

Subliminal primes in real life situations

A study on the effect of textual
subliminal primes presented
on computers via the Internet.

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Abstract

Over the course of time the effectiveness of subliminal messages has been the subject of much controversy. This study investigates whether subliminal messages spread via the internet had an effect on which words participants were likely to choose. 108 Participants were presented with a countdown after which a series of four words was presented from which the participants had to choose one word. During the countdown a subliminal prime was presented in the form of a word present in the fifth series. This process was repeated five times for five different word lengths. The result suggests subliminal priming cannot be used to affect people's choice of words in a real life situation.

Keywords: subliminal, messages, persuasion.

Samenvatting

In de loop van de jaren is de effectiviteit van subliminale boodschappen een punt van controverse geweest. Dit onderzoek onderzoekt of het gebruik van subliminale boodschappen die via internet verspreid worden invloed hebben op welke woorden proefpersonen kiezen. 108 Proefpersonen zagen een scherm waarin werd afgeteld, waarna een serie van vier woorden werd gepresenteerd, de proefpersonen moesten een keuze maken uit deze woorden. Tijdens deze aftelling werd een subliminale boodschap gepresenteerd in de vorm van een woord uit de vijfde serie. Dit werd vijf keer voor vijf verschillende lengtes van woorden herhaald. De resultaten suggereren dat subliminale boodschappen niet gebruikt kunnen worden om de woordkeuze van mensen in het echte leven te veranderen.

Trefwoorden: subliminaal, boodschappen, overreding.

Introduction

The goal of this study is to investigate the effect of subliminal messages projected via the Internet. Subliminal is an adjective which finds its origin in Latin, meaning under the level of conscious awareness (McConnel, Cutler & McNeil, n.d.). Merikle (2000) wrote: “Subliminal perception occurs whenever stimuli presented below the threshold or limen for awareness are found to influence thoughts, feelings, or actions” (Merike, 2000, p. 497). There are two forms of subliminal messages commonly described, one under the level of awareness due to the length of the prime and the other a message embedded into a picture. For this research only subliminal messages of the first kind are used, according to Fishbach, Friedman & Kruglanski (2003) this means words that are presented less than 50 ms.

Nowadays the use of the Internet has become an integral part of life; in the year 2011 87.2 percent of Dutch citizens used the Internet (Oosterveer, 2012). Therefore a lot of money goes around in the internet branch, for example online retail sales, social networking and advertising. One way of advertising is the use of subliminal messages. Stichting Reclame Code (Dutch Advertising Code Authority) published a code in 2009 stating that it is illegal to influence people with subliminal messages spread via the media. However this cannot be controlled on the Internet due to the fact the code does not apply to other countries. As such if a website is hosted from another country it may still use subliminal messages.

This research will attempt to determine if subliminal messages projected via the internet will influence people’s choices, when it comes to choosing a word. This brings us to the research question and hypotheses:

RQ: If a word is subliminally primed prior to a set of words being presented, are people more likely to choose the primed word instead of the words that are not primed?

H₀: The primed group will choose the primed word as often as the control group.

H_a: The primed group will choose the primed word more often than the control group.

History of subliminal messaging

For many years researchers have conducted studies on the effect of subliminal perception. There are two important concepts in this research the first is definition of priming. Priming means people are influenced by a certain stimulus like a word or picture. The prime influences people’s choice or even behaviour, because specific memory has been triggered by

the prime. The other important definition is threshold, in the field of psychology this is a concept that defines as a certain stimulus or sensation is intense enough to influence one's behaviour (Morey, 2008).

The first psychological studies on the subject of subliminal messages were conducted in the late 1800s and early 1900s. In these studies participants were asked whether or not they were aware of the stimuli. To test if the prime was unconsciously processed the participants were for example asked if a specific letter was presented earlier in the test. The results showed above-chance accuracy on guessing if a letter was presented or not (Merikle, 2000).

One of the best known studies on subliminal messages is by James M. Vicary in the year 1957 (Crandall, 2006). In a cinema he showed thousands of people, in six weeks time (Pratkanis, 1992) the subliminal messages "Drink Coke!" and "Eat Popcorn!" with a presentation time of 3 ms (Berkes, 2004). Results of this research showed increased sales of Coca Cola by 57,7% and increased sales of popcorn by 18,1% (Bermeitinger, Goelz, Johr, Neumann, Ecker & Doerr, 2009). In 1962 it was discovered the results of Vicary were made up (Rogers, 1993), though the results were fake, the study gave rise to many more studies.

In 1958 the claims of Vicary were tested by the Canadian Broadcasting Corporation (CBC), they subliminally flashed the prime "Call Now" during a popular Sunday night programme called "Close Up" for 352 times (Vokey, 1992). There was no increase measured in the number of callers that day. When asked to guess the message that was presented; out of the roughly 500 people who responded to that question, none guessed right (Pratkanis, 1992).

Another study reported on the effect of subliminal messaging, participants were confronted with a string of letters after being primed if they were in the test group, or not primed if they were in the control group. These strings of letters formed, in some cases, a word. The participants were asked whether this string was a real word or not. Even if the masked primes were not detected by the participants it facilitated decisions on whether the string was a real word (Marcel, 1983).

In 1970 the researcher Hawkins conducted an experiment on subliminal messages. He used a cover experiment where the participants had to recognize automotive brand names. Meanwhile he subliminally presented the words "COKE" and "DRINK COKE" to the test group, the control group was presented with the nonsense string of letters "NYTP". Hawkins reported the prime "COKE" was found to arouse the basic need, thirst. This was the same for the cue to "DRINK COKE"; people were not inclined to drink more coke (Brannon & Brock, n.d. and Blackwell & Halasz, 2007). Several studies showed a similar effect on increasing the

feeling of hunger or thirst after being subliminally primed with words connected to food or drinks (Byrne, 1959; Spence, 1964).

However, Karremans, Stroebe and Claus (2006) published a study which did not confirm these results. The study concluded that test subjects who are primed with the words “Lipton Ice” choose this drink more often after being primed. This was only for people who prior to the priming reported they were thirsty. A significant difference this study and the study of Hawkins is that according to Karremans et al the subliminal prime persuaded the subjects to choose a certain brand. Whereas in Hawkins’ experiment in 1970, subjects who were primed with the word “COKE” were not more inclined to drink more coke.

Chartrand, Huber, Shiv & Tanner (2008) confirmed with their research subliminal messages cannot only influence people’s basic needs like thirst but can also influence people’s choice on more complex subjects like being thrifty. Participants were primed with either words of prestige or with words concerning being thrifty. After being primed, the participants were asked whether they would buy the expensive or cheaper pair of socks. The results showed people who were primed with the prestige words were more likely to buy the expensive sock compared to the other group who was more inclined to buy the cheaper socks. These results show an effect on the people’s choice which might be an indicator the current study will show a significant difference between both groups.

The feeling of wellbeing or self-esteem could also be influenced according to Dijksterhuis (2004). He investigated how implicit self-esteem could be improved by subliminal association of the self and positive primes. It was found that when self words were paired subliminally with positive words, participants had higher implicit self-esteem, as measured by their preference for letters in their own name.

Subliminally primed images

Not only research on subliminal primes with words has been conducted, several studies showed the effect of subliminally primed images. Kunst-Wilson & Zajonc (1980) for example conducted an experiment on subliminally primed octagons. In the first phase octagons were subliminally primed, each octagon 5 times. The subjects were unable to recognize the octagons projected later in the experiment. The second phase consisted of a test series where the subjects were presented with a pair of octagons; one previously exposed the other new. The subject had to indicate which octagon he liked better. The results showed a preference for the primed octagons.

Another study that worked with images instead of words is the study of Underwood (1994). In the year 1994 he primed the Eastern part of England on the BBC show “Tomorrow’s World” during a short clip. The primed group was subliminally primed 7 times with a smiling face of a woman for 20 ms each time. The western part of England was not primed; they were the control group. At the end of this short clip a picture of a woman, the same woman as before, with a neutral expression was shown. The audience at home was asked to call and report if the woman was sad looking or happy, around 37.000 people called. The results from this research showed a so called “Contrast effect”, the primed group reported seeing a sad looking woman whereas the control group reported a more happy face.

Prior to the study of Karremans et al (2006) mentioned earlier, Channouf, Canac & Gosset (1999) did the same kind of research but with images of either a Coca Cola bottle or an Orangina bottle. The control group was primed with neutral images. During the test people were asked whether or not they wanted something to drink. The results showed the primed group was more inclined to drink something; however there was no significant difference between what the two primed groups chose to drink. In other words the group primed with the Coke bottle was not more inclined to drink Coke and the ‘Orangina group’ was not inclined to drink more Orangina. This study implies subliminal messages can lead to change in behaviour, but it cannot influence the brand choice. The difference between these three studies and the studies mentioned earlier is obviously the sort of prime. In one case, pictures are used whereas in the other case the primes were words. Pictures and words are not processed the same way which could have led to different outcomes. Without delving too deep into this matter a study conducted on this subject will be discussed briefly. Potter and Faulconer (1975) conducted an experiment on the differences between processing words and images; using a tachistoscope they flashed either a word or an image to 96 participants. The participants’ task was to either name the object by its name (for example “head” or “coat”) or categorize the object (for example “clothing”). The time between the prime and answer was measured. The results showed that pictures can be categorized faster than words and words can be named faster than pictures. From these results it can be concluded that there is a difference between the processing of pictures and words, meaning that doing the current study with pictures might yield different results.

Fears and critics on subliminal messages

There are widespread ideas and fears of the use and effect of subliminal messages. As mentioned earlier the Stichting Reclame Code forbids using subliminal messages on Dutch television. The Stichting Reclame Code does not stand alone in this opinion. Vokey believes a big part of these negative feelings and fears against subliminal messages come from research done by a former professor at the University of Western Ontario, Wilson Bryan Key (Vokey, 1992). Another person who warned the public for the effect of subliminal persuasion was Norman Cousins with his article “Smudging the conscious” published in 1957 in the weekly magazine “Saturday Review”. He wondered if Vicary’s research had such an impact what effect it would have if for example politicians were able to use this method for persuading people to their advantage. Examples of this method of persuasion in the area of politics are two advertisements produced by the Republican campaigner Alex Castellanos. The first example is an advertisement published in 1990 for a rightwing Republican senator using racial imagery. Another example can be found in the 2000 presidential campaign for Bush, where a subliminal prime was inserted into a campaign video. During this video the democrats, Bush’s opponents, were associated with bureaucrats while the word ‘RATS’ was shown on the screen for a thirtieth of a second. Alex Castellanos later denied inserting these messages on purpose (Borger, 2000).

The warnings of Cousins were taken seriously by the Federal Communication Commission; who immediately started an investigation into the study of Vicary. The National Association of Broadcasters, an association operating in the United States, responded to this with a ban of subliminal advertisements. Other countries, like Britain and Australia followed (Pratkanis, 1992).

A discussion point on subliminal perception is the use of self-reports; this introspection is used as a source of data. Reingold and Toth (1996) described one of the fundamental problems with these self-reports.

“...factors unrelated to awareness, such as demand characteristics and preconceived biases, may lead subjects to adopt a conservative response criterion and report null perceptual awareness even under conditions in which conscious perceptual information is available. Response bias represents a threat not only to the validity of the subjective report measure of awareness, but also to its reliability. In particular, variability in response criteria makes it difficult to compare reports of null subjective confidence across-subjects, or within-subjects across conditions.” (Reingold & Toth, 1996, p. 162).

Mere-exposure effect

The goal of this study is to test whether or not the subliminal primes will have an effect on the choice of the participants. Subliminal primes can also lead to a form of persuasion, this can be explained by a model called the Elaboration Likelihood Model; this model describes how communicating specific primes can affect attitude. This model has been developed by Petty and Cacioppo (1986) and distinguishes two routes namely the central route and peripheral route. The first route requires a lot of thoughts and involvement, whereas the peripheral route does not require deliberate thoughts. According to Blackwell and Halasz (2007) subliminal messages or as they call it subliminal cues fall into the peripheral route and therefore can persuade people who are not really paying attention to the prime or are not able to detect it. This might be a reason to believe the subjects in this research might be persuaded to choose the primed word in favour of the other words.

Low-involvement processing implies it is possible people are not aware of all the materials showed, this is often used in explaining the behaviour of consumers. It supports the idea that it is possible to influence people's feeling toward a certain product by using subliminal messages (Rosen & Singh, 1992).

Another reason to believe there would be a significant difference between both groups is the mere-exposure effect (Zajonc, 1968). In short it means people tend to rate a stimulus (both pictures and words) more positive after being exposed to it more often and therefore are more willing to choose this word. The subliminally primed subjects in the present study were exposed to a prime word (for example 'glas', the Dutch word for glass) which was displayed 13.5 times on average during the pre-test. An example of the mere-exposure affect appears to be visible in this study as shown in table 1. This table shows a relation between the hits on Google Search and the choice of words during the experiment. The words displayed on the left are some of the words that are used in this study. The frequency in the middle shows how many times these words have been chosen. People who use the internet frequently are more likely to have been in contact with the words that have more hits on Google and as the table shows they are more likely to choose this word in favour of another word.

Table 1

Word choice frequencies compared to the hits on Google Search.

Word	Frequency	Hits on Google Search
KWAST	8	1.480.000
GETAL	23	9.310.000
SPORT	41	208.000.000
VADER	46	23.100.000
OVERAL	17	27.000.000
STRAAT	22	37.600.000
WERKEN	38	74.200.000
MILIEU	41	34.600.000
AUDITIE	13	1.480.000
DIAGRAM	13	3.340.000
NOORDEN	23	18.200.000
SEIZOEN	69	53.100.000

Method

Design

The design of this study is as follows; participants were subjected to a website with sets of words from which they had to choose a random word. The participants were randomly assigned to the non-primed (control) or primed group.

Prior to the study a pre-test with a high-speed camera was conducted on the duration of the primes on several combinations of computers and screens. The pre-test with the high-speed camera resulted in a built-in detector that could detect with enough certainty if primes were subliminal, meaning under 50 ms. The following could be concluded for the data. Some primes were displayed too long, longer than 50 milliseconds and in many cases the prime was not displayed all the time.

After the pre-test the website and database have been adjusted to save the maximum duration of the subliminal prime for a set. Therefore the data of participants in cases where at least one subliminal prime was too long could be erased from the dataset.

The second conclusion of the pre-test could be ignored because of the fact the subliminal prime was offered more than once. Every subliminal prime was offered 25 times but due to technical constraints the prime was displayed 13.5 times on average during the pre-test.

Stimulus Materials

The website used for this research was designed in HTML 5, Canvas 2D and Javascript. The data were collected and stored at a server. The participants all used their own home or work computers. This means different computers and screens were used, therefore it is not possible to mention the specifications. The difference in computers and screens was one of the key factors of this research.

Participants

The group of participants consisted of 110 people. Of the participants 59 were female and 51 were male, the oldest was 71 year old and the youngest was 11 years old with an average age of 35. In the prime group there were 47 valid participants, meaning the prime was not presented to them for longer than 50 ms, and 63 in the control group. The prime and control group were comparable in age (prime group $M = 35.53$, $sd = 12.79$, control group $M = 34.71$, $sd = 14.83$) and sex (percentage of male participants in prime group .34 and control group .40).

Procedure

Participants could enter the website by clicking a hyperlink distributed via social networking sites or sent by e-mail. Once they opened the website an introduction on the research was given where people were told the study was about choices of words from random sets of words on the internet, the subliminal prime was not mentioned. The participant was told to look at the screen and after the countdown from 5 to 1 to read all four words and choose a random word. The optimal timeline for the countdown for the primed group was as follows:

Session 1:

Frame 1: 11111111 duration: 980ms

Frame 2: 11kaart11 duration: 20ms

Frame 3: 22222222 duration: 980ms

Frame 4: 22kaart22 duration: 20ms

Frame 5: 33333333 duration: 980ms

Etc.

In the current study there has not been a (self-reported) questionnaire on whether or not they had seen the subliminal prime because many participants were needed for this experiment. It could not be prevented that participants could participate for a second time on the research or talk to others about the goal of the research. This could have influenced the results, which would have had a negative effect on the reliability. Another reason not to use self-reported questionnaires is the fundamental problem described by Reingold and Toth (1996) mentioned earlier.

Results

The hypothesis predicted that the primed group will choose the primed word as often as the control group. First of all the participants were divided in two groups, primed or not primed. Table 2 shows how many times the participants chose the primed word in prime- and no prime conditions.

Table 2
Primed word choice

Prime	Word				
	Glas	Getal	Milieu	Noorden	Namelijk
Prime	.26	.15	.40	.17	.11
No prime	.27	.21	.30	.21	.11

The percentage of the participants that chose the primed word was not affected by the prime, for ‘glas’ $\chi^2(1, N = 110) = 0.00, p = .96$, ‘getal’ $\chi^2(1, N = 110) = 0.27, p = .60$, ‘milieu’ $\chi^2(1, N = 110) = 0.84, p = .36$, ‘noorden’ $\chi^2(1, N = 110) = 0.05, p = .82$, ‘namelijk’ $\chi^2(1, N = 110) = 0.05, p = .82$. In other words none of the word series showed a significant difference.

Discussion

The goal of this study is to investigate the effect of subliminal messages in real life situations. The results showed there is no significant effect; several reasons could cause the lack of effect. As described earlier the mere-exposure effect could have been a reason the current study would show a significant effect. A reason though why the mere-exposure effect might not have been present during this study could be the fact it was not tested in a laboratory. According to De Houwer, Hendrickx & Baeyens (1997) a mere-exposure effect if subliminally primed will probably only work in a laboratory setting. A possible cause of this difference between real life situations and a laboratory could be the “Hans Kluger” (Clever Hans) effect. In 1904 the New York Times reported about a horse named Hans who was able to count and read (The New York Times, 1904). By tapping his foot the horse could for example tell a solution to an arithmetical problem. Oskar Pfungst studied this case and published an article (1911) on how the horse was able to complete those tests. According to Pfungst’s experiment the horse responded to the signs his owner, Mr. von Osten, involuntarily gave by slightly moving his head. In studies conducted earlier on subliminal messaging it is possible the experimenter who welcomed and explained the procedure to the participants was familiar with the research question. This could have had the effect that the participants were

unconsciously subliminally primed by the experimenter, which could have influenced the results.

Another reason for the difference could be the surrounding sounds; according to Banbury & Berry (2005) surrounding sounds are a factor of distraction while performing tasks. It is possible the primed persons were distracted by music; people talking or other sounds that might have influenced the processing of the subliminal prime. In the present study subjects were deliberately not asked to switch off their music or to get into a silent room. There were two reasons for that; on the one hand it was not possible to trace if all the subjects adhered to this request. On the other hand, and this was an even more important reason, the research was conducted to examine the effect of subliminal messages in real life situations. Ambient sounds are a part of real life situations and therefore not kept out of the research.

When conducting a research in a laboratory the apparatus is controlled, in this controlled situation it is exactly known what computers and screens are used. This could give more certainty during the test phase and more uniformity as the subjects all use the same computer. It is possible that on a certain computer with a specific screen the results of a test are different and would show a significant difference. The present study used many different computers.

As reported earlier in this study, Karremans et al (2006) showed an increased feeling of thirst and that subjects were more inclined to choose a specific brand, namely Lipton Ice. This could be seen as an indication that the current study might show a significant difference between the primed group and control group. The difference between the current study and the study of Karremans et al. is that the participants of the Karremans study had a physical need which influenced the results, namely thirst. This physiological need was not present during this study which might have caused a different outcome. According to Maslow's motivation theory one needs to fulfil certain needs before going into a different level of needing (Maslow, 1970). These needs he classified as:

- Physiological needs for example the need of food; drinks; sleep and sport.
- Safety needs examples are: accommodation; freedom of fear; need for structure, limits and law.
- Belongingness and love needs, giving and feeling affection.
- Esteem needs, desire for strength, competence, status, glory and fame.
- Self-actualization need, being true to your own nature.

The first need has to be satisfied before going into the next level and so on. Clearly the prime Karremans et al. used in his research appealed to the first phase of Maslow's motivation

theory. The prime used in the current study does not appeal to the first or second phase, it most likely appeals to the third or fourth phase. The third phase because many subjects knew the experimenter, this could lead to a feeling of belongingness and love for helping a friend. The fourth phase because subjects might have felt they had to fulfil a certain task which might have influenced their feeling of competence. This could have caused a difference between the results of the current study and the one of Karremans et al.

Further research

As described earlier, there are many reasons to believe the same study would give different results in a laboratory compared to a real life situation. The reason for this is the mere-exposure effect with subliminal primes might only work in a laboratory setting where the situation is controlled according to De Houwer, Hendrickx & Baeyens (1997). While doing the research in a laboratory one could change specific parts of the study like the presentation time of the primes, the screen or if the participants would do the test with or without ambient sounds. In that case it can be controlled and tested if subliminal priming with words works and what is needed to make it work.

Another recommendation would be to do the same test but instead of using words, using pictures. As can be read in the section “history of subliminal messages” studies with pictures show a significant result in favour of the subliminal prime.

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