game in two consecutive sessions of 10 minutes each. The game consisted of a bar, which could be moved horizontally, a ball and a number of blocks above the bar. The task was to reflect the ball with the bar and to hit the blocks, which disappeared when the ball touched them. The number of hits were scored.

The score of the first session was used as the baseline. In the second session subliminal suggestions imbedded into the noise of a waterfall were presented to the subjects through headphones while they were playing. The ratio of the two scores (Score 2/Score 1) was used for further analysis. The subliminal suggestions were "I am getting better and better" for group 1 and "The game is too hard for me" for group 2. These suggestions were given 200 times during the experimental session. After the experiment all subjects were asked to fill out the mood scale for a second time. Finally a test for suggestibility was administered. It consisted of 5 items taken from the Creative Imagination Scale, CIS (Barber & Wilson, 1976). These were presented to the subjects via audiotape and headphones. For the test the subjects were seated in a relaxation chair.

Experimental groups: It was assumed that the improvement compared to the base-

line was significantly higher in the enhancement group (group 1) than in the deterioration group (group 2). As a control group, 20 subjects received irrelevant subliminal auditory suggestions about a certain color (group 3). This information was assumed to influence the choice of a colored box in a forced choice task following the computer game. The suggestion here was simply "Take green." To raise their motivation the subjects were told, that they could win some money (5 DM) if they chose the right one out of five colored boxes.

Apparatus: The technical equipment of the experiment consisted of two 486-PCs. One was used for playing the game, the other served for mixing the masking noise and the suggestions using a sound blaster chip. The signal/noise ratio was -15 dB. The noise was played on a mono cassette recorder, which was plugged into the sound card. The mixed sound was presented to the subjects through closed headphones. Further material was 5 colored boxes (green, red, blue, violet and black), paper and pencils for tests previously mentioned and a relaxation chair, which was used for the suggestibility test.

Results

Task performance: A single-factorial analysis of covariance yielded a significant main effect ($F = 3.9$; $p < 0.05$, $df = 2/59$) confirming the hypothesis that the performance improvement in the enhancement group (group 1) was significantly higher than in the deterioration group (group 2). The suggestibility score, the first mood score and the "game experience" (little or no versus much experience with computer games) were used as covariates. The mean performance ratio was $M1 = 2.05$ in the enhancement group, $M2 = 1.34$ in the deterioration-group and $M3 = 1.77$ for the control-group (see figure 1).

The overall mean of 1.72 almost equalled that of the control group, while the means of

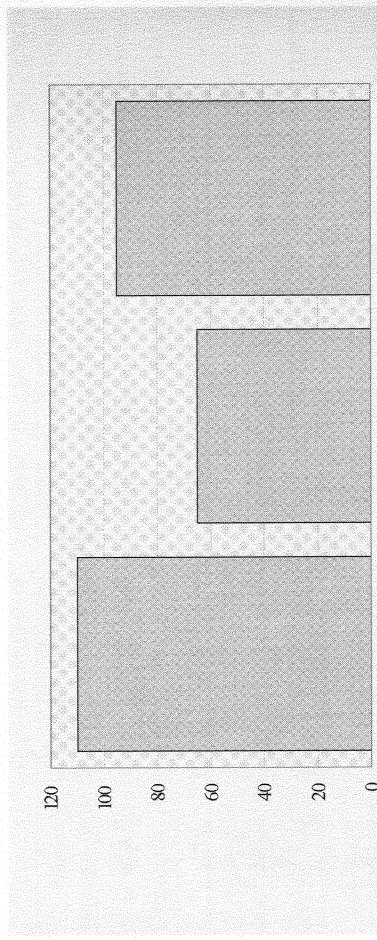


Figure 1: Mean task performance in a computer game for three groups with different subliminal instructions (20 subjects each): Group 1 (first column): Enhancing motivation to achieve; group 2 (second column): Lowering motivation to achieve; group 3 (right column): Irrelevant instruction. The y-axis indicates the ratio of second to first performance (after and before subliminal instruction).

group 1 and group 2 differed from the overall mean in the expected directions. The ratio score was used instead of a difference score in order to level large individual differences in the raw scores. These latter yielded a significant difference between the sexes ($t=4.17$; $df = 58$; $p < 0.01$), which vanished when using ratio scores ($t = 0.75$; $df = 58$; $p > 0.05$). Similarly the difference between unexperienced and experienced players vanished when the difference score (after-before) was substituted by a ratio score.

Mood: Another hypothesis was that the mood of the subjects might be affected by the subliminal instruction. A single-factor analysis of variance of the dysphoria score revealed a significant difference between the enhancement group and the deterioration group in the baseline ($F = 4.86$; $df= 2/59$; $p < 0.05$), the deterioration-group (group 2) having more elevated mood (lower score of dysphoria). The mean scores were $M1 = 5.35$ and $M2 = 2.70$ respectively. However after the games no significant difference was found, the means being $M1 = 4.35$ and $M2 = 3.10$ respectively. That is, there was a slight although nonsignificant interaction: in the enhancement group the mood enhanced and deteriorated in the deterioration group (see figure 2).

Choice behavior: No evidence could be found for the hypothesis that subliminal suggestions influenced the choice in the colored box-task: In the instruction group (subliminally told to take green) 2 out of 20 subjects chose green, whereas in the non-instruction group (which had no suggestion) it were 7 out of 40 subjects.

Discussion

The significant result concerning the game performance could be interpreted as an influence of the subliminal messages. But other factors may have contributed. For instance it could be interpreted as an experimenter effect, which only could be excluded by a double-blind arrangement concealing the nature of the subliminal tapes to both, the subject and the experimenter. However, it still remains to explain, why this worked

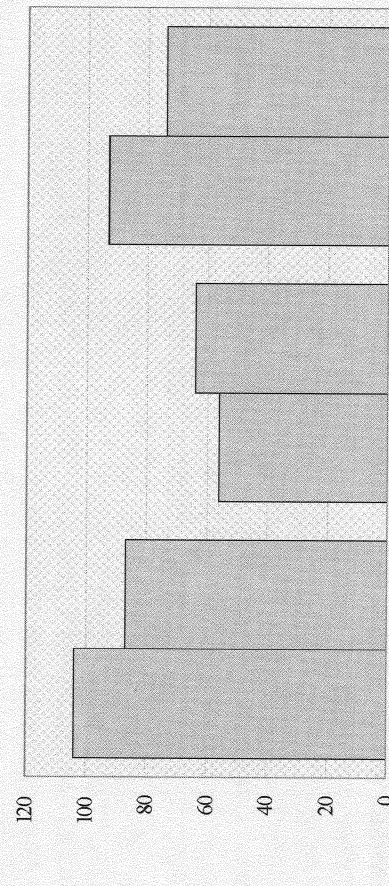


Figure 2: Mean dysphoria score before (left column) and after (right column) subliminal instructions in three groups of 20 subjects each: Group 1: enhancing motivation to achieve; group 2: lowering motivation to achieve; group 3: Irrelevant instruction.

in the point gaining skill task (the computer-game) and not in the money winning choice task. Moreover, in order to keep the time of contact between experimenter and subject brief, the experimenter left the room during the game sessions and during the test for suggestibility. So, the only opportunity to influence the subjects nonverbally could have been at the beginning of the experiment when the procedure was explained. All subjects were told that there would be subliminal stimulation, but they were not told that the stimulation was only during the second game session.

The subjects were asked if they had experience with the game or with a PC-mouse. If they had, the warm-up time for the game was reduced from five minutes to two minutes. Because most of the subjects ($n = 58$ out of 60) did not know the game and 75% ($n = 46$) had little computer handling skills, it could be reasoned that the majority had identical prerequisites. It is somewhat amazing that, although subjects were randomly assigned, in the deterioration group 40% (8 out of 20 subjects) had computer skills or knowledge of the game. Despite this, these subjects (group 2) were significantly lower in performance improvement compared with the enhancement group (group 1). This could be interpreted as strengthening the evidence for the efficacy of subliminal stimulation.

The findings support the widely accepted assumption that the bigger the emotional or motivational relevance of a subliminal message is, the stronger is its impact. The deteriorating instruction is intended to lower the motivation of the individual, which is seen in the mood score and the task performance. Although more than a dozen repetitions of Silverman's (1976) results with dart players failed to replicate his results, it seems to be of interest to scrutinize more carefully under which conditions there is an influence of auditory subliminal stimulation on performance, especially on performance of experts like athletes. Another group of subjects of interest might be examination candidates or pain patients.

Further investigation therefore is necessary to gain more insight in the effectiveness of auditory subliminal stimulation with subjects which more seriously motivated. Moreover, studies in this field should have a double-blind design and a task more easily controlled by the subject than the computer game used here. (For example a reaction-time experiment with lever-pressing-task). Also it is important to create a standardized method for producing subliminal messages (e.g. Urban, 1993).

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Normal Instruction or Hypnotic Suggestion: What makes the Difference?

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■ *What is the difference between an ordinary instruction and a classical hypnotic suggestion? Several previous and contemporary attempts to answer this question are discussed: the intervening variables "hypnotic state" and "suggestibility" of the hypnotized as well as "credibility" of the hypnotizer, the emphasis put on "context" by some contextualists and system theorists, and finally the position of radical constructivism that does not recognize fundamental differences between suggestions and normal instructions on the level of selfreferential processes. It is emphasized that all these variables are of relevance only within a particular interpersonal relationship that has been called "rapport" for more than two centuries. Unfortunately, rapport has not been investigated extensively in comparison with other variables.*

I believe that the varying and ambiguous use of the word 'suggestion' has created an apparent image of acutely contrasting opposites that, however, does not exist in reality. It is worth taking the trouble to examine what may actually be called 'suggestion'. This statement made by Sigmund Freud (1888-89) in his "Translator's Preface" to Bernheim's (1888/1985) "Die Suggestion und ihre Heilwirkung" (Suggestion and its Healing Effect) has still the same validity today. Do we really know what we mean when we speak of suggestion? It seems to be "a rather generally held view that certain verbal communications [...] are to be and can be *a priori* distinguished from others as being 'suggestions'. Other communications, on the other hand, can be said *a priori* to be 'instructions', 'commands', and 'requests'" (Weitzenhoffer, 1974, p. 258; italics in the original).

Many clients and, as a matter of fact, more than a few trainees, that is, thoroughly professional colleagues, too, seem to have a relatively clear and simple notion of what is to be understood by "suggestion": namely, all those kinds of injunctions, instructions, orders and directives, that one can not resist and are therefore carried out and complied with quasi-automatically. Such notions are still very common today and