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Auditory Subliminal Stimuli

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Abstract

The aim was to study whether stimuli that cannot be detected consciously might nevertheless influence subject's higher cognitive functions, and whether such an effect differs in individuals with different levels of state-trait anxiety, social desirability and "Repressor". Participants ($N = 56$) listened to a classical piece of music in which subliminal messages were embedded. These messages could be either positive ("I am clever") or negative ("I am worthless"). After listening to the music participant had to complete the Standard Progressive Matrices test (Raven, Court & Raven, 1992). Levels of state and trait anxiety and social desirability were evaluated by means of questionnaires, which the subjects filled in before and after they listened to the music. Results revealed an interaction effect between social desirability and the subliminal messages for the dependent variable score on the Matrices test. Different possible explanations for the results are given; and finally suggestions for future research are recommended.

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Introduction

The present study examines subliminal perception. This concept has often met opposition, and many people actually want to believe that it does not exist at all. According to Hassin, et al. (2005) the fear is that our own consciousness is not in control of our behavior. Also it is believed that conscious thought should mediate everything we do, at least with regard to important behavior and decisions. But do we really always want conscious thought to produce, or at least mediate, our functioning in general? (Hassin; Uleman ; Bargh, 2005)

In short we can state about the theory behind subliminal stimuli: Messages which are below a person's audio level or visual level will be received directly by the "unconscious" mind - that is conscious evaluation is by-passed. At the *audible* level, subliminal messages may contain music or sounds from nature. In the present research we used the piece of Bach and it is called the "Sixth Brandenburg Concerto". Below these audible sounds were verbal messages that are *inaudible* as far as conscious perception concerns. According to the theory, the "subconscious" mind will distinguish the *inaudible* verbal messages from the *audible* ones, respond to them, and act upon them.

In agreement with the initial study/pilot study, the definition of "Unconsciousness" perception is identical with the concept of subliminal material/messages in the present study.

The present theoretical understanding

Hassin, et al. (2005) states that the new unconscious concept is much more concerned with affect, motivation, and even control and meta-cognition than was the old cognitive unconscious. The new concept includes the causes of the phenomenal experience, of having intentions and free will, of attributing these to oneself and others. (Hassin; Uleman ; Bargh, 2005)

The existence of the unconscious has been doubted for decades. A large amount of research, however, now suggests that the existence of unconscious processes is no longer questionable (Loftus & Klinger, 1992). After many years of denial of the unconscious processes, they are now accepted by the great majority of psychologists (Kihlstrom, Barnhardt & Tatarzyn, 1992). Greenwald (1992) states that unconscious cognition is now solidly established in empirical

research, and the concept seems to be much simpler than the sophisticated concepts that are used in psychoanalytic theory. So, at the moment attempts are made to simplify the understanding of the mental processes involved in the unconscious. To put it in a simple question: "Is the unconscious smart or dumb?" (Loftus & Klinger, 1992)

The idea that the unconscious receives messages directly through finer perception rather than the conscious mind is based Sigmund Freud's theories. He taught that the main driver behind human behaviour is the unconscious mind, and described the mind as being like an iceberg with most of the mass below the surface. According to Freud, it is from this area, of which we are unaware, that our external behaviour arises. Therefore, the promoters of subliminal are basically Freudian.

During the 20th century many different approaches have been taken with respect to the existence of the unconscious. The sceptical view, that psychoanalytic conceptions of unconscious cognition lack empirical confirmation, was prevalent in the 1950's.

In a classic work, Bruner (1957) was talking about a "New Look" in perception, and mentioned colleagues, which were beginning to explore the problem of subliminal (unconscious) perception. Bruner and his contemporaries said that what we see not only depends on what is out there, but also on inner factors such as expectations, motivations, and affect (Bruner 1957, 1992).

In an experiment Bruner and Postman showed toys and plain blocks of equal height to young children. The children, due to their expectations, thought the toys were taller. The toys also seemed to increase in size when the researchers made them unavailable to the children. This approach, the "New Look", was in contrast to the prevailing "formal" one that treated perception as a self-sufficient process to be considered separately from the world around it. Because there were not enough methodologically sound demonstrations of unconscious perception (Loftus & Klinger, 1992), the New Look was widely rejected by the late 1950's.

Erdelyi (1974) started a second New Look, and made a strong case for theoretical connections between cognitive psychology and unconscious cognition. Nevertheless, New Look 2 has not produced widely accepted evidence for psychoanalytic interpretations of unconscious influences on perception or judgement.

A third New Look is well under way according to Greenwald (1992), and the most unexpected aspect here, is the support for a simpler view of unconscious cognition than that of psychoanalytic theory: Greenwald distinguishes two meanings of unconscious cognition: 1) cognition without attention, and 2) verbally unrepeatably cognition. According to him, a recent blossoming of research on these two types of unconscious cognition has established several procedures that have replicable findings. He points to research on selective attention and subliminal activation. For example, Silverman & Weinberger (1985) have found effects of subliminal presentations that resulted in cognitive effects of multiword strings. It is called Subliminal Psychodynamic Activation, using “Mommy and I are One” as the text of a subliminal stimulus.

Silverman and Weinberger state, the phrase “Mommy and I are one” works because “there are powerful unconscious wishes for a state of oneness with the good mother of early childhood and gratification of these wishes can enhance adaptation. Silverman and Weinberger say that:

- Neutral subliminal messages, such as “people are walking” have no effect on subjects.
- Disturbing messages, such as “Destroy Mother,” have a negative effect.
- In areas where the usual term for mother is something different, such as “Mama” rather than “Mommy”, the phrase “Mommy and I are one” has no effect. Some follow-up work has claimed that in a game of darts, the phrase “It’s OK to beat dad” improved scores.

Silverman, L.H: & Weinberger, J. (1985).

There is strong evidence for the efficacy of the “Mommy and I are one” message. Thus two meta-researches were published in 1990 in major peer reviewed journals (Hardaway in Psychological Bulletin and Weinberger and Hardaway in Clinical Psychology Review). The results of these meta-analyses indicated that the message did supply reliable effects. The meta-analyses on “Mommy and I are one” indicated that the effects are reliable, of reasonable size, did not depend upon who conducted the study, and were unlikely to be a result of biased reporting of positive results. It appears that something is happening when this message is flashed.

However, this study has been met with considerable skepticism in the scientific community: Critical points of view reveal that subliminal messages in general have not been found to be

so effective. "Mommy and I are one" is a fairly complicated phrase that seems to require cognition to process, unlike a visceral image of a bear or simply the word "enemy."

An instrument for measuring visual and auditory stimuli has been developed by Silverman (1983). It is called Subliminal Psychodynamic Activation (SPA). SPA has been used to intensify or reduce unconscious conflicts in clinical and non-clinical populations and as an adjunct to therapy and education studies (Silverman, 1983). Auditory stimuli have many advantages compared to visual stimuli. For example, since the area of the visual fields that impinges on the fovea (the "fovea" also known as the "fovea centralise" which is a part of the eye located in the central of the macula region of the retina. The fovea is responsible for sharp central vision, which is necessary in humans for any activity where visual detail is of primary importance) is relatively small and the dimensions of that area limit the length of a visually exposed message. In contrast, auditory SPA messages of any length, within reason, can be presented (Fudin & Benjamin, 1991)

The theoretical methodology

Urban (1993) agrees with Fudin and Benjamin that much of the debate regarding the likelihood of (auditory) subliminal stimulation appears to be secondary to the fact that 1) no standardized methods for the presentation of subliminal stimuli exist, and 2) there are no agreed upon protocols for the testing of methods. He also claimed that this lack of standardization seems critical to address if consensus is to be reached regarding the reality of auditory subliminal stimulation. Even a cursory reading of the literature indicates how exceedingly difficult it is to make comparisons between or base inferences on studies with completely dissimilar methods and protocols and methods (Urban, 1993).

Briefly, related to the studies of unattended stimuli (dichotic listening and dichotic viewing), Greenwald (1992) shows that low levels of analysis (i.e., for physical features) occur for information in secondary channels. At intermediate levels, various procedures indicate that word meaning is processed at least partially in a secondary auditory or visual channel.

Furthermore, in double-blind tests of claimed beneficial effects of verbal suggestions buried subliminally in self-help audiotapes, only negative results have been reported (for example Greenwald, Spangenberg, Pratkanis & Eskenazi, 1991).

Greenwald and colleagues (1992) also found a huge placebo effect. Apparent from this study is that expectancy can account for most of the satisfaction expressed by subliminal self-improvement patrons.

A study by Cheesman & Merikle (1986) contains a good example of such a dissociation effects. They make a distinction between an objective threshold and a subjective threshold. A subjective threshold refers to the level of discriminative responding at which observers claim not to be able to identify or recognize perceptual information (when forced they might detect it at a better than chance level of performance). And an objective threshold is the level of discriminative responding corresponding to chance level performance.

Chesman & Merikle (1986) points out: if one accepts that subjective measures can be valid indicators of awareness, then there is considerable evidence for perception without awareness. According to Merikle, it is relatively easy to demonstrate that perception occurs when subjects do not believe that they have either seen or heard an adequate stimulus. As an example for this he points to cortically blind patients (Merikle, P.M. 1986).

There are several research indicates that unconscious stimuli may have effects on bodily processes (Evans & Richardson, 1988; McLintock, Aitken, Downie & Kenny 1990). That is, during surgical operations positive suggestions were given to subjects during under narcosis. Results showed that people who were given these positive messages recovered more quickly and were in need of less pain reducing medication than those subjects who had been listening to an empty tape during the operation. Kotzé & Möller (1990) confirmed with their study the hypothesis that auditory subliminal stimulation would effect a significant increase in galvanic skin response. (Galvanic skin response occur a change in the electrical resistance of the skin that is a physiochemical response to emotional arousal which increases sympathetic nervous system activity)

Although unconscious emotional stimuli, have hardly been used in the study of cognitive processes and the existing results about this topic area are in confliction. However, Chakalis & Lowe (1992) found a positive effect on a memory task in a group that had been given subliminal positive suggestion, compared to a control group. They showed that subliminal positive affirmations (embedded in relaxing music tapes) could enhance recall performance

on everyday memory tasks, primarily when the subliminal messages are specifically related to the particular memory component.

A study on personality test by Meehl & Hathaway (1946) and Cronbach (1946) have both cogently described, how participant various self-imposed can give intrude attitude upon personality tests. More recently, Edwards (1957) has stressed the importance of Social Desirability stereotypes as a biasing factor. He seems to suggest that this particular response set is so pervasive that it impairs the validity of most standard personality inventories. For Edwards, the forced choice technique affords a possibility of minimizing the effects of social desirability. The forced choice format calls for responses to pairs of statements; the pairs presumably have been equated for social desirability on the basis of prior ratings of the separate components of the pair. (Edwards, A. L. 1957).

State-Trait Anxiety

According to Spielberger (1983) the term *anxiety* is used to refer to at least two related, yet logically quite different constructs. Empirically, anxiety is perhaps most often used to describe an unpleasant emotional state or condition. Anxiety is also used to describe relatively stable individual differences in anxiety-proneness as a personality trait.

Emotional states exist at a given moment in time and at a particular level of intensity. Anxiety states are characterized by subjective feeling of tension, apprehension, nervousness, and worry, and by activation or arousal of the autonomic nervous system (Spielberger, 1983). In contrast to the transitory nature of emotional states, personality traits can be conceptualized as relatively enduring differences among people in specifiable tendencies to perceive the world in a certain way and in dispositions to react or behave in a specified manner with predictable regularity. In his manual, Spielberger explains *trait anxiety* as referring to relatively stable individual differences in anxiety-proneness; i.e., differences between people in the tendency to perceive stressful situations as dangerous or threatening and to respond to such situations with elevations in the intensity of their *state anxiety reactions*. Persons with high *trait-anxiety* exhibit *state-anxiety* elevations more frequently than low *trait-anxiety* individuals, because they tend to interpret a wider range of situations as dangerous or threatening (Spielberger, 1983).

In the study of Robles, Smith, Carver & Wellens (1987) the major hypothesis was that exposure to negative stimuli would result in higher levels of *state anxiety* and that exposure to positive stimuli would result in lower levels of *state anxiety*, compared with the neutral condition. An additional prediction was that exposure to the subliminal stimuli would have no effect on *trait anxiety*. The results of this study are consistent with the hypothesis that information presented outside conscious awareness can exert an influence on subjective emotional experience. Subjects exposed to humorous subliminal stimuli reported lower levels of *state anxiety* than did the same control group. These effects were specific to *state anxiety*, with no such difference emerging in self-ratings of *trait anxiety*. (Robles, Smith, Carver & Wellens, 1987)

Repressors

The *repressor concept* has traditionally been used to signify people with heightened recognition thresholds for anxiety-provoking stimulation (Weinberger, Schwartz, & Davidson, 1979). *Repressors* show an obvious inconsistency between how they describe themselves – calm, happy, with high self-esteem and their outer appearance, as others perceive it. Those with high on social desirability and low on anxiety were thus termed *repressors*, while other groups were labelled true *low anxious*, *high anxious*, and defensive *high anxious*. Weinberger et al. (1979) found that the *repressors* were more stressed (according to three physiological and three behavioural measures) than the true low-anxious people despite claims of lower trait anxiety. Subsequent empirical research has found that *repressors* show high reactivity in a number of physiological measures, but report very little negative affect, presumably because they are highly motivated to maintain a positive image of themselves (as reviewed in Weinberger & Davidson, 1994).

Inspiration by psychoanalytic defence mechanisms theory, the idea that a *repressor* uses strong defensive structures in order to uphold an image of him/her that is quite different from the more objective reality, as others see it. To test this inconsistency a classification was made by Weinberger et al. (1979) by way of psychological scales, one that measured *social desirability* and another scale measuring anxiety level (Weinberger, Schwartz, & Davidson, 1979). The Marlowe- Crowne Social Desirability Scale (1960) was accorded to the constructors, measuring affect inhibition and protection of self-esteem.

By Marlowe- Crowne social Desirability Scale predicted a repressive style involving an avoidance of disturbing cognitions. This conclusion was supported by the *repressors*

particular denial of cognitive (relative to somatic) anxiety and their reports of decreased trait anxiety, following a stressful experiment. The *repressors* defensiveness and preoccupation with avoiding awareness of anxiety often may interfere with effective coping and, paradoxically, promote behavioural and physiological responses indicative of *high anxiety*.

According to Brown & Eriksson, *repressors* traditionally defined as persons who manifesting heightened recognition to thresholds for anxiety provoking stimuli, and they consistently avoid disturbing cognitions across a variety of perceptual, projective, and learning tasks (Brown, 1961; Eriksson, 1966). *Repressors* defensiveness and preoccupation with avoiding awareness of anxiety often may interfere with effective coping, and paradoxically, those promote behavioural and physiological responses, witch indicative of high anxiety.

Weinberger, Schwartz & Davidson (1979), with in a study investigated the distinction between; a) truly low anxious subjects, who report low trait anxiety on the Taylor scale and low defensiveness on the Marlowe-Crowne scale and b) *repressors* who report low anxiety but high defensiveness. Research has supported the claim that the *repressor* is not a so called other deceiver, i.e. actually aware of his or her own feelings but aiming at making a good impression on others (Derakshan & Eysenck, 1998; Weinberger & Davidson, 1994).

The psychodynamic theory of an active avoidance of conflicting, anxiety arousing stimuli thus seemed an appropriate frame to the *repressor* concept. When it came to particular defence mechanisms it was suggested that the mechanism of projection was relevant for *repressors*, since it would seem a convenient strategy to attend to negative material in others when avoiding it in oneself, empirical support for this suggestion was found by Newman, Duff & Baumeister (1997). Furthermore previous research has leaded us to resembling a specific hypothesis about Repressor that can be testing in statistical analyses.

Social Desirability

In proportion to encyclopaedia of psychology, *Social Desirability* was described by Edwards in 1957 and has been long discussed within psychometrics. Holden (1994) *social desirability* bias is the tendency for individuals to portray themselves in a generally favourable fashion and in accordance with Rudmin (1999) this tendency varies across individuals contexts and may require a trait of high self-regard and/or deliberate impression management.

Measures of *social desirability* are useful for identifying susceptible items during the development of psychometric scales (Rudmin, F. W. 1999).

Amongst established *social desirability* scales, the Marlowe Crowne Scale is one of the oldest and most widely scales used (Crowne & Marlowe, 1960). It was developed to be a measure of bias towards affirming social norms and to be independent of psychopathology. Holden & Crown-Marlowe found that this scale is independent of gender and has items focused on interpersonal sensitivity and considerateness. Paulhus (1991), in a factor study of ten social desirability scales, concluded that the Marlowe-Crowne Scale is a measure of impression management and to a lesser degree, self-deception (Paulhus, 1991)

Hypothesis

After outlining some of the research done in the field of the (cognitive) unconscious, and mentioning some of the controversies about the (cognitive) unconscious in the ongoing debate, it is important to mention that this study is based on Professor Ingegerd Carlssons earlier research. By having her earlier pilot study as a control-group the stage was set for this study.

The general idea is that the content of the subliminal message would affect the score on the test of logical-inductive ability, measured by the *Standard Progressive Matrices (SPM)*. Subjects who got the negative message would have a lower score than subjects who got the positive message.

The *first hypothesis* was that the content of the subliminal messages would affect the score on the test of logical-inductive ability as measured by the SPM. Subjects who got the negative message were likely to have a lower score than subjects who got the positive message.

The *second hypothesis* was that the content of the negative subliminal message (“I am worthless”) would affect the individuals identified as “Repressor” (i.e., people with High social desirability scales and Low trait anxiety). They are more affected than subjects with Low social desirability and high trait anxiety. This effect would measure on the level of Standard Progressive Matrices test (SPM).

The *third hypothesis* was that the content of the negative or positive subliminal message (“I am worthless”) and (“I am clever”) would affect the subjects with High social desirability no matter how low or high they are on trait anxiety.

Subliminal Messages	Social Desirability	
	Low	High
2 (C) Positive	SPM –Test Mean = ?	SPM - Test Mean = ?
3 (W) negative	SPM –Test Mean = ?	SPM -Test Mean = ?

This correlation matrix table portrays the design of the third hypotheses and

relationship between high and low social desirability, negative and positive subliminal messages, on Standard Progressive Matrices Test scores, which are based on the estimated mean of different groups.

Method

Pilot Study

The pilot study mentioned above, was undertaken by Carlsson, Brakel, et al (1999). Their pilot study served to choose the level of the voice on the tapes for this research in order to make sure that masked subliminal messages were proper or with in good volume in dB. In this way a correct threshold for subjective subliminality could be established for two messages.

Cheesman and Merikle (1986) introduced a distinction between *objective threshold* (a level of stimulus presentation at which forced-choice responding indicates that a stimulus is undetectable) (In forced choice, the subject is presented with a number of spatial or temporal alternatives in each trial, in which the stimulus is presented. The subject is forced to choose the location or interval in which the stimulus occurred) and *subjective threshold* (a level of greater duration, energy, or signal, noise ratio at which subjects report awareness of stimulus presence) that is above chance responding.

Initial course of action between Social Desirability and Trait Anxiety to this point essentially supported by Ingegerd Carlsson methodical concept that constructing on SPSS. In the present study, the boundary between conscious and unconscious perceptual processes will be equated with a subjectively defined threshold which based on claimed awareness rather than an objective threshold which based on discriminative responding (Cheesman & Merikle, 1986).

The first researchers to mention *objective threshold* and *subjective threshold* were Cheesman & Merikle, 1984. In a typical subliminal perception experiment, subjects are given a sequence of trials in which a stimulus is either presented or not. For each trial, subjects say whether a stimulus was presented on that trial. Subjective threshold occurs at the level of discriminative responding for which subjects claim not to be able to detect perceptual information (that is, they claim to be literally guessing); whereas objective threshold occurs at the level of discriminative responding corresponding to actual chance performance (that is, subjects claim a stimulus was present no more frequently when it was present than when it was not). Thus, the subjective threshold is the point at which subjects do not know that they know that a stimulus was presented; the objective threshold is the point at which subjects do not know that a stimulus was presented. Cheesman & Merikle (1984) found that subliminal perception occurred in the sense of a stimulus being below subjective but not objective threshold. They results imply that subliminal perception exists in one sense meant by the lay

person might not believe that they saw anything and yet still show by their above chance guesses, and by reliable priming, that the information nonetheless affected their behaviour.

The study here uses two different verbal messages, a positive and a negative. The positive message is “I am clever” (in Swedish: “Jag är duktig”). The negative message is “I am worthless” (in Swedish: “Jag är värdelös”). A woman is saying the Swedish sentences in an appropriate tone of voice.

Kappas, Hess & Schere (1991) give a summary of the vocal intonation for different emotions. The affective state of sadness-dejection (“I am worthless”) is described by a decrease in mean F0 (fundamental frequency), F0 range, downward-directed F0 contours and also, mean intensity high-frequency energy and precision of articulation decrease. Recitation of F0 in encyclopaedias, Fundamental frequency is a concept in music or phonetic, often referred to as simply a “fundamental”. The number of waves that pass a fixed point per unit time is also the number of cycles of vibrations undergone in unit time by a body in periodic motion. The fundamental frequency (also called a natural frequency) of a periodic signal is the inverse of the pitch period length. The pitch period is, in turn, the smallest repeating unit of a signal. One pitch period thus describes the periodic signal completely. The significance of defining the pitch period as the smallest repeating unit can be appreciated by noting that two or more concatenated pitch periods form a repeating pattern in the signal. (Encyclopaedia, 2008)

However, the affective state joy/elation (“I am clever”) is described by increases in mean F0, F0 range, F0 variability, and mean intensity. If listeners are able to decode the sender’s emotional state from vocal cues, the voice must be carrying that information in its acoustical parameters, recorded verbal messages; in this study, supposed to have these differences in acoustical parameters, but it was not checked for.

These verbal sentences (adjusted to which affective state they have to represent) have been embedded three times in a short musical piece. A computer was used in this phase. The musical piece takes about 25 seconds and has been chosen because it was found to be a neutral kind of music. The piece is composed by Johann S. Bach and is called the “Sixth Brandenburg Concerto”. In another study in which musically untrained listeners had to rate fourteen different compositions (Nielzén & Cesares, 1982).

Next step was to transfer the embedded voice plus music to a tape. Several versions were transferred using differently strong versions of the voice, from a very weak to a very loud voice. The computer recorded the classical piece of music at 10 dB and added the messages at the following loudness in the following order: -7 dB, -7 dB, -4 dB, -4 dB, -1 dB, -1 dB, -2 dB, 2 dB, 5 dB, 5 dB, 8 dB, 8 dB, 10 dB, 10 dB.

There after a cohort of 55 females listen to the tape, and they describe everything they heard. Most of the women were students (N = 47) and came from different departments at the University of Lund (Sweden). These departments included the technical, medical, humanistic, physiology and faculty. The other women (N= 8) were employed/unemployed. Their ages ranged from 18 to 40 (mean = 25 years; SD = 4, 44).

In the beginning of developing the method of the pilot study the participating women were instructed as follows: “You will listen to several repetitions of a short piece of music. Between each repetition I will stop the tape recorder. Please notice whether the music sounds the same from one piece to the next or that it is changing. Write down any change that you are able to observe”.

From -7 dB up to -4 dB none of the women heard anything that was comparable to a voice, at the -1 dB loudness level only one subject mentioned that she “... could hear someone speaking weakly in the background...” and from 2 dB up till 10dB many more women did hear someone speaking. For the message to be subliminal (with a subjective threshold) the musical piece was chosen to be recorded at 10 dB and the verbal message at -1 dB.

As a control to find out if the messages (I’m worthless/I’m clever) were subliminal, participants filled in a questionnaire with three questions on, whether they have heard anything within the music they listened to. The result was that none of the subjects had heard any words or voice while they listened to the classical music.

Subject

The participants in this present study were 62 undergraduate female students from the University of Lund & Malmö Högskola (in Sweden). Since the woman in the messages speaks in Swedish, the participants ought to be of the same sex and the same language. Participants came from different parts of Malmö and Lund University with a variety of

background. Their ages ranged between 18 and 45 years (mean age = 25 years; $SD = 5.84$) and all had adequate hearing. Each student participated voluntarily. After they had let known that they were interested in participating, they were approached by phone, cell phone text message (sms), and e-mail. They were told that the testing would take approximately one hour and an appointment was made.

Subjects were randomly assigned to one of the two conditions, with 31 subjects getting the positive subliminal message, and 31 subjects getting the negative subliminal message. Finally within statistical data, for the reason of high distribution in data, some reduces had to be down, those subjects who had extreme high or low distribution were reduce, and the number of participant change from 62 to 56 subjects. With division of 28 subjects in negative subliminal message (“I am worthless”) and 28 subjects with positive subliminal message (“I am clever”).

Procedure

Each individual tested, was met by the experimenter and taken to a quiet room. The subjects had their own table to work on. After a short introduction, the subject filled in a *General information form*. (Appendix “A” and Appendix “B” for translation in Swedish) This form served to get some personal information about the subject like name, age, occupation, high-school grades, and informed consent. (But unluckily, many of participants where not prepared to fill completely in the “general information” questionnaire, which were imbedded, and requested. this grounds make only “age variable” possible to exploit in statistics data). Then, the subject completed both portions of the *State – Trait Anxiety Inventory* (STAI, Spielberg, 1983). (Two test and 20 question each of the questionnaires). Next step were a questionnaire about *Marlowe- Crowne Social Desirability Scale*, which base on 10 questions (1999). (At this moment had to be filled in another questionnaire about *Self Esteem Scale* by Rosenberg, (1965). but this instrument is not analyse in this article) When they finished doing this, the subjects got the instructions of the *Raven Matrices Test* (Standard Progressive Matrices, Raven, Court & Raven, 1992) and a written music instruction. (Appendix “C” and appendix “D” for a translation in Swedish)

Next step was to let the subjects listen to one of the randomly selected tapes (subliminal messages) for approximately, four minute. A double-blind procedure was used; i.e., the experimenter was unaware of which tape contained which message, for the reason that,

participant were unaware of the use of subliminal messages, subjects had a passive attitude towards the stimulus message in the music. The subjects were equipped with earphones when they listened to the music. After music played completely to the end, directly, subject started to work on the Raven Matrices Test.

The subjects could have as much time as they needed to finish the test. The instructions of the Raven Test were also given before they listened to the music, because of a possible interference problem, between the instructions and the subliminal message, if the instructions were given after the music.

There were two questionnaires left to completed after they finished there MT-test. The first one was the State portion of the State – Trait Anxiety Inventory (STAI, Spielberger, 1983). (Critically, at this part of the experiment, incorrectly, participants obtain with the wrong questionnaire; instead of State Anxiety Inventory questionnaire, Trait Anxiety questionnaire took the place). The last one was a questionnaire with three questions about the Music they listened to and two questions about the Matrices-test (Appendix “E”). finally, the subjects were thanked them for their participation and experimenter gave them a *Concluding Information* about the purpose of experiment (Appendix “F”).

Material

State- Trait Anxiety Inventory

Previously, mentioned in the introduction the term *anxiety* is used to refer to at least two related, yet logically quite different, constructs. Empirically, anxiety is perhaps most often used to describe an unpleasant emotional state or condition. Anxiety is also used to describe relatively stable individual differences in anxiety-proneness as a personality trait (Spielberg, 1983).

The *State – Trait Anxiety Inventory* (STAI) has been used extensively in research and clinical practice. It comprises separate self –report scales for measuring *state and trait anxiety*. The *state anxiety scale* consists of twenty statements that evaluate how respondents feel “right now, at this moment.” The *trait anxiety scale* consists of twenty statements that assess how people “generally” feel. The *state anxiety* scale has been found to be a sensitive indicator of changes in transitory anxiety experienced by clients and patients in counselling, psychotherapy and behavioural modification programs. The scale has also been used extensively to assess the level of *stats anxiety* induced by stressful experimental procedures and by unavoidable real-life stress factor, such as, imminent surgery, dental treatment, job interviews, or important school tests (Spielberg, 1983).

The *trait anxiety* scale has been used, among others, for screening high school and college students and military recruits for anxiety problems. In clinical and experimental research, the STAI *trait anxiety scale* has proven useful for identifying persons with high levels of neurotic anxiety and for selecting subjects for psychological experiments who differ in motivation or drive level (Spielberg, 1983). In one of the study on *trait anxiety scale* was used to divide the subjects in a *high trait anxiety* group and a *low trait anxiety* group. Reliability data gives reasonably high test-retest correlation for the *trait anxiety scale*, ranging from .73 to .86 for six subgroups within a college student population, but somewhat lower for a high school student’s population, ranging from .65 to .75. For the *state anxiety scale*, the stability coefficients for college and high school students were relatively low, ranging from .16 to .65. Given the transitory nature of anxiety states, measures of internal consistency such as the alpha coefficient, provide a more meaningful index of the reliability of *state anxiety scales* than test-retest correlations. For samples of working adults ($N = 1838$), college students ($N = 855$), high school students ($N = 424$), and military recruits ($N = 1964$) it can be noted that all but one of the *state anxiety* alphas was above .90 the alpha coefficients for the trait anxiety scale were also uniformly high, ranging from .89 to .91. Thus, stability, as measured by test-

rest coefficients, is relatively high for the *STAI trait anxiety scale* and low for the *state anxiety scale*, as would be expected for a measure assessing change in anxiety resulting from situational stress. The internal consistency for both the *state anxiety and trait anxiety scales* are quite high as measured by alpha coefficients (Spielberg, 1983).

Construct validity of the *state anxiety scale* may be noted in the finding that the state anxiety scores of college students were significantly higher under examination condition, and significantly lower after relaxation training, than when they were tested in a regular class period

The *State-Trait Anxiety Inventory* was designed to be self-administering and may be given either individually or to groups. The inventory has no time limits (Spielberg, 1983).

(Since hypothesized in this study aim to analyse the effect of changes in transitory anxiety before and after listening to subliminal messages; important to notify that the study failed to statistically measure the difference on standard progressive matrices test scores).

Norwegian short-form of the Marlowe-Crowne Social Desirability Scale

An unpublished Norwegian translation of Schuessler's (1982) 10-item English short-form of the Marlowe-Crowne Scale was made by Wichström (1995). Schuessler had selected 5 positively keyed and 5 negatively keyed items based on highest item-total correlations (Rudmin F. W. 1999). He developed a short form of the Marlowe – Crowne *Social Desirability Scale* (Crowne & Marlowe, 1960). Besides aiming at a shorter version, another goal was to attain a better balance between positive and negative items. The resulting Norwegian short form consisted of 10 items instead of 33, and showed better inter-item correlation means and a mean closer to the mid-point of the response scale than the original scale.

Social desirability in its extreme however, can cause difficulties in research, particularly in psychological and medical research. When participants in research provide socially desirable answers, results can often be confounded. Of the established social desirability scales, the Marlowe-Crowne Scale is one of the oldest and most widely used (Crowne & Marlowe, 1960). It was developed to be a measure of bias towards affirming social norms and to be independent of psychopathology. Holden & Fekken (1989) found that this scale is independent of gender and has items focused on interpersonal sensitivity and considerateness.

Paulhus (1991), in a factor study of social desirability scales, concluded that the Marlowe-Crowne Scale is a measure of impression management and to lesser degree, self-deception. Two faults with the Marlowe-Crowne Scale are (1) excessive length and (2) unbalanced positive and negative keying. Positively and negatively keyed items should be equal in number if acquiescence bias, or the tendency to answer “yes”, is to be cancelled out. The purpose of the present study was to produce a Norwegian short-form of the Marlowe-Crowne Scale (Rudmin, 1999).

Standard Progressive Matrices (SPM)

The *Standard Progressive Matrices* test was constructed to measure the *eductive* component of “g” as defined in Spearman’s theory of cognitive ability to perceive, and the ability to identify relationships. Since perception is primarily a *conceptual* process, the essential feature of educative ability is the ability to generate new, largely non-verbal concepts, which make it possible to think clearly. The *Standard Progressive Matrices* were developed for use in homes, schools, and workplaces (where testing conditions and levels of motivation are often far from a perfect psychometric point of view) as well as in laboratories. Therefore, it had to be simultaneously short, attractive, robust, and valid (Raven, Court & Raven, 1992).

The scale is made up of five sets, or series, of diagrammatic puzzles exhibiting serial change in two dimensions simultaneously. Each puzzle has a part missing, the person taking the test, has to find the missing part among the options provided. The scale consists of 60 problems divided into five Sets (A, B, C, D, and E); each made up of 12 problems. In each Set the first problem is as nearly as possible self-evident and the followed problem, were built on the argument of those pass problem and become progressively more difficult. The order of the items provides the standard training in the method of working. The five Sets provide five opportunities to grasp the method of thought required to solve the problems and five progressive assessments of a persons’ capacity for intellectual activity. To ensure sustained interest and freedom from fatigue, each problem is boldly presented, accurately drawn, and as far as possible, pleasing to look at (Raven, Court & Raven, 1992).

A person’s total score provides an index of intellectual capacity. As an untimed “capacity” test, the results have been found to be more reliable and psychologically valid than one might expect from sixty problems arranged in five sets of overlapping difficulty (Raven, Court & Raven, 1992).

There are many studies dealing with the reliability of the *Standard Progressive Matrices* and some of them have been reported in the literature. They cover a very wide age-range, many cultural groups, and clinical as well as normal populations. The general picture is of good reliability, whether in terms of internal consistency or re-test reliability. The concurrent and predictive validities of the *SPM*, vary with the age, possibly sex, the homogeneity of the sample, and the conceptual relevance of the criterion to which the *SPM* will be related and the quality of the assessment. A review of relevant research, however, allows some general conclusions to be formulated. According to Raven et al. (1992): 1) good correlations of the *SPM* with concurrent intelligence measures 2) good correlations with concurrent achievement measures, and 3) predictive validity coefficients generally ranging up to .70 (however, research on the predictive power of *SPM* has produced some inconsistencies in the interpretation of these results).

The content validity of *SPM*, as measured by the internal consistency of the test, varies markedly when different test items are considered. About the “factorial construct validity”: the *SPM* has been described, as one of the purest and best measures of “g” or general intellectual functioning available. Nevertheless the evidence from factor-analytic research suggests that while *SPM* is a relatively good measure of general intellectual ability it is not a pure g estimate. The assessment of other factors may be of particular importance in cross-cultural contexts (Raven, Court & Raven, 1992).

Question about Music and question about Matrices Test

The last questionnaire the subjects got to fill, was especially made for this study. It consisted of four questions: two about the music they were listening to and two about the Raven Matrices test they completed.

First the subjects were asked to describe the music in their own words, then they had to rank the music on a 5- points scale from “negative” to “positive” and then they were asked if they heard something special in the music (like a voice). If they did hear something they had to describe with their own words what they hear.

The two questions about the Raven Matrices test have 5-points scales as well. First the subjects are asked how difficult they found the matrices test on a scale from “easy” to “difficult”. After this they had to try to compare their own performance with the performance of people of the same age on a scale ranging from “bad” to “good”.

This last questionnaire had been added to check a couple of things. The most important part of it were, *subjektive* awareness, The *subjective threshold* has already been mentioned above (on Method/pilot study, page15) Question number two (“Did you hear something special in the music? If yes: describe...”) served to check this subjective threshold (Appendix “E” & “F”).

Result

Statistics data for this experiment showed a normal distribution. Cronbach's alpha showed high item alpha on *trait-state* portion of the *STAI* ($\text{Alpha} = .91$), high on *trait* portion of the *STAI* ($\text{Alpha} = .89$), while it was rather low on Social Desirability ($\text{Alpha} = .58$).

Age

The mean age for the whole group was 25 ($SD = 5.84$). The mean age for the group of subjects who got positive subliminal message was 25.68 ($SD = 5.23$) and for the group of subjects who got negative subliminal message was 26.0 ($SD = 6.44$); with $t(54) = -.23$ and $p = 0.82$. Thus, there were almost no differences in age amongst the participants in the two experimental groups.

Score on Raven (SPM)

The mean score on the *SPM* test, for the group of subjects, who got negative subliminal message, were 59.7 and the mean score for the group of subjects who got positive subliminal message were 59.03 and there was no significant difference for age groups on the results on *SPM*.

Trait anxiety

The mean score on the *trait* portion of the *STAI*, for the whole group was 41.6 ($SD = 9.24$). For both (positive and negative subliminal messages) experimental groups the mean score on the *trait* portion of the *STAI* was 40.7, while the negative subliminal message had a SD equal to 9.43 and positive subliminal message had a SD equal to 9.02. So, there was no significant difference between the experimental groups with respect to the level of *trait anxiety*.

Although results showed a positive correlation between the *trait* and the *state* portion of the *STAI* ($r = 0.36, p = 0.007$), a negative correlation was shown between *trait* portion and *Social-Desirability* ($r = -.299, p = 0.025$).

Social Desirability

The mean score for the whole group on the *social desirability* was 26.08 ($SD = 4.25$). The mean score for the group of subjects who got negative subliminal message is 26.63 ($SD = 4.04$). The mean score for the group of subjects who got positive message is 25.57 ($SD = 4.51$). As a result, the experiment groups were not different with respect to the level of

Social desirability $t(54) = -.75, p = .46$.

ANOVA'S

A one-way ANOVA is employed to test whether there are significant differences in the mean scores of the dependent variable across the diverse groups. The following analyses have been made. The groups of subjects first had to be split, before the analyses could be made. For example, subjects were ranked as “highly anxious” above the median and as “low anxious” below the median. This was done for the following variables: trait anxiety, social desirability and age on score raven test (SPM) and two different questionnaires about Matrix-test, (Q. Rav. 1 & 2).

Descriptive Statistics

Dependent Variable: RAVEN.R

Subliminal Messages	NTILES of NEWSOC.D	Mean	Std. Deviation	N
2,00 Positive	Low	53,2000	4,03909	15
	High	53,5714	4,62851	13
	Total	51,8929	4,47494	28
3,00 Negative	Low	51,2143	4,61067	14
	High	50,3846	3,93631	14
	Total	52,3929	4,37450	28
Total	Low	52,2414	4,36426	29
	High	52,0370	4,50198	27
	Total	52,1429	4,39185	56

This table illustrates the summary of statistics which given by the one-way ANOVA to test whether there are significant differences in the mean scores of the dependent variable. The first column shows the different groups of the subliminal message and the second column represents the Low and High score on social desirability.

Score Raven (SPM): trait anxiety, social desirability and subliminal messages

Statistics from the score on the SPM were analyzed in ANOVA with the variables of the trait anxiety questionnaire (high and low), the social desirability (high and low) and both messages. Results illustrate an interaction effect on the level of high *social desirability* and both positive and negative message: $F(1, 52) = 5.04, p = .029$.

Score Raven: High social desirability and Low trait anxiety “Repressor”

For high social desirability and the group who got positive subliminal messages with a mean equal to 53.60 ($SD= 4.76$ and $N=13$) and the negative message with a mean equal to 52.20 ($SD=4.53$ and $N=14$).

The *repressors* had scores below the score point on state anxiety and above the median on social desirability; the low anxious group had scores below the score point on raven test, while the high anxious group had a high score. *Trait anxiety* could be either high or low on social desirability. Result of the ANOVA showed $F(1, 52) = 5.04, p=0.29$. The groups did not differ significantly.

Score Raven: social desirability and subliminal messages

Social desirability and subliminal messages both negative and positive on the Raven score, confirm the interaction on $F(1, 52) = 5.04, p = .029$. Furthermore t-test for equality of means shows $t(26) = 6.19, p < .05$.

Tests of Between-Subjects Effects

Dependent Variable: RAVEN.R

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	97,595(a)	3	32,532	1,756	,167
Intercept	151575,026	1	151575,026	8182,505	,000
TAPE	5,036	1	5,036	,272	,604
NSOC	,733	1	,733	,040	,843
TAPE * NSOC	93,403	1	93,403	5,042	,029
Error	963,263	52	18,524		
Total	153318,000	56			
Corrected Total	1060,857	55			

a R Squared = ,092 (Adjusted R Squared = ,040)

The table shows a significant interactions between subliminal messages (TAPE) and social desirability (NSOC) with $F(1, 52) = 5.04 (p = .029)$

The matrix below portrays the design of the third hypotheses which confirm the finding above and effect between subliminal messages and social desirability. This effect is illustration on the average SPM - test score (based on the estimated means of the different groups), for the subjects with high social desirability. Average score is higher on positive subliminal message than the average SPM – test score on negative subliminal message. Although this effect is

also true for the subjects with a low social desirability; the difference between average SPM – test scores is less within the latter group comparing to subjects with high social desirability.

Subliminal Messages	Social Desirability	
	Low	High
2 (C) positive	SPM –Test Mean = 53.2	SPM - Test Mean = 53.57
3 (W) negative	SPM –Test Mean = 51.2	SPM -Test Mean =50.38

Score Raven: trait anxiety and subliminal messages

Data throughout the score on the SPM were analyzed by ANOVA with the variables of the *trait anxiety* questionnaire (high and low), and both positive and negative subliminal messages. An interaction effect between the level of trait anxiety and messages cannot be found.

Discussion

The first hypothesis was that the content of the subliminal message would affect the score on the test of logical inductive ability as measured by the *SPM*. Subjects who got the negative message were likely to have a lower score than subjects who got the positive message. The hypothesis about projection was not supported, and there are several explanations for this which are discussed in the following:

First, Mayer and Merckelbach (1999) point to parametric research on subliminal stimulation with respect to the question of how profound the effects of subliminal stimuli are. Their paradigm has yielded two important insights: 1) effects of subliminal stimulation are short lived in the sense that they only occur within the 100 ms time frame after prime onset; 2) there is no carry over effects from one subliminal trial to the next, which indicates that subliminal stimuli have no access to memory. This is in line with Greenwald (1992) who is saying that unconscious cognition appears to be intellectually much simpler than the sophisticated agency portrayed in psychoanalytic theory.

Secondly, Begg, Needham, and Bookbinder (1993) demonstrate that subjects are not able to recognize the (forward) meaning of backward speech. People are able to make accurate discriminations with regard to some physical characteristics of backward speech, but not with regard to the content of the speech (Begg, Needham, Bookbinder, 1993).

Moreover, as mentioned before, there are a number of complex issues hiding behind the simple question of how to make sure that a stimulus has been presented subliminally. When subjects in a subliminal stimulation study are asked to specify what stimuli had been presented, and if they identify the stimuli at a level no better than chance, the researchers are relatively confident that the stimuli did not reach awareness as expected. Maybe the setup, which has set the stage for the above study, did not use the proper level of subliminality.

According to Robles, Smith, Carver, and Wellens (1987), being unable to identify what one has seen, may or may not reflect an absence of awareness at the instant of initial exposure. Considering, the time that passes between exposure and presentation of the question, is brief, it is arguable that a real awareness decay can reduce recognition to the level of chance. A

subject may still be aware of having the stimulus message at the earlier moment, but that current awareness would not be reflected in the measure that has been taken (correct identification of the stimuli) (Robles, Smith, Carver & Wellens; 1987). As Erdelyi (1992) puts it: “Any unconscious process may in fact have been fleetingly conscious, but forgotten”.

Another explanation for this study is that the thought was to use a subjective threshold, but instead used an objective one. As Cheesman and Merikle (1986) reason, it may be impossible to demonstrate experimental effects when discriminative behaviour indicates a complete absence of perceptual processing. Maybe it was necessary to establish an individual threshold for every each subjects, (but this kind of procedure is totally out of capacity for this study). Already mentioned in the introduction, Silverman and Weinberger (1985) have found effects of subliminal presentations that resulted in cognitive analyses of multiword strings (described as Subliminal Psychodynamic Activation, using “Mommy and I are One” as the text of a subliminal stimulus). One reason for the difference between Silverman’s effects and the tendency to results in this study could be that the sentence used in Silverman’s study (“Mommy and I are One”) is very specific with respect to the content of the subliminal message. It is possible that the subliminal messages used in this study (“I am clever”, “I am worthless”) are too general, they can be applied to almost everything. Probably the subjects did not apply the message to their own performance. Furthermore speculation can reflect to, possibility of Raven Matris Test that logical inductive ability was too easy for university students since they had roughly good scores on raven test. Although Raven et al. (1992) stressed the point that the test is not short enough to be unduly exhausting or unwieldy, and that there are not enough difficult problems to discriminate between adults.

According to Urban (1993), the various methods reported for presentation of auditory subliminal stimulation encompass a range of approximately 60 dB. Given that 3 dB represents an approximate doubling of loudness in the acoustic energy available for peripheral and central auditory processing, it is readily apparent that comparisons of presently available literature are inadequate and inappropriate.

The *second hypothesis* was that the content of the negative subliminal message would affect subjects with high social desirability and low level of trait anxiety as it identifies “Repressor”. The results showed tendency for significance on mean effect. The number of participants in the repressor group was limited for this study, especially in the low anxious group, and this

contributed to the lack of stronger differences. However statistical result could show greatly higher level of significance if the repressors could be identified before the study. For instance, by examining individuals throughout different questionnaires and finding a higher number of repressor for performance of this experiment. In this way the data could illustrate a entirely different significanse of results on the level of auditory subliminal messages and Scores on Raven Matris Test.

Another finding in the Carlsson and Smith (1997) study, namely that unlike repression taken as a whole, the specific subcategory of immature repression showed an opposite pattern: It was significantly negatively related to the Raven score on the SPM test, and the subliminal messages. Carlsson et al (1997) conclusion was drawn, more symbolic repression indicated better neutralization and hence a cognitively more mature defensive function. Used the term “successful repression” as an equivalent of sublimation, is the same total scoring of immature defines that limits the comparison with the present results (Carlsson & Smith, 1997).

The vocal subliminal stimuli used previously in the pilot study by Carlsson, Brakel et al (1999), contain both a semantic and a prosodic component. In contrast to the method studies, the experimental participants were not instructed to attend to the music, or to expect any changes in. Carlsson et al expected that this, together with the instruction to relax, might have counteracted the possibility that the voice would be noticed, even though the stimulus was repeated many times.

Apparently this is a methodological problem, since it is unresolved if one subject or the other was more influenced by the verbal subliminal stimuli, or if prosody were more important, it world be essential to have chosen stimuli with pre-judged emotional valence. Maintaining of this argument was not controlled for in this study, but if the verbal content were more important, then prosody would be less problematic. However, a spoken phrase without prosody seems not to fulfil all criteria for it to be an emotional message. Since verbal emotional stimuli have been effective in earlier research in the visual mode (of course containing no prosody),

Carlsson et al. find it likely that the semantic property did contribute; at present the role of prosody is unknown (Carlsson, Brakel, et al;1999). It is unresolved and was not even focused on in previous research - if just one word was processed or the entire short message. Since the

only semantic difference was between one emotional significant word in each message, this single word may have had enough influence by itself.

In brief, about first and second hypotheses: it is clear from our discussion that there are quite a few number of criticizing points that have been raised against the actual effect of auditory subliminal messages. The hypotheses have not been confirmed to the extent expected.

The *third hypothesis* was that the content of the either negative or positive subliminal messages would affect the subjects with High social desirability and no matter how Low they are on trait anxiety. The statistical results show clearly a significant level on this dependable variable. This hypothesis is very much definite. $F(1, 52) = 5.04, p = .029$. Furthermore t-test for equality of means show; $t(26) = 6.19, p > .05$.

This data did illustrate how a systematic bias by high social desirability groups of people and positive subliminal message can cause the appearance of a significant correlation. Although this effect is also true for the subjects with a low social desirability; the difference between average SPM –test scores is less within the latter group comparing to subjects with high social desirability.

After presentation of the first manuscript, at the major seminary (30/3-07) some unexpected results on some of the five different hypotheses, brought too much focus on missing points, and generated a kind of confusion concerning the general idea and the nature of subliminal messages. Therefore it was decided to concentrate the analysis on this current hypothesis.

The essence of this hypothesis is characterized, by Ingegerd Carlsson, to stabilize trait anxiety and social desirability, which influences the individual in certain situations. As to the debate on the effect of subliminal stimuli, this hypothesis supports the position that they do in fact have an effect. The original hypotheses in this study, before this completed version, didn't give successfully significant result.

However, achievement of the social desirability hypothesis is supplementary to the other argument, which have been presented on the first and second hypotheses. The arguments on the character of subliminal messages and effect of positive and negative message is quite convincing in third hypothesis.

Throughout the matrix table of the obtained measurements the third hypothesis is confirmed as to the effect of subliminal messages and social desirability. The effect is measured by means of the average standard progressive matrices test score, and based on the estimated means of the different groups. Confirmation is for the group of participant who identify as high social desirability. Average of standard progressive matrices test score is higher on positive subliminal message (M=53.57) than, the average of standard progressive matrices test score on negative subliminal message (M=50.38). Although this effect is also true for the subjects with a low social desirability; the difference between average progressive matrices test scores is less within the latter group comparing to subjects with high social desirability.

In the present study social desirability scale contains 10 items, each requiring a correct or incorrect answer. The scale has been proved reliable and continues to be used. Those participants who answered 7 or more items correctly were considered high social desirability persons, and those who answered fewer than 4 items correctly were considered low social-desirability persons. All participants completed two instruments measuring trait and state of anxiety.

In one approach (Cronbach, 1946; Crowne & Marlowe, 1964; Edwards, 1957; Seibold, 1988) the expression of social desirability is considered an interfering variable that should be controlled in any study. This approach argues that social desirability is a tendency to respond consistently in what is seen as a socially acceptable and desirable way (Sohlberg, 1976) and that this tendency always causes bias in personality assessment.

In another approach, instead of being treated as an interfering variable, social desirability is seen as an indicator of a characteristic reaction pattern of an individual in certain situations (Sohlberg, 1976, p. 302); it reflects a personal trait that becomes a meaningful personality variable and, in turn, correlates with different kinds of human behaviors (Block, 1965; Crandall, Crandall, & Katkovsky, 1965; Crandall & Gozali, 1969; Cronbach, 1970; Crowne & Marlowe, 1964; Dicken, 1963).

As a personality variable, social desirability is considered an individual tendency to perform socially and culturally acceptable and approved behaviours. Crowne & Marlowe (1964) conducted a series of studies concerning the motivation of individuals seeking social

approval. They found that high social desirability individuals tended to be more cautious, conventional, and easier to persuade than low social desirability individuals. Moreover, Crowne & Marlowe (1964) found that individuals with a higher degree of social desirability were less proficient in using language, showed a low degree of task productivity, tended to be more dependent on others for completing assignments, and were less aggressive verbally and physically in interacting with others. Furthermore some research showed that high social-desirability individuals expressed significantly less aggression, especially in situations in where the intention of the frustrating source was not specified.

These researches in summary, has indicated that high social desirability individuals (at least among Americans) are less aggressive, are less willing to talk, avoid social interaction, and are more constrained. These findings are very likely related to the present proposition which aimed to examine the impact of social desirability in relation to the content of subliminal messages.

The most prominent results were found with regard to masked subliminal messages. Higher levels of social desirability individuals were associated with a decrease in relative to neutral elevated levels of trait anxiety. This latter effect were found to be more effected on the content of the negative or positive subliminal messages, however these finding mainly seen among participants who simultaneously scored high on social desirability would be significantly lower in trait anxiety than low social desirability individuals.

In brief, this study on the entire SPM produced fairly high degree of correlation between social desirability rating and subliminal messages. The present study did contribute some of the positive results in subliminal stimulation studies. With respect to the link between subliminal stimulation, trait anxiety and social desirability, a large contribution analysis has been made through statistical examination, ANOVA.

Some limitations of this study have been pointed out, and there was not strong evidence of correlation between repressor and subliminal messages. The significant correlation expected did not appear.

There may be some uncertainties, which the research did not give attention to, such as the test person may be influenced by factors not known to the researcher. The level of Raven Matris

Test can have different implications because of different learning background or tolerance level or some other procedural complexities or lack of enough participants, such as Repressor in this study. In spite of this, significance between the social desirability questionnaire and subliminal messages is confirmed.

Suggestion for coming studies. It is important to identifying a sufficient number of Repressors before the study is started. Further more, as it is discussed on the first hypnoses, another suggestion could be to clarify the best level of the Raven Matris Test, with respect to the participants in question, e.g. university student.

An interesting next research for persistent effects also raises more acute ethical issues. All researchers in the field need to know how long subliminal effects will last. Much of modern life and our political institutions assume that humans can make rational decisions and exert a high degree of conscious self-esteem. However, somehow persistent effects from auditory subliminal stimulation would cast doubt on the validity of assuming that humans have a capacity for conscious self-esteem, which can be compromised by unconscious stimulation for a few minutes or hours.

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Appendix “A”
GENERAL INFORMATION

I would like you to fill in this form. With this information I can check whether my subject groups are equal of compilation. All your data will be treated anonymously. It is your right to stop your co-operation with this research project whenever you want to. You will receive more information about the project after you have filled in the paper & pencil questionnaires. After that information you can still decide to stop your participation.

The next hour you are going to do the following things in the following order:

- Fill in the general information form
- Questionnaire about anxiety
- Statements from which you have to choose the ten which fit yourself best
- Questionnaire about self concept
- Listening to music
- The Raven Matrices Test
- Questionnaire about anxiety
- Some questions about the music
- Here you will get some concluding information

Name:-----

Address and Tel.nr:-----

Year of birth:-----

Average high school grade:-----

Occupation:

- Employee-----
- Student at the dept.
of-----
- Else-----

I have read and agree to participate,

Date: / 2006

Place:-----

Signature :-----

Appendix "B"

ALLMÄN INFORMATION

Får jag be dig fylla i detta formulär. Det ska användas för att kolla, att försökspersonerna är jämförbara i olika avseenden. Alla data behandlas anonymt, och blanketter med namn på förvaras inlåsta. Du har rätt att avbryta medverkan studien utan att uppge något skäl. Du får ytterligare information efter att du har fyllt i formulären, och du kan även då besluta att avbryta din medverkan.

Under den följande timmen (drygt) kommer du att göra följande saker:

- Tre olika frågeformulär om; hur du känner dig, och uppfattar dig själv, i olika avseenden.
- Kort musikstycke.
- Matris-testet.
- En frågeformulär om; hur du känner dig, och uppfattar dig själv, i olika avseenden.
- Frågeformulär om testet och musiken.
- Avslutande information.

Namn:-----

Ålder:-----

Adress:-----

Tel.nr:-----

Genomsnittsbetyg från gymnasiet:-----

Sysselsättning:-----

Anställd. var?-----

Studerande. Var?-----

Annat. Vad?-----

Jag har läst och accepterar att delta:

Datum / 2006

Plats -----

Namnteckning:-----

Appendix “C”

MUSIC INSTRUCTION

Now you are going to listen to some music. It will take approximately 5 minutes. The music is divided into shorter pieces, and they are also separate by a pause. Everyone gets another piece of music and we want to check whether different kinds of music have a different effect on performance. Try to relax while listening to the music. I will stop the tape and then you start making the Matrices test you just practised.

Appendix "D"

MUSIK INSTRUKTION

Nu kommer du att få lyssna till klassisk musik. Det tar cirka 5 minuter. Musiken spelas upp i korta avsnitt med liten paus emellan. Olika grupper får olika musik, och vi vill studera inverkan från musiken på det man ska utföra. Lyssna till musiken i ett avspänt läge. När jag har stängt av musiken, fortsätter du med en gång med Matris-Testet som du fick instruktioner om förut.

Appendix "E"
FRÅGOR OM MUSIKEN

1. Hur bedömer du musiken på nedanstående skala? Ringa in ett alternativ!

Negativt - - 0 + ++ positivt

2. Hörde du något speciellt i musiken? (Ex. vis röster; skorranden e. dyl.?)

- Ja
- Nej

Om Ja,

beskriv:-----

FRÅGOR OM MATRIS-TESTET

1. Hur uppfattade du detta test? Ringa in!

Lätt 1 2 3 4 5 svårt

2. Hur tror du att du klarade testet (jämfört med andra i din ålder)?

Dåligt 1 2 3 4 5 Bra

Appendix “F”

QUESTION ABOUT MUSIC

1. How do you describe the music?

Negative -- - 0 + ++ positive

2. Did you hear anything like a voice, in music?

- Yes
- No

If yes, please describe -----

QUESTION ABOUT MATRICES TEST

1. How difficult they found the matrices test on a scale form “easy” to “difficult”?

Easy 1 2 3 4 5 difficult

2. How do you think you performed the test, comparing with other people at your age?

Bad 1 2 3 4 5 good

Appendix G

Concluding information

Tank you very much for your participation. Now I will give you some more information about the project. The music you have been listening to was the same for everyone. The only difference was the verbal message it contained. In each small piece of music there was hidden message. There was a positive message and there was a negative message, I don't know which message you got. We want to check whether this message has had either a positive or a negative effect on your performance on the Rave Matrices Test. Don't worry, if there is any effect, it is only short-living, and so it won't disturb you any more! The questionnaires you had to fill in serve to check whether there exist any differences in effect in different individuals. Please do not tell your friends any details until they have participated! Questions?