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The Effect of Subliminal Messages and Suggestions on Memory: Isolating the Placebo Effect

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THE EFFECT OF SUBLIMINAL MESSAGES AND SUGGESTIONS ON MEMORY:
ISOLATING THE PLACEBO EFFECT

BY
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ABSTRACT

The purpose of this study was to investigate the effects of subliminal messages and suggestions on memory. The participants ($N = 76$) were students at a large state university in the southeast. The participants took a face recognition memory test with three different conditions; one was with a matched suggestion and subliminal message; two was with a mismatched suggestion and subliminal message; three was with neither suggestion nor subliminal message. A questionnaire was used to measure how much participants knew about subliminal messages, and how much they believed in the effect of subliminal messages. The participants used check sheets to answer the face recognition memory tests. A One-way ANOVA was applied to the research data to determine whether there were any differences among the three participant groups. A correlation analysis was also applied to determine whether the subjects' belief in the subliminal message correlated with their test score. The statistical analyses revealed that there was no significant difference among the three groups and no relationship between the test score and subjects' belief in the effect of subliminal messages. This study failed to reject both of the two hypotheses that the scores of participants' face recognition memory test would not be affected by either subliminal messages or suggestion. In summary, no effects of subliminal message or placebo effect were found in this study.

CHAPTER 1

INTRODUCTION

Subliminal messages have become a standard tactic for advertising departments to increase sales or even decrease behaviors. A highly publicized study in the 1950's by James Vicary incorporated a subliminal message in an ad "Drink Coke, Eat Popcorn." The net effect was an increase in sales after movies at the refreshment box (Russel, Rowe, & Smouse, 1991).

A subliminal message is designed to affect one's mind or behavior when the messages cannot actually be seen or heard. The self-help corner in the bookstores, CD stores, or pop-ups on internet sites contains advertisements with attention-getting phrases, such as "Stop smoking! by listening to the tape an hour a day", "Lose weight or learn a foreign language by listening while you sleep". Companies design these tapes for improving maladaptive behaviors, such as quit smoking, stop bedwetting, improve well-being, relieve pain, gain intimacy, develop creativity, improve athletically, or have financial success.

The self-help subliminal audiocassette market is rapidly expanding. These kinds of tapes are advertised in popular magazines including Psychology Today, and sold directly through the mail and in local bookstores. Companies seek to produce profit in this commercial area. Sales of these items by Mind Communication Inc., grossed \$2 million in 1986; in that same year, the Joe Land Company sales topped that figure in 1 month (Dillingham, 1987).

However, there is little hard evidence to suggest that such tapes actually work. According to Staum and Brotons (1992), there are no subliminal messages included in many published tapes on the market. As a matter of fact, almost all the articles reviewed by the author which studied auditory subliminal messages showed no effect on the targeted behavior. Yet, their appeal is enormous because they claim to deliver results with virtually no effort (Dillingham, 1987).

Is the subliminal effect an illusion or misrepresented? Some articles have reported positive results, but the authors usually describe those changes as being due to the placebo effect (Greenwald, Spangenberg, Pratkanis, & Eskenaze, 1991; Froufe & Schwarts, 2001; Benoit & Thomas, 1992). The research outlined in this study is designed to evaluate the effect of subliminal messages on memory and investigate whether the effect is caused by the subliminal

message itself or by the placebo effect. The results may confirm or disaffirm that subliminal messages work.

CHAPTER 2

REVIEW OF LITERATURE

Definition of Subliminal Messages

The nature and usage of a subliminal message may seem to be imprecise, but literally speaking, subliminal means below threshold. A subliminal message is a visual or auditory message presenting at so fast a speed or so low an intensity that people usually cannot detect it. However, researchers have studied the effect of subliminal messages and have tried to prove the possibilities for use in therapeutic or academic fields.

For example, Cheesman and Merikle (1986) cited the Psychodynamic Activation Theory and theorized how subliminal messages worked in individuals. This theory suggests the stimulus must be related to the unconscious defense mechanisms of the individuals. The subliminal stimuli then impact the psyche by communicating with the unconscious, selectively affecting certain desires and behaviors without the individual's awareness. In other words, a subliminal message provides a subliminal stimulation, which the conscious mind may be unaware of, to either the visual or auditory cortex of the brain. The subliminal message bypasses the gatekeeper in the conscious mind and plants those messages straight into the individual's subconscious (Stress Relief Management, 2005; Emergemann, & Kopiez, 2006). As yet, there is not research to support their theory.

History of Subliminal Messages

The concept of subliminal messages has been around since 1900 when the first book was published by Scripture entitled The New Psychology (Scripture, 1907). It described the basic principles of subliminal messages. After that, Knight Dunlap, an American professor of psychology, flashed an "imperceptible shadow" to subjects while showing them a Müller-Lyer illusion containing two lines with pointed arrows at both ends which create an illusion of different lengths. Dunlap claimed that the shadow influenced his subjects subliminally in their judgment of the lengths of the lines (Wikipedia, 2007). This visual flash was the beginning of visual subliminal messages.

Some researchers applied the visual flash technique to other fields. During World War II, there was an instrument which projected pictures for an extremely brief period so that soldiers

would be trained to recognize enemy airplanes in only 1/100th of a second (Melvin, Retrieved November 11, 2007, from <http://www.mind-course.com/subliminal.html>). Today this instrument is used to increase reading speed or to test vision. After the war, Damron (1951) at Indiana University used a tachistoscopic technique to teach football quarterbacks how to spot an open pass receiver almost automatically. Damron's method is still being used today by collegiate and professional teams in training football players (Melvin, Retrieved November 11, 2007, from <http://www.mind-course.com/subliminal.html>).

James Vicary, a researcher, claimed in a press release that subliminal messages had motivated movie viewers to purchase popcorn and Coca-Cola (Packard, 1957). He used a tachistoscope to project the words "Drink Coca-Cola" and "Hungry? Eat popcorn" for 1/3000 of a second at five-second intervals during the presentation of the movie entitled *Picnic*. He asserted that during the test, sales of popcorn and Coke in a New Jersey theater increased 57.8 percent and 18.1 percent respectively.

Soon after the release of the Coca-Cola study, subliminal messages caught the attention of the business world. Federal funding started being provided for research in the area of subliminal perception (Russel, Rowe, & Smouse, 1991). Seeing a potential opportunity for profit, people began to incorporate subliminal messages into advertisements. For example, Becker (1979) claimed fifty department stores in the U.S. and Canada began broadcasting subliminal auditory messages in the store's background music to deter shoplifters. It was reported that the implementation of these messages reduced store theft by 37%, for a total savings of \$600,000.

The public and academia viewed the subliminal message as a channel that may have indirectly caused antisocial behaviors, such as suicidal acts and drug use (Taylor, Retrieve December 5, 2007, from <http://www.innertalk.com/downloads/subtech.html>). In May of 1978, police investigators in a Midwestern city attempted to arrest a murderer by interspersing subliminal messages among frames of TV news film describing the murder (New York Times, 1990). In the music industry, rock and roll has often been blamed as a trigger for adolescents' antisocial behavior. These cases were very sensational so that subliminal messages in music or TV commercials were becoming widely known and controversial simultaneously (Block & Bergh, 1985; Zanut, Pincus, & Lamp, 1983; Egermann, Kopiez, & Reuter, 2006). No empirical

studies have proven so far that rock music has backward subliminal messages or, if present, are harmful.

Subliminal Messages

In past studies, scholars have investigated two kinds of subliminal messages, visual subliminal messages and auditory subliminal messages (Moore, 1982). These two messages are similar, but the researchers have found that their effectiveness is different. For example, Theus (1994) stated that the existence of subliminal perception in visual modality is very likely. As a matter of fact, it is much easier to find empirical studies showing positive results of visual subliminal messages than those using auditory subliminal messages (Moore, 1982; Theus, 1994; Seamon, Marsh, & Brody, 1984; Mandler, Nakamura, & Zandt, 1987). According to Urban (1992a), the phenomenon of visual subliminal stimulation is real; however the disagreement continues over the effects and the existence of such sensory modalities, especially the auditory senses.

Visual Subliminal Messages

One study examined whether being exposed to visual subliminal stimuli affects people's recognition. It concluded that the longer subjects were exposed to the stimuli, 8 to 48ms, the better recognition they had (Seamon, Marsh & Brody, 1984). A study, conducted by Mandler, Nakamura, & Zandt (1987), reported that exposure of unmasked irregular geometric shapes for very brief durations, one or two milliseconds, have been shown to generate preferences as well as judgments of familiarity for the previously exposed shapes. Self-esteem is usually hard to be influenced by short term intervention. However, Dijksterhuis (2004) reported that visual subliminal stimuli enhanced implicit self-esteem by using positive trait terms which were paired with the word "I".

There are other interesting studies attempting to modify behavior. In a series of Silverman's studies, he used the phrase, "Mommy and I are one", with a tachistoscope at four milliseconds to help people lose weight and found significant improvement (as reported in Silverman, Martin, Ungaro, & Mendelsoh, 1987). Silverman and colleagues also stated that the visual stimuli, intended to manifest symbiotic gratification fantasies, may have enhanced the effectiveness of therapeutic interventions of various kinds, such as quitting smoking, increasing

self-esteem or losing weight. Parker (1982) also used the subliminal visual message, “Mommy and I are one”, and showed significant positive effect on grades of undergraduate college students. Yet, the studies did not pinpoint the reason why the message worked on weight control or other behavior changes.

Auditory Subliminal Messages

Different from visual subliminal messages, auditory subliminal messages cannot be detected and proof of their presence in auditory tapes requires special equipment. It is uncertain whether published auditory subliminal self-help tapes indeed contain subliminal messages or not because subliminal messages are not heard by human ears. Scholars started wondering whether manufacturers truly embedded subliminal messages in their tapes around the late 80s. For instance, Merikle (1988) conducted a spectrographic analysis of several subliminal audiotapes to verify the messages and found no evidence for the presence of any identifiable speech sounds. Moreover, Phelps (1992) stated that no subliminal messages were recorded in tapes, so that nobody could hear the messages. However, after Merikle’s study, some scholars such as Urban (1992b) and Harris (1996) reported that Merikle’s study did not use the right methods to detect the embedded messages. They concluded that Merikle’s study did not have enough evidence to prove the absence of speech sounds. Therefore, the existence of the subliminal messages in these studies is still controversial today.

The choice of subliminal words is important because the stimuli affect people’s brains, their perceptions, or behaviors. However, Reid’s study (1991) is the only one which cited the actual words used in the experiment. He used Taylor’s published tape to increase self-esteem. Taylor, an authority on auditory subliminals, published auditory subliminal tapes. In his article, he described the potential of audio subliminals as replacing the unconscious mind’s negative, self-limiting, and toxic contents with powerful, positive, life-enhancing and self-chosen messages which can then transform the listener’s life from the inside out in positive directions. The lack of reporting the used subliminal messages in past studies should be criticized (Taylor, Retrieved December 5, 2007, from <http://www.innertalk.com/downloads/subtech.html>).

Methods of Auditory Subliminal Presentation

People may have heard of some ways of presenting subliminal messages such as backward techniques. There are five methods reported by Urban (1992a) and other scholars.

The first method is the auditory threshold technique that is used mostly in empirical studies. With this technique, the dB of subliminal messages is set under the hearing threshold with background music (Stroh, Shaw, & Washburn, 1908; Emergemann, Kopiez, & Reuter, 2006). Moreover, according to Staum and Brotons (1992), the subliminal threshold is changed day to day, and defined as the point where people detect the stimulus 50% of the time. Therefore, the threshold does not have a fine borderline to differentiate between hearing and non-hearing areas which can fit everybody. Most empirical studies reflected the uncertainty of the hearing threshold and did not report the decibel level used in studies (Bushholz 1968/69).

A second method consists of masking the signal with music or white noise. This type of subliminal messages is recorded as mixed speech and noise onto magnetic tape. Although Zenhausern & Hansen (1974) and Elie (1989) used this technique in their studies, Urban (1992a) stated that using this method was not recommended because of having the risk that subliminal messages become audible. Some scholars investigated which specific dB of white noise is the most effective for listeners to do their visual tasks. A series of studies reported that white noise-subliminal accessory stimulation, which was 30 dB below threshold, resulted in significantly more illusory experiences than the mean of the other five noise levels (Zenhausern & Ciaiola, 1973). Zenhausern and Hansen (1974) reported that only the highest level of stimulation, 70 db above the threshold, lowered reaction time. These studies indicated that white –noise subliminal accessory stimulation had improved the effect on visual sensitivity.

A third method utilizes recent advances in computer technology and particularly digital signal processing (DSP) techniques. DSP is computer manipulation of analog signals, such as sound or image, which have been converted to digital form (Dictionary.com, 2007). This method has been applied from the ideas of Becker, Corrigan, Elder, Tallant, and Goldstein's study (1965). With this technique, the words could be repeated 9,000 times an hour at very low volume so that the words were barely audible (The New York Times, 1979). It is so-called subliminal mixers. (Urban, 1992a)

A fourth method is backward masked messages, which are known to the public via the mass media. With this technique, messages are literally played backward in three different styles,

such as time-structure messages, highpass-filtered messages, and time-shrunk messages (Emergemann, Kopiez, & Reuter, 2006). With time-structure, messages are played backward and mixed above the perceptual threshold, so people can hear the messages. With highpass-filter, messages are played backward with frequencies about 15 kHz, which usually people cannot hear. The audible frequency range is usually quoted as 20 Hz to 20,000 Hz (Wikipedia, 2007). Finally, time-shrunk subliminal messages are played backward at a speed twice as fast as originally recorded.

With easy access to newspapers and academic articles, controversy spread regarding the use of backward messages in rock music. Some people were worried that these messages were influencing people without them knowing it. There have been religious figures that have voiced their opinions and cautions about listening to rock music. For example, Don Hutchings, a Hot Springs minister, and Michael Mills, the president of research Ministries of Battle Creek, warned parents and their children about backmasking in rock music (Vokey & Read, 1985). Robinson (2001) reported that some people believed that at least some rock music had been backmasked to contain satanic and drug-related messages and added that the content of these subliminal messages influenced the listener. For instance, he criticized “snow-blind” by Styx, “Eldorado” by Electric Light Orchestra, “Hotel California” by Eagles, and “Stairway to Heaven” by Led Zeppelin (Anonymous, 2007).

Although there claims were made, many scholars have proven that no such antisocial messages exist in rock music (Vokey & Read, 1985). Some studies have shown that there is no comprehensibility, conscious or otherwise, of messages spoken backward (Marcel, 1983). Not only scholars, but also many rock musicians denied the existence of such messages in their own music (Staum & Brotons, 1992). Overall, no effects of rock music with backward subliminal messages have been found in empirical research to date. However, Vokey and Read (1985) claim that the public still believes such messages and lyrics have baleful influences attributed to them. In summary, these arguments for the existence of backward subliminal messages that have been voiced as of today are criticisms without any cause.

Subliminal Perception

Perception is the process of acquiring, interpreting, selecting and organizing sensory information (Wikipedia, 2007). Because perception differs from person to person and day to

day, there is no fine line that separates subliminal detection from conscious detection (Moore, 1982). Moore stated that “there exists no absolute cut-off point for stimulus intensity below which stimulation is imperceptible and above which it is always detected” (p.39). More recent research by Merikle and Daneman (2000, p. 497) has defined subliminal perception as “any situation in which unnoticed stimuli are perceived.” Although there is much research in this area, an accepted standard has not been proven.

Empirical Studies and Placebo Effect

Although the public has widely known of subliminal messages, not many experimenters have conducted empirical studies under strict laboratory settings. Staum and Brotons (1992) investigated a meta-analysis of auditory subliminals and concluded: “In this analysis of the published literature spanning 40 years, only eight substantive experimentally controlled studies concerning auditory subliminals and music were found.” In this paper, 7 out of 8, which Staum and Brotons found in 1992, and 15 studies, which were published after their analysis will be discussed.

Empirical Studies

Benes & Gutkin (1989) analyzed the relationship between free association and different types of music masking subliminal messages. This study used two kinds of music, mellow and frenetic. The objective was to verify which kind of music yielded more responses from subjects. The results showed that the usage of mellow music produced a greater number of total responses per subject than frenetic music. Thus, this indicated that different types of music resulted in different responses.

Doche-Budzynski (1989) conducted a study to enhance the self-esteem in adult type A males by using subliminal self-help tapes. In this study, the experimenter used the words, “Mommy and I are one”, which was used by the Silverman, Martin, Ungaro, and Mendelsohn’s study (1987) for visual subliminal messages. Twenty subjects listened to 20 minute audio cassette tapes with subliminal messages each night for four weeks before sleep. The Tennessee Self-Concept Scale, the Coopersmith Self-Esteem Inventory, and Jenkins Activity Survey were administered pretest, posttest and at a three month follow-up. The study demonstrated significant enhancement in self-esteem of subjects. Borgeat, Boissonneault and Chaloult (1989) also

reported that subliminal activation auditory suggestions increased heart rate but not skin conductance, in the presence of a stressful task. They also stated that 25-dB suggestions masked by 40-dB white noise intensity combination triggered some physiological effects without the subject's awareness of the content of the suggestions. Similarly, Kotze and Moller (1990) further reported a significant increase in GSR, Galvanic Skin Response, after listening to auditory subliminal stimulation. In their study, 38 subjects listened to the tapes consisting of either emotional or neutral words, masked by a 45-dB white noise. The results showed a significant difference between the two groups. The authors concluded that the existence of subliminal perception was demonstrated by their results. Therefore, the above studies (Doche-Budzynski, 1989; Borgeat, Boissonneault, & Chaloult, 1989; and Kotze and Moller, 1990) have indicated that auditory subliminal messages may have influenced physical responses.

On the other hand, there are many more studies which have concluded no effect of the subliminal messages. In addition, some researchers concluded that subliminal messages are generally not effective in changing attitude, behaviors, motivations, or complex behaviors (Zanot, 1983; Moore, 1988). For example, Lenz's study (1989) focused on the effect of subliminal auditory tapes on both motor and verbal learning. He had 270 Los Angeles police recruits listen for 24 weeks to music with and without subliminal implants designed to improve either knowledge of the law or marksmanship. The tapes did not improve either. Clifton (1995) did a unique research on effects of masked verbal suggestions of itching on scratching behavior. The average voice level was 40 ± 5 dB masked by new-age style music. At this level, suggestions of itching remained clearly audible when music tracks were completely removed. There was no evidence of influence from subliminal suggestion. In this research, both behavioral and self-report measures of itching were used.

Schnell (1986) investigated the effectiveness of subliminal tapes for improving public speaking. In the study, 26 participants were divided into subliminal tape and placebo tape groups. Participants in the placebo group evaluated their own confidence, improvement, and enjoyment as higher than that of the subliminal group. The final grade of the subliminal group was higher than that of the placebo group. However, there were no significant differences between the two groups.

Russel, Rowe, & Smouse (1991) evaluated the effect of subliminal self-help tapes on academic achievement. In this research, three groups were used: a treatment group, an inactive

treatment group, and a control group. Participants in the treatment group listened to tapes with subliminal affirmations masked by ocean waves. The inactive treatment group listened to placebo tapes with ocean waves but no subliminal messages. Final examination scores were compared among the three groups. No significant differences were found.

Swart and Morgan (1992) analyzed the effects of subliminal backward messages on attitudes of preference toward the targeted object. In the experiment, three subliminal backward-recorded messages from a popular song were used. Eighty-two undergraduates were randomly assigned to one of four conditions: a three-message group heard a tape containing the backward messages recorded three times in succession, a six-message group heard a tape with the same backward messages recorded six times in succession, two control groups heard recorded music with no backward messages. No statistically significant differences were found among the groups on a post-tape attitude questionnaire.

Moller, Kotze, and Sieberhagen (1993) investigated the effects on self-concept of Rational-Emotive Therapy and auditory subliminal stimulation, separately and in combination, on 141 undergraduate students with self-concept problems. They were randomly assigned to one of four groups receiving either Rational-Emotive Therapy, subliminal stimulation, both, or a placebo treatment. Rational-Emotive Therapy significantly improved scores on the dependent measures: cognition, self-concept, self-esteem, and anxiety, but not behavior. Results for the subliminal stimulation group were similar to those of the placebo treatment except for a significant self-concept improvement and a decline in self-concept related irrational cognitions. Between these two groups there were no differences in self-concept. The above studies showed no effect of using subliminal messages.

After Staum and Broton's meta analysis in 1992, a new and interesting experiment was conducted on the effect of auditory subliminal messages on memories. Chakalis & Lowe (1992) reported that the subliminal auditory stimulation improved subjects' performance on the recollection of names. The experimental conditions were the following: (a) a relaxing sound cassette named "Garden of Dreams" and (b) music with subliminal message cassette entitled "Memory Improvement." Both sound cassettes were presented at a comfortable listening level of 45 dB. None of the subjects received overt information relative to what they were about to hear. Subjects had a passive attitude towards the stimulus, being unaware of the usage of subliminal messages in the music. The subliminal messages used were not stated.

Although scholars and experimenters have tried to find evidence to prove the effect of subliminal messages, there is no standard opinion on whether the messages are effective. Some researchers think that subliminal effects are just an illusion, and that any effects actually may be due to a placebo. Some scholars, such as Merikle, started mentioning the placebo effect in 1988. Since then, many articles began to shift attention from results of subliminal messages toward those of placebo effect.

Studies of Placebo Effect

According to Wikipedia (2007), “placebo is a preparation which is pharmacologically inert but which may have a therapeutic effect based solely on the power of suggestion.” This effect likely happens with the usage of subliminal messages. Taylor (Retrieved December 5, 2007, from <http://www.innertalk.com/downloads/subtech.html>) stated that one in five subjects will report positive results to a blank tape. Merikle & Skanes (1992) also reported that for some users, a strong belief in the efficacy of subliminal audiotapes may be sufficient to produce positive effects. Thus, even though audiotapes may not contain any subliminal messages which can conceivably influence behavior, the tapes may be beneficial to some extent to a small proportion of the users.

Greenwald, Spangenberg, Pratkanis, and J. Eskenazi (1991) reported that more than a third of the subjects had an illusion of improvement specific to the domain named on a tape’s label. In this research, they tested subliminal audiotape products claimed to improve memory and to increase self-esteem. They used mislabeled tapes, which actually contained embedded messages to improve memory, but labeled as increasing self-esteem. Also using the reverse, they provided tapes with embedded messages to increase self-esteem, but labeled as improving memory. Effects were examined after listening to the tapes for several weeks. The results found improvements in performance following regular listening to either subliminal or placebo tapes. They also found improvement in both targeted domains. Memory improved even when subjects listened to placebo tapes mislabeled as self-esteem and self-esteem improved even when the subjects listened to placebo tapes mislabeled as memory. In addition, the subjects themselves also reported that they improved in the area labeled on their tape. The authors of this study therefore concluded that “such an illusory placebo effect may have the potential to become an actual effect by mechanisms of expectancy or self-fulfilling prophecy” and that the effect may be

worthy of further study. However, the dB and the exact subliminal words used were not presented in the article.

Another study examined the role of suggestion in changing the perception of satanic messages in rock and roll music. Results indicated that the groups who received the suggestion that satanic messages were in the tape reported that they heard more messages with satanic content than did the other groups who did not receive any suggestion (Throne & Himmelstein, 1984).

Benoit & Thomas (1992) reported that subjects who contained a predisposition toward believing in subliminal messages had significantly greater mood changes than the non-believing subjects did, while listening to tapes that consisted only of music. Also, believers reported hearing a nonexistent subliminal message significantly more than the nonbelievers did. They added that, "...if subliminal stimuli are more likely to produce positive effects when subjects expect their presence, then the effects of subliminal stimuli could depend as much on the subject as on the stimulus" (p. 336). In this experiment, the participants consisted of 137 volunteers from psychology classes at Texas Christian University. The Psychological Beliefs Assessment Scale, a 10-point Likert-type scale, was used. There were no descriptions of either words or the exact dB level used in the article.

Although experimental research has confirmed the capacity of the human cognitive system to process information that does not reach consciousness (unconscious perception), empirical evidence of subliminal verbal messages included on audiotapes improving human resources and correcting some behavioral problems is still meager and inconsistent (Froufe & Swartz, 2001, p. 19). Froufe and Swartz (2001) did an experiment to assess the influence of subliminal tapes designed to increase self-esteem. Participants were randomly assigned for four experimental conditions. One group listened to a tape of music with supraliminal, above the hearing threshold level, and subliminal messages; the second group listened to a tape of music with only subliminal messages; the third group's tape had only music, although the participants of the third group believed it also included subliminal messages; a last (control) group heard no tapes, but still completed the same scales of self-esteem. The test used in this experiment was the Tennessee Self-Concept Scale which was given to each group before listening to the tape and again after several days. They reported that all groups showed a similar pretest-posttest improvement in self-esteem, except for the control group, which did not improve. This implies

that only a placebo took place. The subliminal auditory tape used in this study was produced by New Age Consulting, designed to increase self-esteem. However, dB level or what kinds of words were used in the tape was not explained in the article.

On the contrary, some studies reported no placebo effects. For example, Russel, Rowe and Smouse's study (1991) concluded that there was no placebo effect on tests scores by subjects who listened to subliminal self-help tapes. For another example, Merikle & Skanes (1992) also concluded that there was no placebo effect on weight loss. In this study, three different groups of subjects were tested: One group listened to subliminal audiotapes purchased directly from a manufacturer, the second group listened to comparable placebo tapes, and the third group did not listen to any tapes at all. Each subject in each group weighed in once each week for five weeks. They concluded that when a subject believed in the power of the subliminal messages the placebo effect did not occur. The average amount of weight loss by each group was approximately equivalent.

In one article by Melvin (1996), the researcher, discussed how important it is to know the changes caused by placebo effect as;

As the placebo effect in medicine has demonstrated, the mind can bring about cellular changes, and subliminal input can contribute to this process of self-healing with subconscious embeds. As doctors learned in medical school, over 50% of all patients brought into hospitals are suffering from hypochondriacal ailments. By understanding and enhancing the placebo effect or mind over body connection, better insight as to the mind's ability to heal the body can be learned.

In summary, a subliminal placebo effect may occur when people have the suggestion that a subliminal message exists or a predisposition toward belief in the effects of subliminal messages.

Purpose Statement

The purpose of this research is to investigate the effects on memory improvement between subliminal messages and the power of suggestions. The current study is designed to test whether subliminal message have an effect on a face recognition memory test and whether a placebo effect occurs when people believe in the effect of subliminal messages.

Hypotheses

This study tests the following null hypotheses:

- 1: The scores of participants' face recognition memory tests will not be affected by either subliminal message or suggestion.
- 2: The score of participants' face recognition memory tests will be correlated with their belief in the effect of subliminal messages.

CHAPTER III METHOD AND PROCEDURE

Subjects and Setting

Subjects (N=76) for this study ranged in age from 18 to 46 and were students at Florida State University. The subjects were recruited in classes or on campus by the researcher prior to the experiment. Approximately half of the subjects were American students and international students in the music school, and the rest were American students in other departments such as math, chemistry and business. Among them, 33 were male and 43 were female. The degrees they sought varied from bachelor to doctorate. All subjects were conveniently divided into 3 groups: experimental group (N=26), placebo group (N=26) and control group (N=24). See Table 1 for demographics and Table 2 for mean demographics by group.

The experiments were conducted in the music therapy research room, in a practice room in the music building, or in the graduate students' study room in the library. A projector, Sharp Notevision PG-MB60x, and a personal computer, HP Pavilion dv6000, were used to show the face recognition memory test through Microsoft Office Power Point 2007.

Table 1

Demography of the Participants

Subjects	Group	Gender	Age
		Male/Female	
1	A	M	N/A
2	A	M	20
3	A	M	28
4	A	M	46
5	A	M	22
6	A	F	23
7	A	M	19
8	A	M	45
9	A	F	36

Table 1 Continued

Subjects	Group	Gender	Age
		Male/Female	
10	A	F	26
11	A	M	20
12	A	F	21
13	A	F	22
14	A	F	19
15	A	F	22
16	A	F	20
17	A	M	24
18	A	F	19
19	A	M	19
20	A	M	N/A
21	A	M	20
22	A	F	32
23	A	M	21
24	A	M	22
25	A	F	21
26	A	F	21
27	B	M	27
28	B	F	19
29	B	F	22
30	B	F	19
31	B	F	21
32	B	M	20
33	B	F	21
34	B	M	19
35	B	F	21

Table 1 Continued

Subjects	Group	Gender	Age
		Male/Female	
36	B	F	18
37	B	F	21
38	B	M	21
39	B	M	21
40	B	F	18
41	B	F	N/A
42	B	F	21
43	B	F	19
44	B	M	29
45	B	F	19
46	B	M	22
47	B	M	23
48	B	M	19
49	B	M	26
50	B	M	23
51	B	F	22
52	B	F	25
53	C	F	19
54	C	F	19
55	C	M	18
56	C	M	18
57	C	F	21
58	C	F	21
59	C	F	18
60	C	F	22
61	C	F	21

Table 1 Continued

Subjects	Group	Gender	Age
		Male/Female	
62	C	F	21
63	C	F	19
64	C	F	18
65	C	M	25
66	C	F	19
67	C	M	23
68	C	M	18
69	C	F	24
70	C	F	19
71	C	F	20
72	C	F	23
73	C	F	20
74	C	M	24
75	C	M	21
76	C	M	20

Table 2

Number and average age of each group by Gender

	Group A		Group B		Group C	
	N	Average age	N	Average Age	N	Average Age
Male	14	25.5	11	22.7	8	20.8
Female	12	23.5	15	20.4	16	20.25

Research Design

The experimental procedure was conducted once for each group. There were two independent variables for this study. One was a subliminal message with correct answers to the face recognition test, and another was the suggestion that listening to the subliminal message would increase memory ability. The dependent variable was the score on the face recognition memory test.

There were two experimental groups and a control group. The experimental groups consisted of Group A receiving a matched suggestion and subliminal message, and Group B receiving a mismatched suggestion and subliminal message. Group C, the control group, received neither a subliminal message nor suggestion. All groups listened to the same music.

Measurement/ Materials

All data for subjects were collected by a face-recognition test adapted from Science and Nature (See Appendix C). The memory recognition test consisted of three sets of slides presented via power point. The first and second sets showed participants 10 unfamiliar pictures to memorize, and the last set showed 18 pictures which mixed six pictures from the first and six pictures from the second set with six pictures never seen.

The music used in the study was “Orchestral Suite No. 3 in D major, BWV 1068 Air” by Johann Sebastian Bach whose length was 5 minutes 18 seconds. Subliminal messages were recorded with a Hewlett-Packard microphone by a female voice. Experts listened to the tapes and reported that the messages were at an inaudible dB level. The sound equipment showed frequency waves for the recorded message. The subliminal messages used in the study were actual answers to the questions testing recognition for the faces shown (See Appendix D for script).

A Test 1 questionnaire was used in this study. It included both yes/no questions and open-ended questions (see Appendix E). The questionnaire asked about the participants’ previous knowledge of the subliminal messages.

Suggestion was given to the participants in Group A and Group B by the researcher before the test was conducted. The purpose of the suggestion was to make participants believe

that they were going to listen to subliminal messages to increase memory. The content of the suggestion was the following:

“Now you are going to listen to the music. This music contains subliminal messages. Some researchers reported that subliminal messages affect people’s memory ability.”

Procedures

Data for each of the three groups were collected in a classroom separately. The informed consent form, questionnaire and two answer sheets were given to the participants when they entered the room. After the participants completed the informed consent form and questionnaire, the face-recognition test for Test 1 was conducted. Each picture in Group A was presented from one to three seconds at random. Then a 20 second break was provided. After the break, each picture in Group B was presented. Again each picture was presented from one to three seconds at random. Then a second 20 second break was provided. Finally, the last set of the pictures was presented. In the final set, participants watched 18 pictures mixed from Group1 and 2 with others which they had never seen. The participants saw each of the 18 pictures successively for five seconds and made a circle on the answer sheet identifying it as seen in either Group1, Group2, or never seen (See Appendix F).

After Test 1, the suggestion was given to the participants in Group 1 and 2. Then Test 2 was conducted. The pictures used in Test 2 were totally different from the ones used in Test 1, so there were no common pictures used in both Test 1 and Test 2. Each picture in Group A was presented from one to three seconds at random. Then a 20 second break was provided. After the break, each picture in Group B was presented. Again, each picture was presented from one to three seconds at random. Then a second 20 second break was provided. Then participants in Group 1 and 2 started listening to the music with subliminal messages, and participants in Group 3 started listening to the music without subliminal messages. Finally, the last set of the pictures was presented. In the final set, participants watched 18 pictures mixed from Group1 and 2 with others which they had never seen. The participants saw each of the 18 pictures successively for five seconds and made a circle on the answer sheet identifying it as a seen in either Group1, Group2 or never seen (See Appendix G). The music continued until the end of the last set of the slides. After completing Test 2, the participants were allowed to ask questions and leave.

CHAPTER IV

RESULTS

Tests 1 and 2 for face recognition memory were used in this research. The scores could range from 0 to 18 points for each test. A One-way ANOVA was applied to determine whether there was any significant difference between the Test 1 and Test 2 scores among the groups.

Tables 3 and 4 show means, standard deviations, and statistical results by groups for Test 1 and reveal no significant differences among groups.

Table 3

Means for Test 1

Group	N	Mean	Standard Deviation
A	26	14.69	2.49
B	26	15.54	1.36
C	24	14.88	1.75

Table 4

ANOVA for Test 1

Source	<i>df</i>	Sum of Squares	Mean Square	<i>F</i> Ratio	P value
Group	2	10.256	5.13	1.37	0.26
Error	73	272.625	3.73		
C. Total	75	282.881			

Tables 5 and 6 show mean score, standard deviation, and results of statistical tests by groups for Test 2.

Table 5

Means for One-way ANOVA of Test 2 by Groups

Group	N	Mean	Standard Deviation
A	26	14.50	2.687
B	26	15.88	1.583
C	24	15.25	3.30

Table 6

Analysis of Variance of Test 2 by Groups

Source	<i>df</i>	Sum of Squares	Mean Square	<i>F</i> Ratio	P value
Group	2	24.98	12.49	1.8468	0.1650
Error	73	493.65	6.76		
C. Total	75	518.63			

There was no significant difference among the three groups on Test 2 ($p > .05$). These results show that there was no effect of the subliminal message or the suggestion.

Since there was no significant difference among groups, scores were combined for each test. The groups' combined scores for both Test 1 and 2 were analyzed by the participants' gender by *t*-test. Tables 7 and 8 show these results.

Table 7

Means of Test 1 and Test 2 by Gender

Gender	N	Mean		Standard Deviation	
		Test1	Test 2	Test 1	Test 2
Male	33	15.12	14.91	2.2879	3.2534
Female	43	14.98	15.44	1.6545	2.0389

Table 8

t-Test of Results by Gender

	<i>t</i> -test	<i>df</i>	P value
Test 1	-0.319	74	0.7502
Test 2	0.874	74	0.3849

There were no significant differences between the scores of males and females on either Test 1 or Test 2. Additionally, there was no correlation between the test score and the participants' belief in the effect of subliminal messages ($r^2=0.006$). None was there a correlation between the test score and the participants' age ($r^2= -.021$). Tables 9 and 10 show these correlations.

Table 9

Correlation between the Test Score and the Participants' Belief

Variable	Mean	Std Dev	Correlation	Signif. Prob	N
Belief	4.77	1.25	0.0067	0.957	66
Post test	15.35	2.27			

Table 10

Correlation between the Test Score and the Participants' Age

Variable	Mean	Std Dev	Correlation	Signif. Prob	N
Age	22.08	5.12	-0.021	0.8580	72
Post test	15.40	2.23			

CHAPTER V

DISCUSSION

The main purpose of this study was to investigate the effects of subliminal messages and suggestions on memory. A face recognition memory test, adapted from Science and Nature (Retrieved December 5, 2007, from <http://www.bbc.co.uk/science/humanbody/sleep/tmt/>), and a questionnaire was used for data collection. The questionnaire asked how much subjects knew about subliminal messages and how much they believed in the effect of the subliminal messages.

Statistical analyses showed that there was no significant difference among three groups on the pre test ($F= 1.37$; $df=2, 73$; $p= 0.26$), and also showed that there was no significant difference among three groups on the post test ($F=1.85$; $df=2, 73$; $p= 0.165$). Means and t-tests of pre and post test by gender indicated that there were no significant differences between the score of the males vs. females. The correlation analysis also revealed that there was no relationship between the test score and participants' beliefs about subliminal messages or with their age. The results indicate that people's memory ability is not affected by these variables no matter how much they believe in subliminal messages

It should be noted that the instruments used to record the subliminal messages, the microphone and personal computer, were not professional equipment. Secondly, the volume of the voice might have been too low to affect people's memory. The words used in the study were actually answers to the questions while other studies have offered non-direct messages, such as "your ability of memory is increasing". Therefore, the quality and type of subliminal messages might have affected the experiment.

Feedback from participants was also important to be analyzed. Some participants who were music majors said that it was hard to concentrate on the task while they were listening to the music. Music might have been a distraction and influenced their results. Participants also mentioned their impression of the difficulty of the task. Some participants said that Test 1 was easier. They thought that distinguishing Caucasian people's faces who they were used to seeing in everyday life was easier and that Test 2 was harder because there were more pictures of ethnic people. However, some people cited the opposite. They described Test 1 as harder to distinguish people's faces because they looked similar, and Test 2 was easier because people were unique. Therefore, the inconsistent feedback supported the results of analyses. None of the participants

reported that they actually heard the messages while they were listening to the subliminal message with background music.

Another reason why no effects occurred might have been the intensity of the task. Maybe the subjects focused on their tasks so well, that there was no time or room for the messages to pass the information to their brains.

As many scholars have demonstrated in past studies, the effects of subliminal messages have been vague, and at many times these studies have shown no empirical evidence that subliminal messages actually work. In this study, the results again showed no evidence of the effectiveness of the subliminal messages. The public should realize that products which contain subliminal messages are not likely to be effective and people should not be manipulated by the advertising claims. Moreover, those who claim that subliminal messages embedded in rock music are the trigger for adolescents' antisocial behaviors are probably mistaken.

APPENDIX A

Human Subject Committee Approval



Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 11/1/2007

To:
Kayoko Takahashi
182 Moore Dr. #9
Tallahassee, FL 32310

Dept.: **MUSIC THERAPY**

From: **Thomas L. Jacobson, Chair**

Re: **Use of Human Subjects in Research**
The Effect of Subliminal Messages and Suggestions on Memory: Isolating the Placebo Effect

The forms that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110 (B) cat. 7 and has been approved by an accelerated review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If the project has not been completed by **10/30/2008** you must request renewed approval for continuation of the project.

You are advised that any change in protocol in this project must be approved by resubmission of the project to the Committee for approval. Also, the principal investigator must promptly report, in writing, any unexpected problems causing risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols of such investigations as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Protection from Research Risks. The Assurance Number is IRB00000446.

Cc: Jayne Standley
HSC# 2007.797

APPENDIX B

Informed Consent Form

INFORMED CONSENT

I, _____, freely consent to participate in this research experiment entitled "The effect of subliminal messages and suggestions on memory: Isolating placebo effect." I understand that this study is conducted by Kayoko Takahashi, who is a graduate student of the Music Therapy Department of Florida State University. I understand that this research is being conducted to fulfill the requirements for a master's degree in music.

I understand that the purpose of this study is to examine the effect of subliminal messages in music, face recognition/memory abilities and placebo effect with college students. I agree to watch a short video with music and fill out the provided answer sheets for the memory test that takes approximately 15 minutes for this research study.

I understand that my participation is voluntary. I understand that there will be no risks or discomforts for me while participating in this study. I understand that I can withdraw from this research study at anytime without any prejudice, penalty or loss of benefits to which I am otherwise entitled. I also understand that this research study is anonymous and will never be used outside of this study and confidentiality will be maintained.

I understand that I may contact Dr. Jayne Standley, Florida State University, School of Music, Tallahassee, Florida 32306-1180, (850) 644-4565, the researcher, Kayoko Takahashi, 182 Moore Drive #9, Tallahassee, Florida 32310, (585) 943-8105, or the Human Subject Committee, (850) 644-8633 for answer to questions about this research or my rights. The result will be sent to me upon my request.

I have read and understood this consent form. I have been given the right to ask and have answered any inquiry concerning the study. All questions have been answered to my satisfaction.

Participant's signature

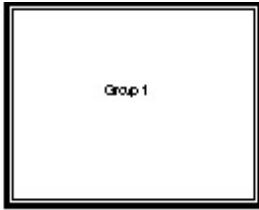
Date



APPENDIX C

Face Recognition Memory Test

Test 1-1



:05 1



:03 2



:03 3



:03 4



:02 5



:03 6



:02 7



:03 8



:03 9



:03 10



:03 11



01:00 12



:05 13



:03 14



:03 15



:02 16



:03 17



:03 18



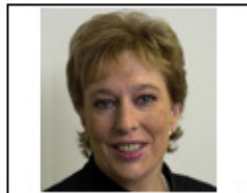
:03 19



:03 20



:03 21



:02 22



:03 23

Test 1-2



:05 1



:05 2



:05 3



:05 4



:05 5



:05 6



:05 7



:05 8



:05 9



:05 10



:05 11



:05 12



:05 13



:05 14



:05 15



:05 16



:05 17



:05 18



:05 19

Test 2-1



:05

1



:03

2



:03

3



:03

4



:02

5



:03

6



:03

7



:03

8



:03

9



:02

10



:03

11



01 :00

12



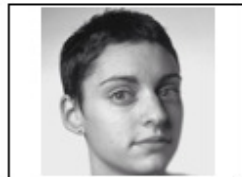
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13



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14



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15



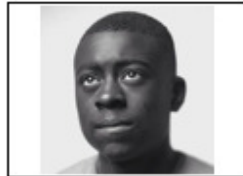
:02

16



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17



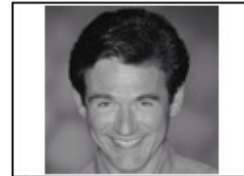
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19



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20



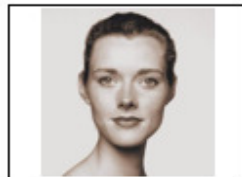
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21



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22



:03

23

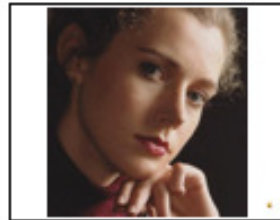
Test 2-2



☰ 02:00 1



☰ :05 2



☰ :05 3



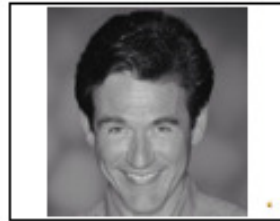
☰ :05 4



☰ :05 5



☰ :05 6



☰ :05 7



☰ :05 8



☰ :05 9



☰ :05 10



☰ :05 11



☰ :05 12



☰ :05 13



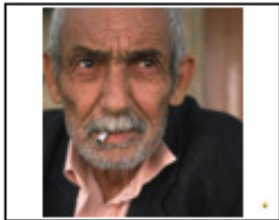
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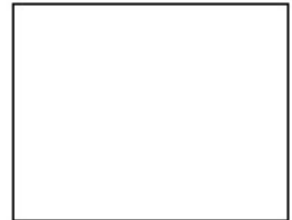
☰ :05 17



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☰ :05 19



☰ 03:00 20

APPENDIX D

Script for Face Recognition Memory Test

Groups	Experimental Group	Placebo Group	Control Group
Script	Group A, Group B, or Never seen	Stop smoking	Nothing

APPENDIX E

Questionnaire

Questionnaire

Gender: Male Female

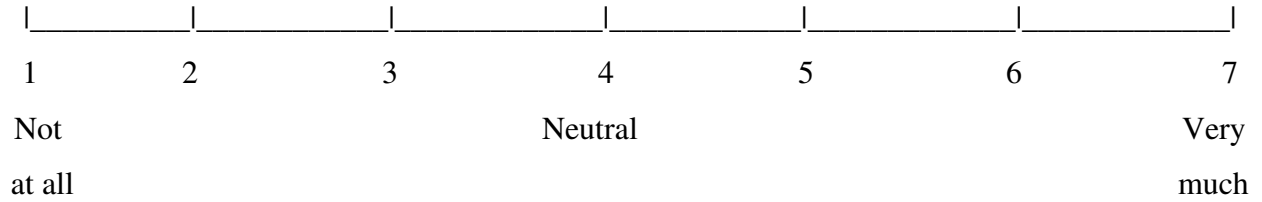
Age: ()

***Please circle one of the numbers or answer each question.**

(1) Have you ever heard of subliminal messages? Yes/ No

(2) If yes, how did you know about it?

(3) Do you believe in the effect of subliminal messages?



APPENDIX F

Answer Sheet for Test 1

Answer sheet for Test 1

*Please circle one of the choices

1. Group 1	Group 2	Never seen
2. Group 1	Group 2	Never seen
3. Group 1	Group 2	Never seen
4. Group 1	Group 2	Never seen
5. Group 1	Group 2	Never seen
6. Group 1	Group 2	Never seen
7. Group 1	Group 2	Never seen
8. Group 1	Group 2	Never seen
9. Group 1	Group 2	Never seen
10. Group 1	Group 2	Never seen
11. Group 1	Group 2	Never seen
12. Group 1	Group 2	Never seen
13. Group 1	Group 2	Never seen
14. Group 1	Group 2	Never seen
15. Group 1	Group 2	Never seen
16. Group 1	Group 2	Never seen
17. Group 1	Group 2	Never seen
18. Group 1	Group 2	Never seen

APPENDIX G

Answer Sheet for Test 2

Answer sheet for Test 2

*Please circle one of the choices

1. Group 1	Group 2	Never seen
2. Group 1	Group 2	Never seen
3. Group 1	Group 2	Never seen
4. Group 1	Group 2	Never seen
5. Group 1	Group 2	Never seen
6. Group 1	Group 2	Never seen
7. Group 1	Group 2	Never seen
8. Group 1	Group 2	Never seen
9. Group 1	Group 2	Never seen
10. Group 1	Group 2	Never seen
11. Group 1	Group 2	Never seen
12. Group 1	Group 2	Never seen
13. Group 1	Group 2	Never seen
14. Group 1	Group 2	Never seen
15. Group 1	Group 2	Never seen
16. Group 1	Group 2	Never seen
17. Group 1	Group 2	Never seen
18. Group 1	Group 2	Never seen

APPENDIX H

Raw Scores

Subjects	Group	Pre test	Post test	Gender Male/Female	Age	Belief 1-7
1	A	9	12	M	N/A	N/A
2	A	17	14	M	20	6
3	A	15	17	M	28	4
4	A	16	15	M	46	1
5	A	16	13	M	22	7
6	A	16	15	F	23	5
7	A	17	16	M	19	5
8	A	16	17	M	45	7
9	A	15	16	F	36	5
10	A	17	16	F	26	4
11	A	15	15	M	20	4
12	A	15	14	F	21	2
13	A	16	15	F	22	5
14	A	16	17	F	19	5
15	A	15	15	F	22	4
16	A	16	17	F	20	5
17	A	17	17	M	24	4
18	A	15	16	F	19	4
19	A	14	16	M	19	5
20	A	14	15	M	N/A	N/A
21	A	18	18	M	20	6
22	A	14	11	F	32	4
23	A	9	9	M	21	4
24	A	10	8	M	22	7
25	A	14	14	F	21	6
26	A	10	9	F	21	5
27	B	17	15	M	27	N/A

28	B	15	17	F	19	4
29	B	16	17	F	22	4
30	B	15	16	F	19	7
31	B	17	16	F	21	5
32	B	17	17	M	20	6
33	B	14	15	F	21	5
34	B	16	16	M	19	4
35	B	16	14	F	21	5
36	B	15	17	F	18	4
37	B	17	16	F	21	2
38	B	16	16	M	21	N/A
39	B	17	18	M	21	3
40	B	17	17	F	18	5
41	B	14	17	F	N/A	N/A
42	B	14	13	F	21	3
43	B	15	17	F	19	6
44	B	14	18	M	29	N/A
45	B	18	15	F	19	4
46	B	17	16	M	22	4
47	B	15	13	M	23	6
48	B	15	16	M	19	5
49	B	15	13	M	26	5
50	B	13	13	M	23	5
51	B	13	17	F	22	7
52	B	16	18	F	25	4
53	C	14	17	F	19	4
54	C	15	14	F	19	4
55	C	14	13	M	18	4
56	C	16	17	M	18	4
57	C	14	13	F	21	4

58	C	14	12	F	21	6
59	C	17	18	F	18	7
60	C	14	16	F	22	5
61	C	16	17	F	21	N/A
62	C	15	17	F	21	4
63	C	10	12	F	19	4
64	C	16	14	F	18	6
65	C	16	3	M	25	4
66	C	15	18	F	19	7
67	C	16	18	M	23	4
68	C	17	17	M	18	6
69	C	13	15	F	24	4
70	C	13	13	F	19	N/A
71	C	14	18	F	20	6
72	C	16	17	F	23	4
73	C	17	16	F	20	5
74	C	16	16	M	24	5
75	C	17	18	M	21	5
76	C	12	17	M	20	N/A

Reference

- Arul Nathan Catholic prayers. (n.d.). *Rock and ruin: "The effects of rock music"*. Retrieved November 11, 2007, from <http://www.arulnathan.com/images/rock.pdf>.
- Becker, (1979). Secret Voice. *Time Archive*, 114 (11). Retrieved November 29, 2007, from <http://www.time.com/time/magazine/article/0,9171,920625,00.html>.
- Becker, H. C., Corrigan, R. E., Elder, S. T., Tallant, J. D., & Goldstein, M. (1965). Subliminal communication: biologic engineering considerations. *In Digest of the 6th International Conference on Medical Electronics and Biological Engineering*, pp. 452-53. Tokyo.
- Benes, K.M., & Gutkin, T. B. (1989). The effects of mellow and frenetic music on reported cognitions resulting from auditory subliminal messages. *The Journal of General Psychology*, 117(1), 83-89.
- Benoit, S.C., & Thomas, R. L. (1992). The influence of expectancy in subliminal perception experiments. *The Journal of General Psychology*, 119, 335.
- Block, M. P., & Bergh, B. O. V. (1985). Can you sell subliminal messages to consumers? *Journal of Advertising*, 14, 59-62.
- Borgeat, F., Boissonneault, J., & Chaloult, L. (1989). Psychophysiological responses to subliminal auditory suggestions for activation. *Perceptual and Motor Skills*, 69, 947-953.
- Chakalis, E., & Lowe, G. (1992). Positive effects of subliminal stimulation on memory. *Perceptual and Motor Skills*, 74, 956-958.
- Cheesman, J., & Merikle, P. M. (1986). Distinguishing conscious from unconscious perceptual processes. *Canadian Journal of Psychology*, 40, 343-367.
- Clifton, W. M. (1995). Effects of subliminally presented auditory suggestions of itching on scratching behavior. *Perceptual and Motor Skills*, 80, 87-96.
- Damron, C. F. (1951). A possible role for two and three-dimensional slide images when used with tachistoscopic training techniques in instructing high school football players in recognition of certain fundamental football defenses. Published master's thesis, Indian University, Indiana.
- Dijksterhuis, A. (2004). I like myself but I don't know why: Enhancing implicit self-esteem by subliminal evaluative conditions. *Journal of Personality and Social Psychology*, 86, 345-355.

- Dillingham, S. (1987). Inaudible messages masking a noise. *Insight*, 14, 44-45.
- Dixon, N. F. (1971). *Subliminal perception; the nature of a controversy*. England: McGraw-Hill Publishing Company Limited.
- Doche-Budzynski, L. (1989). Subliminal self-esteem enhancement in adult type A males. *Education*, 110 (1), 50-55.
- Egermann, H., Kopiez, R., Reuter, C. (2006). Is there an effect of subliminal messages in music on choice behavior? *Journal of Article in Support of the Null Hypothesis*, 4(2), 29-45.
- Elie, R. (1989). Psychophysiological responses to subliminal auditory suggestions for activation. *Perceptual and Motor Skills*, 69, 947-953.
- Froufe, M., & Schwartz, C. (2001). Subliminal messages for increasing self-esteem: Placebo effect. *The Spanish Journal of Psychology*, 4 (1), 19-25.
- Greenwald, A. G., Spangenberg, E.R., Pratkanis, A.R., & Eskenazi, J. (1991). Double-blind tests of subliminal self-help audiotapes. *Psychological Science*, 2 (2), 119-122.
- Harris, J. L., Salus, D., Rerecich, R., & Larsen, D. (1996). Distinguishing detection from identification in subliminal auditory perception: A review and critique of Merikle's study. *The Journal of General Psychology*, 123, 41-50.
- Human Intelligence. (2007). Retrieved from December 3, 2007 from <http://www.indiana.edu/~intell/hhollingworth.shtml>.
- Kotze, H. F., & Moller, A. T. (1990). Effect of auditory subliminal stimulation on GSR. *Psychological Reports*, 67, 931-934.
- Lenz, S. (1989). The effects of subliminal auditory stimuli on academic learning and motor skills performance among police recruits. Unpublished doctoral dissertation, California School of Professional Psychology.
- Mandler, G., Nakamura, Y., Zandt, B. J. S. V. (1987). Nonspecific effects of exposure on stimuli that cannot be recognized. *Journal of Experimental Psychology*, 13(4), 646-648.
- Marcel, A. J. (1983). Conscious and unconscious perception: Experiments on visual masking and word recognition. *Cognitive Psychology*, 15, 197-237.
- Melvin, D. S. (n.d.). Are we already learning in a subliminal way? Retrieved November 11, 2007, from <http://www.mind-course.com/subliminal.html>.
- Merikle, P. M. (1998). Subliminal auditory messages: An evaluation. *Psychology & Marketing*, 5(4), 355.

- Merikle, P. M., & Daneman, M. (2000). *Conscious vs. unconscious perception*. In M. S. Gazzaniga (Ed.), *The New Cognitive Neurosciences, 2nd Edition* (pp.1295-1303). Cambridge, MA: MIT Press.
- Merikle, P. M., & Skane, H.E. (1992). Subliminal self-help audiotapes: A search for placebo effects. *Journal of Applied Psychology, 77*(5), 772-776.
- Moller, A. T., Kotze, H. F., & Sieberhagen, K. J. (1993). Comparison of the effects of auditory subliminal stimulation and rational-emotive therapy, separately and combined, on self-concept. *Psychological Report, 72*(1), 131-145.
- Moore, T. E. (1982). Subliminal advertising: What you see is what you get. *Journal of Marketing, 46*, 38-47.
- Moore, T. E. (1988). The case against subliminal manipulation. *Psychology & Marketing, 5*(4), 297-316.
- Packard, Vance, (1957). *The Hidden Persuaders*. New York: Cardinal.
- Parker, K. A. (1982). Effects of subliminal symbiotic stimulation on Academic Performance: Further evidence on the adaptation-enhancing effects of oneness fantasies. *Journal of Counseling Psychology, 29*(1), 19-28.
- Phelps. B. J., & Exum, M. E. (1992). Subliminal tapes: How to get the message across, *Skeptical Inquirer, 16*(3), 282-285.
- Reid, J. J. (1991). 'Free of depression' subliminal tape study. Master's thesis, Colorado State University, Colorado, USA.
- Robinson, B. A. (2001). Backmasking on records: Real or hoax? Retrieved December 11, 2007, from http://www.religioustolerance.org/chr_cul5.htm.
- Russell, T. G., Rowe, W., & Smouse, A. D. (1991). Subliminal self-help tapes and academic achievement: An evaluation. *Journal of Counseling & Development, 69*, 359-362.
- Schnell, J. A. (1986). A Comparative Study of the Effect of Subliminal Messages on Public Speaking Ability. Retrieved December 3, 2007, from http://eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/1b/e6/27.pdf.
- Scripture, E. W. (1907). *The new psychology*. London; New York: Scribner's.

- Seamon, J., Marsh, R. J. , Brody, N. (1984). Critical importance of exposure duration for affective discrimination of stimuli that are not recognized. *Journal of Experimental Psychology*, 10(3), 465-469.
- Silverman, L. H., Martin, A., Ungaro, R., & Mendelsohn, E. (1978). Effect of subliminal stimulation of symbiotic fantasies on behavior modification treatment of obesity. *Journal of Consulting and Clinical Psychology*, 46(3), 432-441.
- Staum, M. J., & Brotons, M. (1992). The influence of auditory subliminals on behavior: A series of investigations. *Journal of Music Therapy*, 24(3), 130-185.
- Stress Relief Management (2005). How an experiment with Coca Cola and popcorn lead to the discovery of subliminal tape. Retrieved November 19, 2007, from http://www.stress-relief-and-management.com/subliminal_tape.html.
- Stroh, M. A., Shaw, M., & Washburn, M. F. (1908). A study of guessing. *American Journal of Psychology*, 19, 243-245.
- Swart, L. C., & Morgan, C. L. (1992). Effects of subliminal backward-recorded messages on attitudes. *Perceptual and Motor Skills*, 75, 1107-1113.
- Taylor, E. (n.d.). *Subliminal technology: The truth about subliminal tapes*. Retrieved November 4, 2007, from <http://www.innertalk.com/>.
- The New York Times (1990). Judas Priest's lead singer testifies. *The New York Times*. Retrieved December 3, 2007, from <http://query.nytimes.com/gst/fullpage.html?res=9C0CE1DA143FF932A3575BC0A966958260&sec=&spon=&pagewanted=print>.
- Theus, K. T. (1994). Subliminal advertising and the psychology of processing unconscious stimuli: A review of research. *Psychology & Marketing*, 11(3), 271-290.
- Throne, S. B., & Himelstein, P. (1984). The role of suggestion in the perception of satanic messages in ro-and-roll recordings. *The Journal of Psychology*, 116, 245-248.
- Urban, M. J. (1992a). Auditory subliminal stimulation: A re-examination. *Perceptual and Motor Skills*, 74, 515-541.
- Urban, M., & White, C. EE. (1992b). Point-counterpoint. *Psychology & Marketing*, 9 (1), 77-83.
- Vokey, J. R., & Read, J. D. (1985). Subliminal Messages: Between the devil and the media. *American Psychologist*, 40(11), 1231-1239.

- Zanot, E. J., Pincus, J. D., & Lamp, E. J. (1983). Public perceptions of subliminal advertising. *Journal of Advertising, 12*, 39-44.
- Zenhausen, R., & Ciaiola, M. (1973). Subliminal and supraliminal accessory stimulation and tow trapezoid illusions. *Perceptual and Motor Skills, 37*, 21-256.
- Zenhausen, R., & Hansen, K. (1974). Differential effect of subliminal and supraliminal accessory stimulation on task components in problem-solving. *Perceptual and Motor Skills, 38*, 375-378.

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