The verbal overshadowing effect: Attentuating verbal overshadowing

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Abstract

When people give a detailed verbal description of a non-verbal stimuli (such as faces) description in turn affects subsequent identification of the non-verbal stimuli (target face) in a negative manner, this effect is called verbal overshadowing effect. This research has examined whether the phenomenon of verbal overshadowing effect can be suppressed by introducing a visual task phase after a verbal description. As predicted, participants' performance in subsequent face detection as a function of the visual task improved significantly.

A total of 48 participants were randomly assigned to three experimental groups: “verbalize group” (whom gave a verbal description of the target face), “none - verbalize group” (whom did not gave a verbal description of the target face), and “reverse verbalize group” (who performed the visual task).

Anova test showed a statistically significant decrease in facial recognition performance for verbalize group compared with none - verbalize group, while there has been a significant improvement in face recognition performance for reverse verbalize group compared with verbalize group.

The experiment confirmed that the verbal overshadowing effect would be reduced if individuals after a verbalization task performed a visual task before target face detection. The visual task attenuates impairment due to verbal overshadowing effect.

Keywords: verbal overshadowing effect, change in information processing, attenuating verbal overshadowing.
Abstrakt

När människor ger en detaljerad verbal beskrivning av en icke-verbal stimuli (t.ex. ett ansikte) beskrivning i sin tur påverkar en senare identifiering av de icke-verbala stimuli (mål ansikte) på ett negativt sätt, denna effekt kallas verbal skuggande effekt. Denna forskning har granskat om fenomenet verbala överskuggning kan dämpas genom införande av en visuell uppgift fas efter en verbal beskrivning. Som förutspådde, deltagarnas prestation i efterföljande ansiktsidentifiering som en funktion av den visuella uppgiften förbättrats avsevärt.

Totalt 48 deltagare randomiserades till tre experimentgrupper: ”verbalize gruppen” (vem gav en verbal beskrivning av mål ansiktet), ”ingen - verbalize gruppen” (vem har inte gett en muntlig beskrivning av mål ansiktet), och ”omvänd verbalize gruppen” (som utförde den visuelle uppgiften).

Anova test visade en statistiskt signifikant minskning av ansiktsigenkänning prestanda för verbalize gruppen jämfört med ingen - verbalize gruppen, medan det har förekommit en signifikant förbättring av ansiktsigenkänning prestanda för omvänd verbalize gruppen jämfört med verbalize grupp.

Experimentet bekräftade att verbala överskuggande effekten skulle reduceras om deltagarna efter en verbalize uppgift utförde en visuell uppgift inför en ansiktsidentifiering uppgift. Den visuella uppgiften dämpar ansiktsigenkänning nedskrivningar som berodde på den verbala överskuggande effekten.

Sökorden: verbal overshadowing effect, change in information processing, attenuating verbal overshadowing.
Introduction

**Verbal overshadowing effect**
Police and law enforcement routinely interview eyewitnesses to get a basic description of criminals. The eyewitness deemed necessary and useful in criminal investigations, as they will help the police to catch the suspects.

In addition the eye-witnesses' recollections of the perpetrator is crucial from another aspect, namely the important role that eyewitnesses will be playing in the correct identification of the perpetrator when he / she has been apprehended. Eyewitness memory and the ability to provide an accurate identification of criminals considered to be an important asset for successful criminal investigations.

**Earlier research & Theoretical Perspectives**
To speak of an event can disrupt memory for the event. It was Schooler and Engstler-Schooler (1990) whom was the first researchers who through a number of studies have shown that verbal description of a prior viewed face impairs the subsequent identification of that face.

This phenomenon has been called the verbal overshadowing effect. Several subsequent studies replicated the Schooler and Engstler-Schooler (1990) results, (Read & Schooler, 1994; Store & Schooler, 1995; Dodson et al., 1997; Finger & Pezdek, 1999) affirming the validity of the verbal overshadowing effect.

Within the verbal overshadowing effect literature, there are three main paradigms that are used as vehicles to examine and explain this phenomenon: content, recoding (reconsolidation) and information processing.

Content paradigm which focuses on the specific content of verbalization, they investigate to know if the content of description itself interferes with the subsequent recognition performance. research has shown that the content of verbalizing do not have such an effect, since in one experiment, even though the participants did not give a verbal description of a face, but rather a verbal description of a different stimuli a car, again verbal overshadowing accrued (Schooler & Engstler-Schooler, 1990).

Recoding (reconsolidation) paradigm investigate whether memory for the target face is being subject to change, in other word if an inaccurate information during verbalizing reform the original memory of the face, since during verbalization, memory retrieval take place, and the initial visual memory is in the state of plastic (editable), and a reformation of original memory as a result of reconsolidation process is a possibility. According to Dudi (2004) when memories are being reactivated the initial memory can be either reinforce or disrupted.

But within verbal overshadowing effect paradigm several studies have shown that verbalization of a face can actually affect the recognition of a different face (Dodson et al, 1997). Another experiment by Finger and Pezdek (1999) has shown that when participants received a 24 minute delay before the identification of the target face, a release from verbal overshadowing occurred. These are evidence that the initial visual memory for the face has not been subject to consolidation and the initial visual information is still in memory.

Information processing paradigm focuses on factors interfering the original memory and the information process prior and during a face Recognition performance. Some studies have shown that the negative effects of verbalization may be reversible.

For example, by introducing retrieval conditions that encourage access to the original perceptual memory, Schooler, Ryan, & Reder, (1996) examined the effect of re-representation of the target face to the verbalize group prior to face recognition phase.
The aim of this manipulation was to enhance verbalization groups face recognition performance compared to the control group who did not engage in verbalization. The prediction was that the negative effect of verbalization would be eliminated when the target face re-represented to the verbalize group.

Experiment results showed that the re-presentation not only eliminated verbalize effect, it reversed it. Conclusion about the experimental results pointing out that re-representation highlights the differences between subjects verbalize memory and actual target face, and this insight gives subjects the opportunity to fill in and fix their memory for target face.

Some experiments shows that verbal overshadowing effect due to verbalization of a visual stimulus can be reduced by displaying visual clues found in coding (when participant sees a target face for the first time), such as color or background color which was used as clues before participant to perform the recognition task in (Brandimont, Maria A.; Schooler, Jonathan W.; Gabbino, Patrizia, 1997). Thus verbalization shades but do not eradicate the original memory.

Seen in the light of evidence from previous studies on the verbal overshadowing effect, this phenomenon cannot be dependent on the content of the descriptions nor reconsolidation process of visual memories, according to Westerman and Larsen (1997) the verbal overshadowing effect is caused by a shift in the cognitive process, a change in the cognitive process from visual to verbal which interfere and complicates the identification process.

Overall, verbal overshadowing may be due to a change in the cognitive processing (a change in the cognitive process from visual to verbal) thus verbal or visual cognitive process that participants use during the recall task has a decisive influence on the accuracy of face recognition.

More specifically, it can be hypothesized that the verbal cognitive processes lead participants to generate more errors during the face detection task, thus producing the overshadowing effect.

I tested this hypothesis in an experiment when participants generate descriptions of the target before the face recognition task. I also examined the effect of visual cognitive process by inserting a phase in which participants viewed a “nature painting” between description and face recognition phases to produce a release from verbal overshadowing effect.

**Purpose**

The purpose of this study was to examine whether this phenomenon, verbal overshadowing effect can be attenuated, thus the main goal of this experiment is to counteract the negative effects of verbal overshadowing.

In my experiment the standard verbal overshadowing paradigms procedures were followed. In the beginning a target face was shown to each participant, and then they were assigned to one of three conditions: (1) a verbalizing condition in which participants describe the target face, (2) a non-verbalize condition in which participants performed a filler task (3), reverse verbalize condition in which participants after verbalizing the target face saw a nature painting.

**Hypothesis**

Through a nonverbal task (seeing a nature painting), it is possible to attenuate the negative effects of verbalization. The "reverse verbalize participants" (group) for duration of 20 seconds should concentrate on different facial images in a painting which is included in the video intended for this group, this non-verbal task in turn would restore nonverbal information processing after a verbalizing phase, and counteracts the
effects of verbalizing, leading to an improved face recognition performance for "reverse verbalize participants" in comparison to "verbalize participants" (group). As far as I know my experiment is being done for the first time.

**Method**

**Participants**
Total 48 individuals, male and female, participated in this experiment. All were selected by convenience sampling method, randomized into three equally large groups.

**Group 1.** Verbalize participants (12 men, M = 44.5 years, SD = 5.90; 4 women, M = 37.5 years, SD = 9.36).

**Group 2.** No-verbalize participants (12 men, M = 38.41 years, SD = 5.30; 4 women, M = 48 years, SD = 11.62).

**Group 3.** Reverse verbalize participants (12 men, M = 47.16 years, SD = 5.94; 4 women, M = 39.75 years, SD = 5.99).

The participants in the experiment did not receive any compensation in exchange for their participation. The sessions lasted about 12 min.

**Apparatus and material**
A total of 6 different photo set (one "target-face" and five persons of similar appearance) were used as visual stimulus material. In all six versions of the stimulus material (photo) of the "target face" is at a 45 degree angle, while the six-person photo "lineup" consists of full frontal images. The six versions of the photo "lineup" are generated so that "target face" was also included in the versions of the lineup. These 6 versions were displayed for all participants across all conditions.

Given the difficulty in identifying targets from correspondence lineup can vary between 6 different photo (target face and lineup); an identical display sequence was an important aspect that was taken into account when each of the three different video (designed for 3 different condition) was edited and produced.

A nature painting in digital form (Appendix 2), in this painting there are about 15 face like figures that an observer may perceive as faces, in reality these images are nothing but a few separate objects such as stones, trees or other things found in nature, this panting was shown to reverse verbalize participants (group 3) in the experiment.

A 10 inch laptop (equipped with headphones and Windows 7) was used to show the intended video for all three participant groups in the experiment.

**Design and Procedure**
To assess whether this experiments hypothesis (The above presented) is true or not an experimental approach with between-subject design was used. All participants were first given a short written general instructions and an information letter (see Appendix) with information about the purpose of the study, duration and recall that participation in experiment was entirely voluntary and participants may at any time discontinue participation without giving reasons.

The experiment had three conditions (groups), participants in each condition went through three steps which would be taken by each participant simply by seeing a 570 second video destined for each condition, participants were required to follow the instruction which was being given by a narrator voice, the male voice (narrator) gave instructions in Swedish (initially describing each task and procedure prior to each phase) to guide the participants (group) through all the 3 steps of experiment from the beginning to the end, without any interference from the researcher's side.
Stage 1. In the beginning a target face was shown to each participant for 2 seconds, and then they were assigned to one of three conditions. At the beginning of the video, a voice-recorded instructions given through the video, the narrator message consists of this dialogue: "In the next picture you can see a face for two seconds, look closely, later we will ask questions about this face.” And immediately after the message participants saw a "target face" (photo of a man seen from the side) for 2 seconds.

Stage 2. In this step, participants performed different tasks depending on the condition (group) to which they belonged. Below we explain the contents of each state in detail:

a. Verbalize participants (group 1) in this condition I was aiming for a classical verbal overshadowing effect by introducing a face description task that would adversely affect the accuracy of a subsequent identification by participants in this condition in comparison with the control group. The narrator instructions in the video meant for this condition was: "For 20 seconds, describe as much as possible the different facial parts of the target face that you saw last, write these in sheet No. 2, thank you" after 20 seconds, the other instruction was given by narrator for the second task (a filer task) of the experiment: "Over the next 20 seconds you want to name as many as possible of world cities, writes in sheet No.1", please.

b. No-verbalize participants (group 2). This group of subjects did not perform verbalization nor did them the visual task (a nature painting); instead this group performed a filer task. The narrator message in the video meant for this condition was: "In the next 20 seconds, you name as many as possible cities in the world, writes the names on sheet No. 1, please."

c. Reverse verbalizes participants (group 3). This group of subjects did perform verbalization and then the visual task (viewing a nature painting). As was intended by experiment design presuming that the participant's information processing by verbal description dominantly becomes a verbal cognitive process, afterwards when the participant see a nature painting their cognitive processing will return to the visual cognitive processing.

It was predicted that by this manipulation over shadowing effect will be prevented.

Reverse verbalize participants first 20 seconds would describe as much as possible of the various aspects of "target face" that they have seen in step 1, and during 20 seconds viewed a picture (see the picture in the video Meant for condition 3 in Appendix 2).

The Voice instructions in the video provided by the narrator for this condition consist of this dialogue: "During the time of 20 seconds, you will describe as much as possible the different parts of the face that you saw last write these in sheet No. 2, thanks,". After 20 seconds the second recording instruction from the narrator was given:" In the next picture, you have 20 seconds to find as many as possible faces or face-like figures, write the number of faces you could find in sheet No.1, thanks ".

Stage 3. Immediately after step 2, participants were presented with a photo “lineup” identification task. All participants were shown six images for 5 seconds (lineup), an image of the target face (which they had seen in step 1) along with five distractors (all pictures were from the front). Participants should try to identify the target face. Before the identification phase, participants were given this instruction by narrator "in the next picture you will see six faces for 5 seconds, you should identify the target face, the one you saw last and then write the corresponding alphabet in sheet No.3.”

All participants repeated steps 1 to 3 a total of 6 times (6 different target and lineup pictures).

The results were then analyzed using SPSS 21.
Results

As can be seen in Figure 1, the verbal overshadowing effect was replicated, as the participants who made a verbal description had fewer scores on the face recognition test than the participants who made no verbalization.

However, the participants who undertook viewing the nature painting (face search task) after a verbal description of the target face had better face recognition performance than the group who verbally described the target face.

Thus, it appears as if the negative effects of verbalization can be counteracted by introducing a face processing task prior to recognition. These conclusions were confirmed by Anova one-way between-groups analysis of variance. There was a statistically significant difference at the p < .05 level in identification scores for the three groups: F (2, 45) = .17, p = .015. The effect size resulting by calculation of eta squared was .169, which in Cohen’s (1988, pp, 284-7) terms the effect size of .17 can be consider as large effect.

Post-hoc comparisons using the Tukey HSD test also indicated that the mean score for verbalization participants (M = 5.18, SD = 0.65) was significantly different from no-verbalization participants (M = 5.75, SD = 0.58), p = .022, the magnitude of the differences in the means was very large (eta squared = .41) and verbalization participants (M = 5.18, SD = 0.65) was significantly different from reverse verbalization participants (M = 5.69, SD = 0.48), p = .046, the magnitude of the differences in the means was very large (eta squared = .40). Mean score for no-verbalization participants did not differ significantly from mean score for reverse verbalization participants, p = .95.

![Figure 1. Mean recognition as a function of “verbalize participants” (those Performed verbalization task), “no-verbalization” (Control group), and “reverse verbalization participants”(those who Conducted visual task after verbalization) shows the influence of different tasks on identification of the target face in experiments.](image-url)
Discussion

The primary purpose of this study was to investigate whether a face recall advantage can be induced when a visual task before the recognition phase were presented to the participants.

Methodological discussion. The painting used in the visual task is a special type of painting (see Appendix 2) in this painting there are about 15 face like images that one observer may perceive as faces, in reality, these images is nothing but some individual objects such as rocks, trees or other things, found in nature.

Through The Gestalt laws of perceptual organization (similarity, proximity, closure, continuity) the separate objects in the painting can be perceived by participants as part of a larger whole (a face) the perceived faces are actually a mental representation which contains distinctive features of a face.

According to M Wertheimer (1938) when people observe a number of things we do not usually experience that as some individual things, instead the major entities are created from the different parts, which leads to an experience of a wholes.

I assumed when the Participants in reverse verbalize group were encouraged to look deep to see faces in the nature painting, and when they are combining different objects in to images and their concentration to find as many as possible faces or similar face shapes in nature painting, participants will be heavily involved in a cognitive information processing a nonverbal one, and being in this state of cognition in turn helps the participant in the correct recognition of a target face in the following step (stage 3) of the study, resulting in improvement in face recognition scours for participants in group3.

In my experiments results shows that firstly verbalization task lead to impaired face recognition performance of verbalize participants relative to no-verbalize participants and verbal overshadowing effect has been occurred.

I also found that in condition3, “reverse verbalization participants” a release from verbal overshadowing occurred this result is in line with our hypotheses and prediction shows that the impact of verbal overshadowing may be reversible, since “reverse verbalization participants” have been better to identify the target face that was presented to them step 1 than “verbalize participants”, and this difference was statistically significant, therefore we can throw the null hypothesis at the moment and says that by participating in a nonverbal task before the recognition phase we can to some degree swivel verbal overshadowing effect.

Within the verbal overshadowing literature there are mainly two kind of explanation for this retroactive interference in face recognition performances:

Fist one is storage and interpretation, which relay on memory consolidation mechanism, a category of processes that stabilize a memory trace after the initial acquisition. the storage interpretation believe that as a result of a consolidation process when people verbalize, a change occurs in the content of the initial visual memory of the face, in other word the verbalization of the target face overwrites the information and memory of the original target face, thus the reconsolidated memory due to verbalization is less accurate than the original memory for the face.

An experiment by Finger and Pezdek (1999) has shown that when participants received a 24 minute delay before the identification of the target face, a release from verbal overshadowing occurred, this is an evidence that the original memory for the stimuli in this case a face was not subject to overwriting.

In another study, Dodson et al. (1997) initially participants were shown two faces, and participants in verbalizing phase only describe one of the faces. It was observed that
verbalizing not only have reduced recognition for verbalized face, but also the memory of the non-verbalized face, in other words verbalization lead to deterioration of memory for both faces in face recognition phase.

The second explanation is the retrieval interpretation when verbalization about the target face makes the memory for the original target face less accessible during the recognition phase; several studies have encountered retrieval interpretation and not the storage interpretation.

According to Baddeley and Hitchs model (1974) there are two distinct storage mechanism in short-term memory a "phonological loop" for verbal and language processing and "sketchpad" for visual-spatial information processing.

I assume that such difficulties for face recognition that present itself in verbal overshadowing may be due to inhibition of retrieval processes associated with verbal description of memory for the target face, in other words, a verbal retrieval processes induce a processing shift which inhibit the following visual retrieval process.

There by conversely engaging in visual task prior to recognition phase reversed this processing shift, enhancing the accuracy of face recognition and resulting improvement in face recognition scores and a release from overshadowing.

In other word a shift in the processing operations underlies the effect of overshadowing.

**Limitations of the study.** Since we could not take with as many women as men in our experimental groups, one may intend to speculate this representation does not fulfill the classic sample-to-sample (statistical) generalization.

As regards to the impact of our results for theories in the field. I will point out that our study contributes evidence that visual memory has favored when the information is processed visually.

Moreover, our experiments show that the recall advantage may have some practical importance, and this finding may be applied in any review of the current routine to identify criminals.

Perhaps putting the eyewitness in an environment which stimulates their non-verbal information processing prior to a face recognition phase which may in fact aid them in more accurate identification of a target face in a lineup. This may in turn lead to a more accurate identification of offenders and contribute to a safer, more reliable and more successful criminal investigation.

**Suggestions for future research.** Future studies regarding relief from verbal overshadowing effect should focus on the effect of time and duration of verbal, visual processing, in face recognition task.
References

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Appendix
Appendix 1. Missivbrev
Information om deltagande i en undersökning verbal och visuell kognitiv process.
Vill du delta i en studie som är ett projektarbete i psykologi C vid Högskolan i Gävle. syftet med undersökningen är att få mer kunskap om människans kognitiva förmågor, del viss hur vi bearbetar visuella samt verbala information, och delar med insikter om denna mänskliga aktivitet som kallas tanke.
Ytterligare upplysningar lämnas av nedanstående ansvariga:
Appendix 2. Nature painting
Below is the image in the video Meant for permission (group) 3. We predicted that this "contest related tasks" and the willingness of the participants to find as many faces as possible would cause in turn full attention to non-verbal process that causes a re-emphasize on non-verbal processing as a result in step 3 Information processing will be the same as encoding moment in step 1.

Appendix 3. Videos
The three 570 second long videos playable in Windows Media Player, which were used in experiment destined for each condition, Double clicking the icon below to start.

Condition1; betingelsen1x.wmv
Condition 2: Betingelsen 2xfinal.wmv

Condition 3: betingelse3 xfinal.wmv