Is it What You Said or How You Said it?
Distinguishing Between the Content and Processing Accounts for Verbal Overshadowing

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Abstract

A substantial literature suggests that verbalization can be detrimental to face recognition, the term for this phenomenon being verbal overshadowing. Currently two explanations compete to explain verbal overshadowing: a content account, indicating that verbalization is an imperfect representation of the original stimuli, and a processing account indicating that verbalization causes a processing shift from global to local processing, which is detrimental to face recognition. We propose both accounts are valid and applicable under situations dictated by language ability and the verbalization task. The current studies aimed to support the situational applicability of both accounts as well as provide direct evidence for a processing shift. In study one, participants engaged in a face recognition task with a verbalization and control condition, as well as a measure of global/local processing. The results of study one indicate that European Canadians do experience a processing shift towards more local processing after verbalization. Evidence for verbal overshadowing, however, was not found. Study two utilized a similar paradigm, except faces were drawn from a more geographically relevant database and the verbalization task was more demanding. Evidence for verbal overshadowing was found among East Asians for whom English was not their primary language, a finding consistent with the content account. The results of both studies show preliminary evidence for the existence of both content and process effects under certain conditions.
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Introduction

Theory, research and general debate on the nature of the relationship between language and cognition has been in no short supply in past century (Watson, 1924; Whorf, 1956, Hunt & Angoli, 1991). Verbalization – the simple act of translating one’s thoughts into words – lies at the heart of this debate and although verbalization seems straightforward enough, its impact on cognition is far from clear. A phenomenon known as verbal overshadowing typifies the tenuous relationship between language and cognition. As the term implies, verbal overshadowing occurs when verbalization proves detrimental to the task at hand. Despite the fact that the verbal overshadowing effect has been shown to be quite pervasive, permeating areas such as decision making (Wilson & Schooler, 1991) and problem solving (Schooler & Melcher, 1995), its cause remains ambiguous.

In this paper we will first review evidence for verbal overshadowing and its generality to other domains. Next, we will discuss two accounts for verbal overshadowing that have been proposed and framed as competing explanations: a content account, which focuses on the content of verbalization, and a processing account, which focuses on a shift in processing orientation caused by verbalization. The terms content and processing will be explained in greater detail below. We will then propose a framework that integrates the two accounts, specifying situations in which one account is more applicable than another and test this framework in two studies.

Verbal overshadowing was first documented by Schooler and Engstler-Schooler (1990) in a study of eyewitness memory. Participants viewed a video of a robbery perpetrated by a salient individual whom participants in the verbalization condition
subsequently described. The results indicated that participants who described the robber were poorer at picking him out of a lineup, as compared to control participants who read an unrelated text for the same amount of time. As mentioned above, verbal overshadowing is not specific to face recognition, but have been observed in several seemingly disparate domains.

In the problem solving arena, Schooler and colleagues (1993) found that insight problems - problems that do not lend themselves well to analytic reasoning - are susceptible to verbal overshadowing. These researchers asked participants to verbalize their thought processes concurrent to solving several insight problems and analytic problems. They found that insight problem solving was impaired for verbalizing participants, as opposed to participants who engaged in a control task. Further, analytic problem solving was not impaired by verbalization. A similar effect was found in the domain of affective decision making. Wilson and Schooler (1991) performed a study to test whether verbalization impairs the quality of people’s judgments. In a study veiled as an inquiry into consumer judgments of strawberry jams, they asked some participants (verbalizers) to taste the jams and then list their reasons for liking or not liking the jams, as well as analyzing their reasons. Control participants tasted the jams but did not list or analyze their thoughts about the jams. Schooler and Wilson found that participants who did not list and analyze their reasons made judgments that were more similar to that of expert jam raters (from consumer report magazines) as compared to verbalizers. In short, verbal overshadowing is not limited to memory.

Given that a healthy number of studies have documented verbal overshadowing across several different areas of study, it is noteworthy that a single theory has not been
accepted as to what exactly causes verbal overshadowing. Currently, two accounts compete for the right to explain verbal overshadowing: a content account and a processing account, which shall be explained below.

A Content Account

Schooler and Engstler-Schooler (1990) originally proposed a content based account for verbal overshadowing, surmising that while creating descriptions of faces, participants generate misinformation (e.g., noting characteristics that were not actually present) which later interferes with future recognition. The content account agrees well with standard theories of memory interference (e.g., Schooler, Foster, & Loftus, 1988), as well as with the fact that the domains in which verbal overshadowing tends to be documented deal with concepts that are not easily put into words (e.g., faces, tastes, etc). Research demonstrating that verbal overshadowing is especially likely when perceptual expertise exceeds linguistic ability provides excellent evidence for the content account.

Support for the Content Account

In a study testing the effect varying levels of perceptual and linguistic expertise has on verbal overshadowing, Melcher and Schooler (1996) asked participants to taste a wine and either verbalize it or perform a control task prior to identifying the tasted wine among distracters. Participants were either non-wine drinkers, untrained wine drinkers, or trained wine drinkers. Melcher and Schooler’s results align well with the content account as they found that verbalization only impaired untrained wine drinkers. In short, an untrained wine drinker’s perceptual expertise in wine tasting exceeds her verbal
expertise in describing wine, and thus she does not have the verbal tools to describe all of the nuances her palate detected. Thus, she creates a verbalization that does not match up with experience – in other words, verbal overshadowing due to a mismatch between the content of verbalizations and perception.

Content appears to also be an issue when the verbalization task requires participants to produce verbalizations that are beyond their ability. Meissner, Brigham and Kelley (2001) term such instances, retrieval based effects. In short, Meissner and colleagues find that the way in which verbalization instructions are worded can influence the strength and even the existence of verbal overshadowing effects. They find strongest effects in what they call a forced recall condition, in which participants are asked to fill out between 20 and 25 lines of descriptions, even if they feel they are guessing. Meissner and colleagues utilize a content-based explanation for their results, suggesting that forced recall participants are more apt to generate misinformation, which then interferes with recognition. Despite a good deal of evidence implicating content effects as the cause of verbal overshadowing, there are situations in which it is an unlikely explanation.

Content Account Limitations

To be completely confident with a content account, a strong connection should exist between the quality of verbalizations and recognition accuracy. With face recognition, participants who create accurate and complete verbalizations should be more likely to recognize the verbalized face later in the study. Many studies, however, have not shown this correlation between verbalization quality and recognition accuracy (Brown & Lloyd-Jones, 2003; Kitagami, Sato, & Yoshikawa, 2003; Fallshore &
Besides its failure to explain the lack of correlation between verbalization quality and recognition accuracy, the content account fails to explain other findings emerging from verbal overshadowing studies.

A growing number of studies indicate that overshadowing is not limited to the verbalized stimulus. Dodson and colleagues (1997), for instance, asked participants to verbalize only one of two faces and found that verbalization impaired recognition for both faces. Brown and Lloyd-Jones (2003) found a similar effect when they presented participants with 13 faces and only asked that they described the 13th face presented. They found that recognition accuracy was impaired not only for the verbalized face, but for the 12 faces presented prior to the verbalized face. Seeing as the content account relies on the recoding of content into a suboptimal form, the finding that verbal overshadowing occurs for content that is not verbalized makes it unlikely that this account can fully explain verbal overshadowing. The above findings do suggest that at least in part verbal overshadowing may not be due to the specific content of verbalizations, but the simple fact that something is verbalized.

A Processing Account

To deal with the lack of explanatory power provided by the content account in certain situations, researchers have proposed a processing based account for verbal overshadowing (see Schooler, 2002 for a review). Past research has shown that memory for faces, insight problem solving and certain kinds of decision making rely on holistic/global processing, as opposed to item-by-item analytic/local processing. For example, there is strong consensus in the face recognition literature that such featural
processing could deprive the perceiver of holistic information important for face recognition (Valentine, 1988). In other words, it is the way the face looks as a whole that matters, and not as much what each individual feature looks like. When one verbalizes a face, they tend to focus on the easily verbalized features, thus shifting processing from the global to the local (Schooler, 2002). In short, the processing account proposes that verbalization causes a shift in processing from a global/configural processing orientation to a more local/featural orientation.

Support for the Processing Account within Face Recognition

With regards to memory for faces, Schooler (2002) proposed that verbal overshadowing would cause a transfer inappropriate processing shift. If faces are indeed encoded in a more configural manner (Valentine, 1988), and verbalization shifts processing towards a featural orientation prior to retrieval, a disconnect between encoding and retrieval is created, thus impairing memory.

A transfer inappropriate processing shift explains several aspects of previous facial memory studies that the content account cannot explain. For instance, Macrae and Lewis (2001) found that effects similar to verbal overshadowing could be found through substituting verbalization with a task designed to shift processing from global to local. These researchers performed a face recognition study using the robbery video initially utilized by Schooler and Engstler-Schooler (1990), but in lieu of a verbalization condition, presented participants with Navon (1977) letters (i.e., small letters which comprise a larger composite letter, for instance, a large letter ‘s’ made up of smaller ‘j’s) and asked them to report either the larger global letter or the smaller local letters.
Participants in the control condition read from a text unrelated to the study. Macrae and Lewis found that globally orientated participants were better at identifying the robber than control participants, who were in turn more accurate than locally orientated participants. To summarize, these researchers found that it is possible to create an effect similar to verbal overshadowing by inducing a processing shift from global to local.

Further evidence can be drawn from research on memory for same and other race faces. Fallshore and Schooler (1995) found that verbalization interferes with memory for same race faces, but not with memory for other race faces. Given that researchers have found that other race faces tend to be processed featurally (Rhodes, Tan, Brake, & Taylor, 1989), a processing shift towards local/featural processing should not have an effect on other race faces, which are already being processed in such a manner.

Support for the Processing Account outside of Face Recognition

A processing shift has also been implicated in several studies altogether unrelated to facial memory. Forster, Friedman and Lieberman (2004), for instance, found evidence for both transfer appropriate and inappropriate processing shifts in their investigation into the effect of temporal construal on creativity and insight problem solving. Temporal construal refers to the time distance perspective one takes when imagining an event, a variable Forster and colleagues manipulated by asking participants to either imagine their life tomorrow or a year from tomorrow. With regards to creativity, they hypothesized that imagining their life a year from tomorrow would cause a transfer appropriate processing shift, activating mental processes related to more abstract representations, which would carry over to creativity tasks later in the experiment (e.g., creating more
abstract solutions to problems or better performance on insight problem solving tasks). Indeed, participants taking a distant time perspective demonstrated more creativity and solved more insight problems than participants taking the near time perspective. Forster and colleagues also found evidence for a transfer inappropriate processing shift in that participants taking a distant time perspective showed impaired performance on logic puzzles from the analytic section of the GRE, as compared to participants taking a near time perspective and participants in the control condition. As a result of these findings, they postulate that taking a distant time perspective shifts processing away from concrete thinking that is beneficial for analytic logic problems.

More specifically related a global or local processing shift, Yeomans, Chin and Schooler, in an unpublished study, manipulated global or local processing orientation via the Navon letter manipulation (Macrae & Lewis, 2001), and then administered insight problems to participants. They found that globally orientated participants solved more insight problems than locally orientated participants. These results indicate that the focus on global characteristics creates a processing shift of the same nature as that created by the distant time perspective demonstrated by Friedman and Forster. In short, it appears the there exists a general or related set of processes characterized by local, featural and concrete thought, and another set of processes characterized by global, configural, and abstract thought. These two distinct sets of procedures have been shown to be predictably activated by a focus on global or local characteristics of unrelated stimuli, time perspective, mood (Gasper & Clore, 2002), and possibly verbalization.

The research presented thus far is highly consistent with the notion that verbalization causes a transfer inappropriate processing shift, which is at least partially
responsible for verbal overshadowing effects. The current research attempts to provide more direct evidence for the transfer inappropriate processing shift account for verbal overshadowing. One should note, however, that current research in cognition across cultures indicates that the effect of a processing shift may vary cross-culturally.

Cross-cultural Implications of the Processing Shift Account

That East Asians are both more dependent on and more prone to utilize holistic reasoning holds the great preponderance of cross-cultural research findings (see Nisbett et al, 2001 for a review). For instance, Matsuda and Nisbett (described in Nisbet et al, 2001) asked Japanese and American participants to view an animated scene of fishes in an ocean environment and later recall what they had seen. Japanese participants made more statements about the environment, whereas Americans were more concerned with a focal fish. Further, Japanese participants were impaired on a later memory task when the focal fish was shown on a different background, but Americans were not, an effect that suggests that the Japanese were more dependent on background and contextual cues. Abel and Hsu (1949) performed a similar study in which they showed Rorschach cards to Chinese Americans and European Americans. European Americans based their responses more on part of the card, while Chinese Americans based their response more on the gestalt of the card. To apply these cross cultural findings to the current research, it seems fair to say that compared to Europeans, East Asians are chronically globally orientated.

If East Asians are indeed more dependent on global information, a manipulation designed to shift their processing orientation towards a more local or analytic orientation
should influence their performance more than Europeans who are more accustomed to such a processing orientation. Kim (2002) found such an effect while studying the effect of talking aloud while problem solving cross culturally. Specifically, Kim asked East Asian and European Americans (all native speakers) to either verbalize aloud their thought process or not while solving reasoning problems. Kim found that East Asian Americans participants were impaired by thinking aloud, while European Americans were not. Together with Schooler and colleagues' (1993) finding that verbalization impairs the performance of European Americans on insight problem solving tasks, it seems likely that verbalization shifted processing towards a more local/analytic processing orientation that East Asians were not accustomed to using, thus impairing their problem solving performance.

**Content and Processing**

Although the content and processing accounts are often framed as competing explanations, the above review presents no findings ruling out their coexistence. In fact, the two accounts compliment each other quite well.

Content and processing effects are likely *both* at play in many verbal overshadowing prone situations. Content, however, is probably the main culprit when either perceptual ability exceeds linguistic ability, or when the verbalization task demands exceed linguistic ability. We term such situations content driven instances of verbal overshadowing. A processing shift may also be present in such situations, but as we will see, processing shifts tend to be less robust and are perhaps eclipsed by content
effects. Further, if linguistic ability is very poor, one may not be able to verbalize in
enough detail to cause a processing shift.

Of course, verbal overshadowing has been documented even when the conditions
of a content driven instance are not met, and these effects are likely driven by a
processing shift. As mentioned, Meissner and colleagues (2001) find a more robust
verbal overshadowing effect when the verbalization is more forceful and directive. Still,
many researchers have documented verbal overshadowing without such conditions,
indicating that processing instances may be more subtle, and by their very nature, more
fragile (Schooler, 2002). Finger (2002), for instance, found that listening to music prior
to recognition in a verbal overshadowing task can alleviate the effects of verbalization,
ostensibly negating the processing shift caused by verbalization. In short, the coexistence
content and processing effects helps provide a framework for the findings and non-
findings of many prior verbal overshadowing studies.

Summary of Studies

The present studies tested both European Canadians and East Asians Canadians
who either primarily use English or a different language. The studies tested the
relationship between verbalization (in English) and face recognition memory, with the
addition of a measure of global or local processing. In addition to replicating the
standard verbal overshadowing effect, we expected that the measured levels of local
processing would be increased by verbalization, which would in turn predict an
impairment in recognition accuracy. According to the content account, those with low
linguistic expertise should experience greater verbal overshadowing as compared to those
with high linguistic expertise. The processing account, however, would predict that even those with high verbal ability should exhibit some level of verbal overshadowing because they are still focusing on featural elements, thus causing a transfer inappropriate processing shift. The current studies were designed to test such a relationship.

Study One

Study one was primarily designed to provide direct evidence for the processing account. We predicted that verbalization would cause a shift towards a more local processing orientation, which would negatively affect face recognition accuracy. A measure of global/local processing (described below) was used to gauge the effect of verbalization on processing. Further, we expected that East Asians would show greater impairment due to verbalization, as this group has been shown to be more dependent on holistic/global information. Because we sought evidence for a processing shift, which we hypothesize to occur independent of content overshadowing, the verbalization directions were not directive, and simply asked participants to write down as much as they could about the face they viewed.

We attempted to include East Asians and European Canadians with both high and low levels of experience with English in an attempt to control for linguistic expertise. For example, low linguistic expertise would indicate a content driven instance of verbal overshadowing, which doesn’t require a processing shift to occur, thus introducing the possibility of finding verbal overshadowing without a measured processing shift. We also wanted to control for linguistic expertise because it is possible that those with low levels of linguistic ability would not be able to verbalize a face enough to cause a
processing shift. Unfortunately, as there was no prescreening measure available, precise control over the number of primary English and non-English speakers was not possible.

Method

Participants

Participants were 55 University of British Columbia undergraduates participating in exchange for course credit. Participants included 28 women and 17 men, who were between the ages of 18 and 40 ($M = 20.56$, $SD = 3.72$).

Overview and Design

Study one was largely a replication of a paradigm developed by Brown and Lloyd-Jones (2002), with the addition of a global or local processing measure described below. The study was presented using a computer program during which participants viewed several faces (encoding), verbalized the final face seen (or completed a control task), completed a measure of global or local processing (described below), and then attempted to recognize faces seen previously. Upon completion of the above steps, they were repeated exactly, except that the study drew upon a different set of faces, and participants worked on a different experimental condition (e.g., if they had verbalized the face in the first portion of the study, they now worked on the control task). In other words, verbalization was a within participants factor and order was a between participants factor. Thus, the design was $2 \times 2$ (verbalization/control X order).

Materials and Apparatus
The stimulus and test photographs were a set of 50 head-and-shoulder color photographs of Caucasian males. The photographs were taken from The University of Stirling Psychology Department Psychological Image Collection (http://pics.psych.stir.ac.uk). Both counterbalanced experimental conditions utilized 25 of the photographs: 12 faces pre-selected faces presented randomly during the encoding phase, one pre-selected face to be described, and 12 of the faces seen during encoding plus 12 new faces during the test phase.

The study was presented using e-prime software on an IMB compatible style computer with a 15 inch LCD monitor.

Procedure

Upon arriving at the lab room, the experimenter (a female undergraduate) told the participant that he or she would be taking part in a study of face recognition memory. The experimenter then escorted the participant to a computer where the computer program was initialized.

The instructions on the computer screen indicated to participants that they would see several faces that they would be asked to recognize later in the study. Participants then viewed 13 faces, one-by-one, for five seconds each. Depending on the order they were assigned to, participants were then instructed to either write out a description of the last face they had seen with the pen and paper provided (verbalization condition), or list as many countries as possible (control condition). Participants then rated their mood on the PANAS (Watson et al, 1988) and completed a 24 trial shape classification task designed to measure global or local focus. The shape classification task required participants to indicate whether a target figure was more similar to a group of shapes that
matched the target figure's global characteristics or a group of shapes that matched the target figure's local characteristics (Gasper & Clore, 2002). The shape classification slides presented the target figure at the top of the screen and the global or local choices at the bottom left and right, with 12 of the 24 slides containing the local choice on the right and 12 placing the local choice on the right (see figure 1). Finally the program informed participants that they would see faces they had seen before along with faces they hadn't seen and be asked to identify the faces they had seen before. Participants then viewed 12 faces they had seen during the encoding phase and 12 new faces consecutively and randomly, and identified the faces they believed they had seen during the encoding phase. The entire procedure was then repeated with the experimental condition the participant had not yet completed.

Upon completion of the computer program, participants filled out a form with some demographic questions. The experimenter then debriefed and thanked the participant.

Results

One student neglected to fill out the exit questionnaire including integral measures such as primary language and gender, and thus was excluded from the final analysis.

Recognition accuracy scores were calculated by averaging the correct responses, out of 24, in identifying faces seen during the encoding phase of the trial.

Recognition accuracy scores were analyzed with a 2 (gender: male vs. female) X 2 (order: control first vs. verbalization first) X 2 (condition: control vs. verbalization) X ethnicity (Caucasian vs. East Asian vs. other) between-within ANOVA. Gender was
entered into the analysis because all of the faces displayed were male and it was possible that men might have some degree of perceptual expertise with male faces. Gender had neither a significant main effect nor did it interact significantly with any other variables, $F_s < 1$, for this analysis or any of the following analyses described in study one.

Ethnicity was analyzed because prior research has suggested that people process same race faces more holistically and other races faces more analytically (Fallshore & Schooler, 1995). Ethnicity was classified as above for two reasons. First, there is a substantial literature suggesting that East Asians are more prone to holistic reasoning, which may play a role in verbal overshadowing. Further, the other category consisted of two participants who self-reported as African, two as Indian and two as Middle Eastern. As there were too few of these participants to be placed in separate categories, they were placed in the same category. Regardless, this first between-within ANOVA also did not find any statistically significant main effects or interactions between any variables.

Some research has shown that verbal overshadowing effects tend to diminish over time (possibly because processing shifts back to the default global orientation), and as such the first trials tend to be more robust (Schooler, 2002). As such, recognition scores of the first trial participants partook in were analyzed with a 2 (gender: male vs. female) X (condition: verbalization vs. control) X (ethnicity: Caucasian vs. East Asian) between participants ANOVA. Again, no significant main effects or interactions were found. A measure of local processing was created by averaging the number of shape classification trials, out of 24, that participants classified the shape locally. Entering the local processing measure as a covariate into the above ANOVAs did not alter the significance of any of the above effects. Further, a multiple regression predicting accuracy, including
these same variables showed neither an effect for degree of local processing, nor any of the predictors and the model did not significantly explain the variance in accuracy ($F = 1.21$).

Local processing scores of the first trial completed were analyzed with a 2 (condition: verbalization vs. control) X (ethnicity: Caucasian vs. East Asian) between participants ANOVA. One significant effect emerged, a ethnicity vs. condition interaction, $F(1, 28) = 5.83, p = .023$. Analyses within levels of ethnicity revealed that this interaction was driven by a statistically significant effect within Caucasians, $F(1, 28) = 4.85, p = .036$, and no effect of verbalization within East Asians, $F(1, 28) = 1.14, ns$. As predicted, Caucasian participants in the verbalization condition responded more locally to the shape classification task, as compared to Caucasians in the control condition, $Ms = .58$ versus .22 ($SDs = .32, .14$). Although we predicted that results within East Asians would show a similar pattern of results, perhaps even more so because people from East Asian cultures are known to use more holistic reasoning to begin with, this group showed no significant difference between those in the verbalization ($M = .27$, $SD = .22$) and the control group ($M = .40$, $SD = .32$) (see figure 2). Unfortunately, this sample contained merely two East Asian participants who identified their primary language as English, so it was not possible to analyze language separately. Entering primary language, classified as English or non-English, into the above analysis did not alter the statistical significance of the aforementioned effects. To determine if East Asians were verbalizing more holistically, three research assistants rated the verbalizations on the degree of holistic description the verbalization contained ($\alpha = .79$).
Entering this variable into the above analyses did not alter their statistical significance, nor were East Asians more likely to provide a more holistic description ($F_s < 1$).

Affect, as measured by the PANAS, was neither influenced by verbalization, nor did entering it as a covariate in any of the above analyses influence these analyses significantly.

**Discussion**

Although study one did not provide evidence for verbal overshadowing, our hypothesis was supported in that verbalization caused a processing shift. However, this processing shift was only evident Caucasians, who happened to all speak English as their primary language. Separating participants who self-reported as ethnically Asian into those who primarily use English or primarily use their native language was fruitless in that there were only two ethnic East Asians who primarily spoke English. As such, study one cannot disentangle the effects of culture and linguistic ability.

The failure of study one to demonstrate evidence for verbal overshadowing also inspired several questions. The database of faces used in study one contained several faces that were highly distinctive, but perhaps more common in the UK. Because face recognition accuracy was very high in this study, the distinctive nature of the faces may have aided all groups in recognition task, thus eclipsing the verbal overshadowing effect. It is also possible that the delicate nature of the processing shift was disturbed by the PANAS or even the measure of global/local processing. These measures were presented after verbalization, but before the face recognition task, so it is possible they disrupted the processing shift.
Ignoring the failure to demonstrate verbal overshadowing for a moment and focusing on the evidence for a processing shift among Caucasians, but not East Asians, three potential reasons for this pattern of results present themselves immediately: (1) East Asians verbalized the faces differently, possibly directing their attention towards more global details (2) East Asian participants were verbalizing other race faces, while Caucasians were verbalizing same race faces, or (3) East Asians did have the necessary English language proficiency to generate a description that would produce a processing shift. Reason one, attention to holistic details is partially accounted for by the analysis indicating that the degree of holistic description did not significantly influence local processing. The method used for identifying holistic descriptors, however, was not perfect and it is still possible that attention to global or local details played some role. Reason two, the fact East Asians were viewing other race faces while Caucasians were not, will be addressed in study two. Study two also aimed to include enough English language participants to address the role of linguistic ability (reason three).

To summarize, although study one failed to demonstrate verbal overshadowing, it did show evidence for a processing shift among Caucasians. Due to limitations of the study, these Caucasians also happened to both speak English primarily and were viewing same race faces. Goals for the study were thus twofold: (1) control for the same race and linguistic ability effects and (2) simplify and reengineer the design in order to demonstrate verbal overshadowing.
Study Two

The primary goal of study two was to find evidence of verbal overshadowing, which necessarily precedes demonstrating that a specific explanation is accountable for the effect. To this end, we implemented a paradigm Meissner and colleagues (2001) have used to find a more robust, and content-based verbal overshadowing effect (methodology described below). In an attempt to further simplify the study, the PANAS was omitted from study two. Furthermore, affect did not significantly influence the results of study one, so including an affect measure in study two seemed unnecessary. The sample size was increased in hopes of testing more East Asian participants who primarily speak English. In short, these changes allowed us to test the effect of linguistic ability under a situation where the verbalization is more demanding.

We also predicted that the unfamiliar nature of the faces used in study one (photographs were taken several years ago in the U.K.) might have caused unusually high recognition scores and thus prevented the discovery of differences in accuracy. Further, the original set of faces included only Caucasians. Study two overcame this shortcoming through the inclusion of photographs taken at the University of British Columbia campus of both East Asian and Caucasian females.

Method

Participants

Participants were 80 University of British Columbia undergraduates (56 women, 22 men) participating in exchange for course credit, who were between the ages of 18 and 48 ($M = 20.69$, $SD = 4.21$).
Overview and Design

The design of study two followed closely with a paradigm used by Meissner and colleagues. The main change from study one was in the way in which participants generated their description of the target face. In study one, participants were free to create a description as they saw fit, including as little or as much detail as they deemed necessary. In study two, however, we utilized what Meissner et al (2001) call a forced recall condition, in which participants are presented with a sheet of paper with twenty lines and are asked to fill each line with a description of the target face. In order to further simplify the study, the participant viewed only the target face (instead of viewing 12 before it) and was only asked to recognize that face later in the study, in two lineups of six faces each. In the first lineup, the target was not present, and thus the correct response was the target not present option and in the second lineup, the target was in the fifth position. In study two each participant was subject to only one condition, because in study one we only ended analyzing each participant’s first trial. There were, however, two versions of the study, one using photographs of East Asians taken at the University of British Columbia campus and one using photographs of Caucasian students. Thus, the design was 2 X 2 (verbalization/control X East Asian/Caucasian faces).

Materials and Apparatus

The photographs were taken from a set of head-and-shoulder color photographs of Caucasian and East Asian females from the University of British Columbia Campus. The
target Asian and Caucasian photographs were that of a relatively nondescript student and the lineups were comprised of six photographs presented in a matrix with two rows of photographs, with three photographs in each row. The target photographs were taken at a 45 degree angle and the photographs presented in the lineup were at a full frontal angle. This was to ensure that the recognition task tapped the participant’s memory for the target face, rather than the target photograph (Baddeley and Woodhead, 1983). The target did not appear in the first lineup presented, and appeared in the fifth position in the second lineup. The photographs for the lineup were selected by the author for their similarity to the target photo.

The study was presented in the same lab, using the same software and hardware as study one.

Procedure

Upon arriving at the lab room, the experimenter (a female undergraduate) told the participant that he or she would be taking part in a study of face recognition memory. The experimenter then escorted the participant to a computer where the computer program was initialized.

The instructions on the computer screen indicated to participants that they would see a face that they would be asked to recognize later in the study. Participants then viewed a photograph of a Caucasian or East Asian female for five seconds. Participants were then instructed to either write out a description of the last face they had seen with the pen and paper provided (verbalization condition), or list as many countries as possible (control condition). Participants then completed the 24 trial shape classification task
utilized in study one. Finally the program consecutively presented the two lineups mentioned above. The instructions requested the participant press the numeric keypad button corresponding to the position of the face presented earlier in the study (keys 1 – 6) or press ‘7’ if the face wasn’t there.

Upon completion of the computer program, participants filled out a form with some demographic questions. The experimenter then debriefed and thanked the participant.

Results

Of the 80 participants, seven (five verbalize, two control condition) were excluded from the analyses due to computer malfunctions during the experiment: six participants experienced a computer crash while engaged in the study and one experienced a monitor malfunction.

Recognition accuracy scores were calculated by averaging the number of correct responses to the two lineups. Recognition accuracy scores were analyzed with a 2 (condition: verbalize vs. control) X 2 (whether the participant was viewing faces of the same race to their own: yes vs. no) X 2 (primary language: English vs. non-English) X ethnicity (Caucasian vs. East Asian vs. other) between-participants ANOVA. Again, because so few participants (n = 7) classified themselves ethnically as anything other than Caucasian or East Asian, this small group was combined. The only significant effect to emerge from this analysis was a condition X language interaction, $F(1,56) = 4.26, p = .04$. This interaction was due verbal overshadowing among primarily non-English speakers such that verbalizers ($M = .57, SD = .43$) showed impaired memory compared to
control participants (M = .81, SD = .32), t(36) = 1.96, p = .058, while those whose primary language is English showed greater accuracy in the verbalization condition (M = .54, SD = .37), as compared to those in the control condition (M = .81, SD = .29), t(33) = 2.45, p = .02 (see figure 3).

Restricting the ANOVA testing the effect of ethnicity of participant and condition on recognition accuracy to only primary English speakers finds a significant main effect of condition, F(1, 29) = 5.82, p = .02, such that verbalizers (M = .81, SD = .25) perform more accurately than control participants (M = .54, SD = .37). This main effect is not qualified by a condition X ethnicity interaction (F = 1.22). However, we find it noteworthy that although East Asian primary English speakers did show a benefit of verbalization (Ms = .91 versus .67; SDs = .37, .35) numerically, this benefit was not as great as the benefit for Caucasian primary English speakers (Ms = .78 versus .25; SDs = .26, .29) and those classified as others (Ms = .88 versus .50; SDs = .25, .27) (see table 1).

A measure of local processing was once again created by averaging the number of shape classification trials, out of 24, that participants classified the shape locally. Local processing scores were analyzed with a 2 (condition: verbalize vs. control) X 2 (whether the participant was viewing faces of the same race to their own: yes vs. no) X 2 (primary language: English vs. non-English) X ethnicity (Caucasian vs. East Asian vs. other) between-participants ANOVA. Although the ethnicity X condition interaction noted in study one was not replicated, this finding is not entirely surprising given the unusually low number of Caucasian participants in study two. Study two contained 14 Caucasian participants, 4 in the verbalization condition and 10 in the control condition. Numerically, however, Caucasians in the verbalization condition (M = .29, SD = .21)
were processing more locally than Caucasians in the control condition \((M = .21, SD = .29)\). Restricting this analysis to primary English speakers, and excluding those classified as ‘other’ showed a marginally significant interaction between the ethnicity and condition, \(F(1, 27) = 2.31, p < .15\). This interaction indicates that verbalizing East Asians processed more globally than control East Asians \((Ms = .24 \text{ versus } .53; SDs = .33, .37)\), an effect that did not hold for Caucasians \((Ms = .28 \text{ versus } .21; SDs = .22, .29)\) (see table 2).

Although verbalization did not seem to affect the measure of local processing, local processing did seem to have an effect on accuracy. A multiple regression predicting accuracy was performed with condition, ethnicity and degree of local processing as predictors. When restricting this analysis to other race faces, none of the factors predicted accuracy, however within same race faces, local processing emerged as the only significant predictor of accuracy \((\beta = -.424, p = .03)\). This effect indicates that with regard to same race faces recognition, global processing is beneficial.

Discussion.

The results of study two show evidence that verbalization impairs the face recognition of those that do not speak English as their primary language, but aids memory of those that do. These results somewhat agree with past research. For instance, Melcher and Schooler’s (1996) research demonstrated that verbal overshadowing occurs when perceptual expertise exceeds verbal expertise. It is likely that participants with poor English skills indeed are fairly good at processing faces, but simply don’t have the vocabulary or general linguistic ability to put these observations to words, causing verbal
overshadowing. These findings are consistent with a content driven instance of verbal overshadowing. It is not clear why primary English speaking participants were aided by verbalization, although it is possible that the target faces may have had verbalizable features, which allowed for a benefit of verbalization. Further research would certainly be useful in explaining this unexpected benefit of verbalization.

We also proposed that East Asians would be more susceptible to verbal overshadowing effects because they tend to be more reliant on holistic processing. Although this study contained few East Asians with English as their primary language (n = 16), the analysis restricted to primary English speakers did show that East Asians had less of a benefit of Verbalization than Caucasians and others. This trend was not significant. However, we also restricted the analysis on the measure of global/local processing to primary English speakers as well. This analysis showed that East Asians tended towards global processing when verbalizing, while Caucasians did not. Such a relationship suggests that with the effect of language held constant, verbalization causes more global processing in East Asians (also a trend in study one), which doesn’t influence recognition accuracy.

Although we expected that local processing scores would relate to decrements in face recognition, the lack of strong evidence for this relationship was not altogether surprising. For instance, the local processing shift in study one was restricted to Caucasians and Caucasians were underrepresented in study two. Further, study two was designed such that verbal overshadowing may have been driven more by the content of verbalizations. According the currently proposed model of verbal overshadowing, a processing shift is not necessary to cause verbal overshadowing. What may well have
been demonstrated by study two is a content driven instance of verbal overshadowing, without a processing shift.

Also promising is the finding that local processing is detrimental for same race face accuracy. This finding fits with past research demonstrating that same race faces are processed more configurally (Valentine, 1988). The detrimental effect of local processing also suggests that although study two was designed to display more content related effects, processing still played a role – a relationship that supports the dual nature content and processing effects.

General Discussion

The present studies tested two explanations for the verbal overshadowing effect, as well as factors that may partially determine the prominence of each explanation to a verbal overshadowing prone situation.

Study one demonstrated a processing shift caused by verbalization, under non-directive verbalization instructions. Study two showed support for a content driven instance of verbal overshadowing, such that participants unaccustomed to verbalizing experiences in English showed impaired recognition accuracy when verbalizing. Further, the verbalization instructions in study two were more demanding, requiring 20 descriptions of the face seen. There were no clear differences in levels of global or local processing, indicating that a processing shift was not the main cause of verbal overshadowing in study two.

The present studies, therefore, provide evidence for a model of verbal overshadowing in which both content and processing are factors. This model suggests
that there are situations in which verbal overshadowing can be caused by content, processing, or both.

The current studies indicate that linguistic ability and the demands of the verbalization task determine the influence of content in a verbal overshadowing instance. If one lacks the linguistic ability to properly verbalize a stimulus, content is the more likely to drive the verbal overshadowing effect. For example, if linguistic ability is poor, there is a greater chance that the content of verbalizations will not match up well with experience, thus creating a content driven instance of verbal overshadowing. Furthermore, those with poor linguistic ability may lack the ability to produce a detailed enough verbalization to cause a processing shift. In other words, features tend to be more verbalizable than holistic qualities, a notion that is more relevant to those with a high degree of linguistic ability. Those with lower linguistic ability may not have the verbal tools to verbalize features or holistic qualities. Verbalization instructions appear to also play an important role in determining the likelihood of a content driven effect. As witnessed in study two, verbalization instructions that pressure participants to produce a more detailed description than they are able to can lead to verbal overshadowing, without a measured difference in local processing.

Processing driven instances of verbal overshadowing, however, may be more prone to appear when linguistic ability matches up with perceptual ability, and perhaps when verbalization instructions are less directive and forceful. In other words, when there is no reason to suspect content is an issue, verbal overshadowing can still occur in the form of a processing driven instance. In study one, Caucasians viewing same race faces showed evidence of a processing shift towards local processing when verbalizing.
These Caucasians all spoke English as their primary language, and the verbalization instructions were non-directive. Because a processing shift may be more fragile than a content driven instance, this shift may have been reversed prior to the face recognition task, potentially explaining the lack verbal overshadowing.

Of course, both content and processing are likely at play in many verbal overshadowing instances. These instances may represent the most robust and versatile findings.

A non-finding from study one, however, does not seem to fit with theory: East Asians did not show evidence for a processing shift. We initially suggested East Asians verbalizers may not have shown a processing shift because they were verbalizing other race faces. This notion was not supported by study two, which did not find any effect for same or other race photos. We also suggested that East Asians were verbalizing the faces differently, either through use of more holistic descriptors or because most East Asians in study two did not speak English as their primary language. Of these two differences in verbalization, study two indicates that language ability is the key factor, by including East Asians with varying degrees of familiarity with English. East Asians who do not speak English primarily exhibited verbal overshadowing, while East Asians who mainly speak English did not.

The existence of verbal enhancement (i.e., verbalization leading to improved recognition accuracy) is curious. The finding that East Asians who mainly speak English showed a trend towards more global processing after verbalization suggests that perhaps verbalization leads to more global processing in East Asians, which caused verbal enhancement. It is unlikely that this is the only explanation, as Caucasians also
experienced verbal enhancement, but not the same trend towards global processing. On the other hand, Kim (2002) showed that verbalizations impaired the performance of East Asians (native English speakers) in an analytic problem solving task. Kim's findings are difficult to reconcile with the findings of study two, given that East Asians show a benefit for verbalization in relatively nonverbal task. Still, these findings should be followed up as they are qualified by the fact that study two contained few East Asians who primarily speak English ($n_s = 8$ verbalizers and 8 control). Future studies could disentangle culture and language effects by including a condition in which East Asians verbalize in their native language. This condition would be useful in demonstrating the "pure" effect of culture through removing the effect of verbal expertise.

Another explanation for the verbal enhancement effect is that the faces used in study two were unusual in that they benefited from verbalization. It is possible that these faces had features that were easily verbalizable by one with average to above-average verbal ability, and so doing so enhanced recognition. Research using different target faces with the same distracters would clarify this finding.

The lack of correspondence between measures of local processing and face recognition accuracy is also an important avenue for future research. While content instances of verbal overshadowing do not require a shift in processing, processing instances clearly do. Analyses focused on groups that should show a processing shift, East Asian primary English speakers, for instance, showed that local processing was not related to accuracy. As stated above, these conditions suffered from a lack of sample size, but still, the lack of findings here is troubling. Future research studying a larger sample would be beneficial, as would improvements in measuring local processing. We
suggest the use of timed judgments, or merely flashing the composite shape for a brief time, to prevent participants from overanalyzing the shapes and attempting to remain consistent across trials as we are more interested in their gut-level perceptual impression of the figure.

In summary, the present studies suggest two avenues, both leading towards verbal overshadowing, but following different routes with different scenery along the way. Processing driven instances, by their very nature, are more tenuous and fragile, but are also more common and generalizable to areas outside facial memory. They can be used to describe previously cited studies that rule out content effects, such as the study by Macrae and Lewis (2001), in which they manipulated processing orientation through use of Navon letters, and studies that do not show a correspondence between verbalization quality and face recognition accuracy. Processing effects, however, depend on a shift in processing, which can easily not occur or be shifted back by another event. For instance, previous research has shown that listening to music or working on an unrelated task can reverse verbal overshadowing effects (Finger, 2001). Such events may have allowed processing to return to a more global or holistic orientation, which has shown to be the human default (Navon, 1977; Kimchi, 2000). Content driven instances, however, seem to be more powerful, as evidenced by the more robust effects found by Meissner and colleagues (2002) when using a forced recall condition, as well as the findings of the current studies. Despite recent advances in knowledge, much more research is required to support the currently proposed model of verbal overshadowing.

Verbalization is at the center of human experience and thus whether it can detriment cognition through content or processes is a question relevant to both scholarly
debate and the world outside the ivory tower. Sapir and Whorf's (1956) linguistic determinism, for instance, asserts that what we say determines how we think. The present studies suggest that verbalization can influence people's ability to perform a task through both the content of their verbalizations and processes their verbalizations cause. One might say that cognition can be impaired by both the words we choose, and the processes these words cause.
Table 1

*Recognition accuracy by ethnicity*

<table>
<thead>
<tr>
<th>Primary English speakers</th>
<th>Caucasian</th>
<th>East Asian</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>.25 (.29)</td>
<td>.67 (.25)</td>
<td>.50 (.29)</td>
</tr>
<tr>
<td>Verbalize</td>
<td>.78 (.26)</td>
<td>.91 (.37)</td>
<td>.88 (.27)</td>
</tr>
</tbody>
</table>

*Note.* Standard deviations are in parentheses.
Table 2

Local processing by ethnicity

<table>
<thead>
<tr>
<th>Primary English Speakers</th>
<th>Caucasian</th>
<th>East Asian</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>.21 (.29)</td>
<td>.53 (.37)</td>
</tr>
<tr>
<td>Verbalize</td>
<td>.28 (.22)</td>
<td>.24 (.33)</td>
</tr>
</tbody>
</table>

*Note.* Standard deviations are in parentheses.
Figure 1. An example of the shape classification task used in studies one and two. Participants were asked to view the top figure and decided which of the bottom two figures most closely resembles it. Decisions can be made on either global or local qualities of the top shape.
Figure 2. Average number of local responses to shape classification task as a function of verbalization and ethnicity.
Figure 3. Average number of correct responses to lineups as a function of verbalization and primary language.
References


