Assessing the Effects of Audio and Visual Subliminal
Messages on Brand Choice

Jordan Zink
Gahanna Lincoln High School
Abstract

The purpose of the experiment was to determine if audio or visual subliminal messages had an effect on the choice of a brand of gum. Subjects were presented either an audio or video stimulus that either contained a subliminal message or no subliminal message and then were given the choice of three fake brands of gum. Participants, all of which were high school students, were not told they were participating in a study with subliminal messaging in order to prevent a bias from expectation. Phase one (n=39) consisted of one-on-one testing and found that video messages merited further testing. Phase two (n=79) consisted of classroom testing and found that no statistically significant difference existed between groups given subliminal stimulus and control groups (p=0.22), however results indicate more data could prove significance. It was concluded that subliminal messages had no significant effect on choice of brand. It is recommended that further research be conducted since results indicate that subliminal messages could be effective.
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Introduction

The topic of subliminal messaging is an area of psychology that borders on pseudoscience. The concept is at its essence remarkable simple: a message that is taken in through the senses, processed in the mind, but does not enter the conscious mind. This idea differs from the countless stimuli the mind constantly takes in and essentially ignores because subliminal messages possess the ability to change mental perception when being processed by the mind. The specifics of subliminal messaging still lay in theory; however the possible applications are limitless.

The topic of subliminal messaging came into focus after the development of Freud’s psychoanalytic theory and the idea of the subconscious mind. Subliminal messages first came into the public’s eyes after James Vicary, an advertiser, claimed that he could use video-based subliminal messages in the previews of a movie to increase concession sales. There was public outcry from these claims that led to an investigation by the Federal Communications Commission. The National Association of Broadcasters even banned all subliminal messages before they were even proven to be effective. Ultimately, Vicary’s claimed were discovered to be false, but subliminal messaging had become a topic of heated debate (Rogers, 2001).

Another historical popularization of subliminal messaging occurred with the idea of backmasking in music. Backmasking is a technique where audio is reversed and inserted into a selection of music. Several bands of the mid 20th century used this technique to hide messages in their songs, leading to charges of the bands attempting to place satanic messages in their music. This fear and uproar, which led to investigations and hearings, amounted to nothing, and an experiment later proved that backmasking does not contain the proper unconscious effects that a subliminal message must possess to become persuasive (Vokey & Read, 1985).
ASSESSING THE EFFECTS OF AUDIO AND VISUAL SUBLIMINAL MESSAGES ON BRAND CHOICE

Many experiments and studies have been conducted to determine the validity of subliminal messages. An experiment by Karremans, Claus, and Stroebe (2005), which looked into the effects of subliminal messages on drink brand choice, showed possible signs of success. An experiment by Reuter, Kopiez, and Egermann (2006) looked into the use of subliminal audio messages on word choice and brand selection and found no significant difference between control and subliminal groups. The placebo effect has also been tested with subliminal messages, and experiments conducted by Froufe and Schwartz (2001) and Benoit and Thomas (1993) found that, when subjects were informed that a subliminal message existed or detected a message, their results changed significantly regardless of whether a subliminal message actually existed or not, indicating that knowledge of a subliminal message destroys the effect of the message. Also, it should be noted that most experiments on subliminal messaging are conducted in carefully controlled environments and that if any observation of subliminal messages’ effectiveness does occur, it cannot be assumed that such results would occur in real life scenarios (Froufe & Schwartz, 2001).

The purpose of the experiment described in this paper is to determine the effects of audio and visual stimuli on brand choice, specifically brands of gum. If results indicate that subliminal messages can influence the choice of gum brand, then applications of subliminal messages in advertisement could allow for companies to increase sales. However, the hypothesis presented is a null hypothesis; that is, the hypothesis is that there will be no significant difference between groups that receive a subliminal message and groups that do not receive a subliminal message.
Materials and Methods

Participants were all students at Gahanna Lincoln High School. Due to the nature of the research, the fact that all participants were high school age was considered acceptable and not a source of bias, since the idea of subliminal messaging would be theoretically similar to individuals of all ages. Factors like sex and race were not considered since it was assumed that such factors would not present bias significant enough to affect overall results.

While the experiment is meant to assess subliminal messages effectiveness on brand choice in general, gum was chosen to be used in experiments. Products like Pepsi and Coke are very similar products in that they are both colas with similar tastes, but the preconceived notions behind each brand as well as minute taste differences made such products undesirable for the experiment. Gum was chosen because of the relative uniformity of gum products on the market as well as the widespread acceptance of gum in the population (as opposed to pop, which some individuals may choose not to drink). For the experiment, mint gum (all from the same maker) was used for all trials. Because pre-existing brands could introduce bias, three faux brands were created: Winter Ice, Mountain Chill, and Arctic Blast. Logos for each of these brands can be found in Figure 1.1. These logos were wrapped around the foil coverings of the gum in imitation of true gum brands.

The general idea of the experiment is that a subject will be presented with a subliminal stimulus or no subliminal stimuli (control) and then select a brand of gum. However, due to the fact that awareness of the existence of a subliminal message leads to false results, the procedure was modified to eliminate this bias. Subjects were informed that they were participating in a study concerning the effects of gum on the perception of artistic or musical pieces. Subjects were described the experiment, given a stimulus, selected a brand of gum, and were asked a few
questions to keep the illusion of the faux experiment. In reality, the only data recorded what the brand of gum chosen, and the answers to the faux questioner were ignored. If subjects accepted the ruse and failed to notice any subliminal messages, results can be assumed to not be influenced by expectations of participants.

Two different types of stimuli were used: audio and visual. Control audio stimuli consisted of a one minute selection of Trans-Siberian Orchestra’s song Beethoven. To create the experimental stimuli, the recorded phrase “You want Winter Ice gum” was placed within that audio at repeating intervals. The added phrase was at a low enough volume that it could not be consciously detected by an average listener. For the visual stimuli, a thirty second video was created the featured artistic pieces that were displayed for a couple seconds before cutting to black for a couple of seconds. The experimental video consisted of the same video, but with a single frame (measuring 1/30th of a second) placed during one of the art pieces cut to black which had the logo for the Winter Ice gum. This construction was used to minimize the conscious perception of such a message.

The experiment was conducted in two phases. Phase one consisted of one-on-one testing with an experimenter administering the procedure to a single subject. The purpose of the first phase was as a “proof of concept” test to indicate of further testing was needed. Subject of this first phase were divided randomly into two groups: an audio group and a visual group. Each group was then randomly divided into two groups: experimental (subliminal) and control (no subliminal). This division was preformed at a ratio of 2:1 because the control data from both audio and visual would be pooled together for a complete control sample. Phase two consisted of subjects being tested in a classroom setting with groups of fifteen to thirty being tested at a time. The purpose of the second phase was to get a larger sample and simulate a more realistic
scenario equivalent to music in a store or watching TV. Subjects in this phase were given a sheet of paper with the three gum logos on them, given a stimulus, and then told to pick the brand of gum that they wanted. Subjects were told to not talk to one another during the test, removing a possible social bias. Entire classrooms were administered either experimental or control stimulus.

A possible source of bias considered was the order in which gum was presented to an individual, either how it was laid out for a participant during phase one or the order of the logos on the survey sheet in phase two. This was countered in the experiments design by randomly ordering the brands with every test or on every survey sheet. This way, no brand was biased to be selected more because it was, for example, the middle brand.

Experimenters during both phases discreetly observed participants for signs that he or she had become aware of the true nature of the experiment. If it was deemed that the trial had been compromised, it was note and the data was voided.

Ethical procedure was taken to assure subjects were not ethically violated. Phase one subjects signed an assent form and phase two subjects gave verbal consent. Since the only result taken was which brand was chosen, confidentiality was guaranteed. After the experiment, subjects were not told the true nature of the experiment in order to preserve the secrecy of the subliminal message. It was considered whether this would pose an ethical problem, but since the scale of the experiment was so small, it was decided that such deception was permissible.
Results

During both phases of testing, there were no occurrences of a trial being compromised, meaning that the subliminal stimuli created were successful in remaining subliminal and every participant’s data was used. Phase one consisted of 39 participants and results of brand choices can be seen in Figure 2.1. Compared to control, there was a large increase in choice of Winter Ice over the other two brands in the video trials (n=17) from 17% selection to 53%. Audio (n=10) possessed no such change (20% compared to control of 17%), indicating that audio had a low chance of being successful. In order to gain enough data to try and prove significance, it was decided that phase two should only test video. Phase two consisted of 79 participants and the results of phase two as well as total results can be found in Figure 2.2.

Initial looks at the percentages of subjects that selected Winter Ice gum in the experimental group and control group, 36% and 27% respectively, indicate an increase in the selection of the gum that was subliminally influenced towards. However, conclusions cannot be drawn until it has been proven that the two groups are significantly different. The first test considered for analysis was a z-test, which uses approximations of the normal model to determine statistical significance. However, due to the relatively small size of the control group (n=22), approximations of the normal model are not accurate enough. Therefore, a t-test was run. An initial f-test (testing two samples for variance) produced a p-value of 0.397512, which, since it is greater than 0.05, indicates that the t-test run should assume equal variance. The t-test produced a p-value of 0.221879, meaning that there is a 22.2% chance that the results observed occurred by chance rather than due to the subliminal messages. Since the p-value is greater than 0.05, there is no statistically significant difference between the experimental group and the control group.
An interesting topic of discussion that was observed is the distribution of selection in the control group. Theoretically, the brands created for the experiment should not present any bias of selection, which means each brand of gum should be picked 33% of the time. However, Arctic Blast was picked 12 of the 22 times, or 55%. If the choice of gum was truly random, the probability of Arctic Blast being picked 12 or more times out of 22 is given by this equation:

$$\sum_{n=12}^{22} \binom{22}{n} \left( \frac{1}{3} \right)^n \left( \frac{2}{3} \right)^{22-n} = 0.0327039$$

There is a 3.27% chance that Arctic Blast would be picked 12 or more times. This indicates that the design of the Arctic Blast logo made it more likely to be selected. However, this result, since the experimental group was compared to a control group rather than theoretical group, does not affect any of the validity of the experiment but merely shows that the experiment was designed correctly in not assuming theoretical probabilities.
Discussion

Based on the results of the experiment, the null hypothesis is accepted: there is no significant difference between groups given a subliminal stimulus and groups given no subliminal stimulus. Phase one indicated the chances of audio subliminal messages being effective are low. An increase in the selection of the Winter Ice brand was observed for the video group, but the result was not significant. Most of this agrees with previous experiments researched, most of which have found no effective implementation of subliminal messages. Since no subjects were aware of the subliminal message’s existence, it also verifies the results of Froufe and Schwartz (2001) and Benoit and Thomas (1993), showing that any effectiveness of subliminal messaging has more to do with the conscious perception of a subliminal messages existence rather than the message itself. An interesting thing to note is that Froufe and Schwartz (2001) theorized that audio subliminal messages are the most likely to work based on how the brain processes hearing, but the results of this experiment indicate that audio has very low chances of success.

Even though the experiment was designed to eliminate bias as much as possible, some inadequacies still exist in the experiment. One is that only one brand (Winter Ice) was used to be the subliminal messages. A proper experiment would use all three brands for three separate messages (naturally, subjects would only be influenced towards one brand at a time, just not Winter Ice only). The effect of this possible bias on the data is most likely insignificant, but it should still be considered. Also, only one method of implementing an audio and visual message was used. One of these methods could be in its design ineffective at transferring subliminal messages, meaning the data only represents these specific methods of audio and visual subliminal messaging rather than the two concepts of audio and visual messages as a whole. The
main inadequacy of this experiment, however, is the sample size. With 108 points of data used in the final comparison of video subliminal and control, it would be hard to prove subtle yet distinct differences between the two groups. Time constraints prevented a larger sample size from being tested.

The most obvious recommendation for further research is to continue phase two of the experiment and gather a larger sample size. Even though the results were found not to be statistically significant, there was a difference in the two groups and the p-value was only 0.22. A definite trend was observed, and while no conclusions can be drawn from the data specifically, it does indicate that further testing should be done. More data could bring that p-value down to below 0.05 and indicate a significant difference. Other recommendations include looking at different ways to implement subliminal messages in audio and visual sources, look into the differences of results based on age (such as if older people are influenced easier than young people), and look at influencing other types of brand rather than just gum. A wider berth of experimentation would allow for more specific conclusions to be drawn about the effectiveness of subliminal messages.

Applied to the real world, the conclusion drawn would indicate that subliminal messages have no effect on brand choice. However, the results found indicate that video-based subliminal messages could affect brand choice. If this were true, such methods could easily be applied to fields such as advertisement. Companies could hide subliminal messages in TV shows or sporting events to make consumers select their product over competitors. Such messages could even attempt to make someone pick a certain food over another, which could be used for advertisement or by health advocacy groups to try and influence people to eat healthy. However, any application of subliminal messaging raises serious ethical questions. At its core, subliminal
messaging aims to influence a person without them knowing that such an influence is occurring. Morally, such an action is similar to forcibly exerting control over someone else. Because of this, subliminal messaging has a dangerous side in allowing one person to control the actions of another. This, of course, is only true if it can be proven that subliminal messaging is viable.
References


Appendix

Acknowledgements

I’d like to thank my fellow team members A. Baum and E. Taylor for their help on experimental design and data collection. I’d like to thank my psychology teacher Mr. Keenan for mentoring on this project. Finally, I would like to thank the 118 participants as well as the teachers at Gahanna Lincoln High School who allowed us to collect data during class time.

Figure 1.1

Figure 2.1

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Figure 2.2

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