Schooler, J. S., Ryan, R. & Reder, L. M. (1996). The cost and benefits of verbally rehersing memory for faces. In Herrmann, D. J., Johnson, M. K., Hertzog, C., McEvoy, C. & Hertel, P. (Eds.)*Basic and Applied Memory Research, Vol. II.* Hillsdale, NJ: Erlbaum, pp. 51-65.

The Costs and Benefits of Verbally Rehearsing Memory for Faces

Jonathan W. Schooler
Robert S. Ryan
University of Pittsburgh

Lynne Reder
Carnegie Mellon University

Witnesses of a crime are typically asked to describe the appearance of the perpetrator. Such descriptions can be of great help in assisting investigators. However, recent research suggests that one potential cost of describing a previously seen face is that, at least under some circumstances, verbalization can actually disrupt subsequent recognition performance. For example, in a study by Schooler and Engstler-Schooler (1990) subjects viewed a videotape of a bank robbery and then, after a brief delay, verbalization subjects were asked to describe the appearance of the bank robber in as much detail as possible, whereas control subjects engaged in an unrelated filler activity. All subjects were then given a recognition test that included photos of the target person and seven similar-appearing distractor photos. Compared to control subjects, verbalization subjects were significantly less accurate at recognizing the target face. In this chapter, we first review the evidence and current explanations for the disruptive effects of verbalizing previously seen faces (termed *verbal overshadowing*), and then describe some recent findings that reveal situations in which verbalization of faces can be helpful.

A BRIEF REVIEW OF VERBAL OVERSHADOWING

The basic finding that verbalizing a previously seen face can interfere with subsequent recognition performance has been replicated numerous times in the Schooler lab (Fallshore & Schooler, 1995; Ryan, 1992; Schooler &

Engstler-Schooler, 1990; Schooler, Ryan, & Reder, 1990) as well as in other labs (e.g., R. Chaffin, personal communication, 1990; Dodson, Johnson, & Schooler, in press; C. Kelley, personal communication, 1991; Read & Schooler, 1994; Westerman, 1991). The verbal overshadowing effect can be conceptualized within a more general framework that assumes that many activities involve a combination of both verbalizable and nonverbalizable task components. For example, as discussed in more detail later, face recognition can involve both an attention to verbalizable features (e.g., moles, shape of nose, size of ears, color of eyes, etc.) as well as difficult to articulate configural characteristics (e.g., the relationship between the features). From this perspective, a reasonable account of the effects of verbalization is that verbalization causes subjects to emphasize the reportable task components, thereby deemphasizing (overshadowing) the nonreportable components.

Consistent with the interpretation that verbalization shifts subjects' relative emphasis on verbalizable versus nonverbalizable components, verbalization has been shown to impair a variety of other activities for which successful performance is likely to require the substantial use of knowledge or processes that are difficult to articulate. They include: color memory (Schooler & Engstler-Schooler, 1990), insight problem solving (Schooler, Ohlsson, & Brooks, 1993), affective judgments (Schooler & Wilson, 1991; Wilson et al., 1993, Wilson & Schooler, 1991), implicit learning (Berry, 1984; Fallshore & Schooler, 1993), visual imagery (Brandimonte, Schooler, & Gabbino, 1995), recognizing deep structure analogies (Sieck, 1993), taste memory (Melcher, 1994; Melcher & Schooler, in press), map memory (Fiore, 1994; Fiore, Eisengart, & Schooler, 1993), and music memory (Houser, Fiore, & Schooler, 1995; Houser & Schooler, 1994). In contrast, verbalization has been shown to help or at least not impair performance when success can be effectively achieved by relying on readily reported knowledge. Such tasks include: memory for word lists (Darley & Glass, 1975), memory for a spoken statement (Schooler & Engstler-Schooler, 1990), analytic problem solving (Gagne & Smith, 1962; Schooler & Melcher, 1995; Schooler et al., 1993), and learning declarative knowledge (Chi, de Leeuw, Chiu, & LaVancher, 1994). The observation that verbalization disrupts a substantial variety of activities that depend on nonverbalizable information or processes while not disrupting more readily verbalized activities supports the notion that verbalization deemphasizes nonverbalizable task components.

In the domain of face recognition, additional research has been conducted in an effort to more precisely characterize the verbalizable and nonverbalizable task components that may be differentially affected by verbalization. Many conceptualizations of face recognition assume that it involves the consideration of two general types of information: featural information corresponding to the characteristics of individuals facial features and configural information corresponding to the relationship between those features (Carey

& Diamond, 1977; Diam
& Hryciw, 1984). The fe
are the configural com
describe faces as they e
features with which t
encode faces configura
recognize the face (e.g
terization of verbal ove
tion of the appearance
on the featural aspects

Fallshore and School
on the use of featural an
between verbalization a
contribution these two
suggested that when th
(e.g., Rhodes, Tan, Bral
presented upside dow
1986; Young, Hellawell
mation and less on th
verbalization disrupts p
configural information,
under conditions in wh
and minimized under
likely to be used. Con
observed that verbalizat
faces when the recogni
zation did not impair re
tested with inverted rec
findings is that verbaliza
and therefore its impac
information is less apt t

Although consistent v
figural information, it sh
are also consistent with
deemphasize visual info
1986), the visual code i
quently should be expe
because the verbal code
maintain difficult-to-des
verbalization may deem
consistent with the sugg
mation (e.g., Brandimon
and, more generally, wi
nonreportable informati

balizable task components and decr
components. In the context of face
with a deemphasis on configural in
balizable components of face memol
results in a disparity between the
encoding and that emphasized duri
1977; Tulving & Thomson, 1973).

THE BENEF
OF VERBAL REI

The suggestion that the effects of
between the nonreportable informa
ing and the verbalizable information
that face verbalization need not
although an emphasis on the difficu
to be the default approach taken in er
possible to focus on more verbaliza
one notices that a face has a distinguis
for subsequent recognition. In short
recognition of faces encoded under
faces in a manner that was consiste
their performance might not be impa
were able to identify some critical di

According to this view, if subject
the impending verbalization activity
ognition array, then verbalization mi
this prediction, we have observed o
of verbalization are often reduced
Schooler, 1995; Houser et al., 1995;
Ryan, & Reder, 1990). When subject
overshadowing paradigm (i.e., enco
fects of verbalization tend to attenua
trial effect is not known, if the dis
result of a disparity between the in
balization, and test, it stands to re
might learn to become more consis

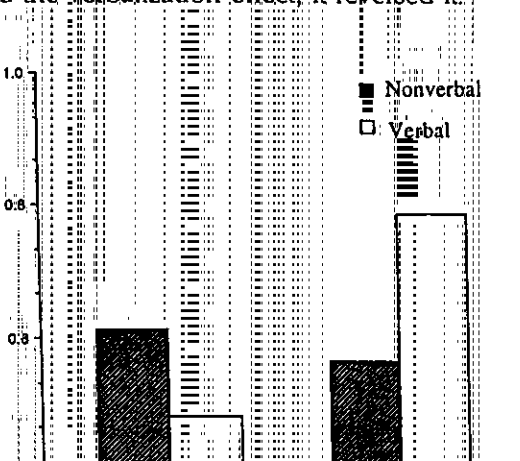
[1]There are, of course, other possible ex
over trials. For example, the verbalizations
another, thereby canceling out their impac
(describing faces is rather difficult) and may
description, thereby reducing its impact.

FIG. 4.1. The effects of verbalization and re-presentation on recognition accuracy

The Effects of Re-Presenting the Face

The claim that verbalization effects are due to a disparity between the nonreportable information typically considered during encoding and the verbalizable information emphasized during verbalization suggests that these effects of verbalization should be eliminated if subjects are given the opportunity to see the face again after verbalization. Accordingly, if impairment is due to the inconsistency between the information emphasized under default encoding conditions and that emphasized during verbalization, then re-presenting the target face might enable subjects to recode the face in a manner that reduces this inconsistency and thereby eliminate the disruptive effects of verbalization. To address this issue, we examined the effects of re-presenting a target face after subjects had verbalized its appearance. Subjects viewed a target face, and then verbalization subjects were asked to describe it while control subjects engaged in an unrelated filler activity. After engaging in the control or verbalization activities, subjects assigned to the re-presentation condition were shown the target photo again. Finally, all subjects were given the recognition array that included a different photo of the target face and five similar distractors.

Based on the importance of the disparity of the information emphasized during encoding and verbalization, our prediction was that the disruptive effects of verbalization would be eliminated when the target face was re-presented following verbalization. As can be seen in Fig. 4.1, our prediction was generally observed, but with a twist. To our surprise, re-presentation not only eliminated the verbalization effect; it reversed it!



Due to the somewhat surprising observation that re-presentation not only eliminated the negative effects of verbalization but actually reversed it, we replicated the procedure with a different set of faces, to ensure that the effect was both reliable and generalizable. To get a better understanding of the possible boundary conditions of this effect, we also added a third condition in which we re-represented the target face in an inverted position. Accordingly, if subjects extracted very simple featural information from the re-presented target face, then even inverted re-presentation could be of some value. If re-presentation refreshed subjects' configural memory or facilitated a more sophisticated analysis of individual features, then only the upright re-presentation should be of value. As can be seen in Fig. 4.2, the beneficial effects of re-presentation combined with verbalization were clearly replicated in the upright condition; however, there was no similar benefit for re-presentation of the inverted face.

The observation that re-presentation and verbalization reliably interacted in the manner that they did provides an important constraint on how we interpret the effects of re-presentation. Had re-presentation merely attenuated the verbal overshadowing effect, then the effects of re-presentation could have been attributed to a refreshing of the configural information, thereby reducing the disparity between the information emphasized during encoding and verbalization. Had re-presentation affected performance in both the verbalization and no-verbalization condition, then the effects of re-presentation could have been attributed simply to rehearsal. However, the fact that re-presentation improved performance only when subjects previously verbalized the face suggests that verbalization was responsible for causing subjects to extract new information from the face during re-presentation.

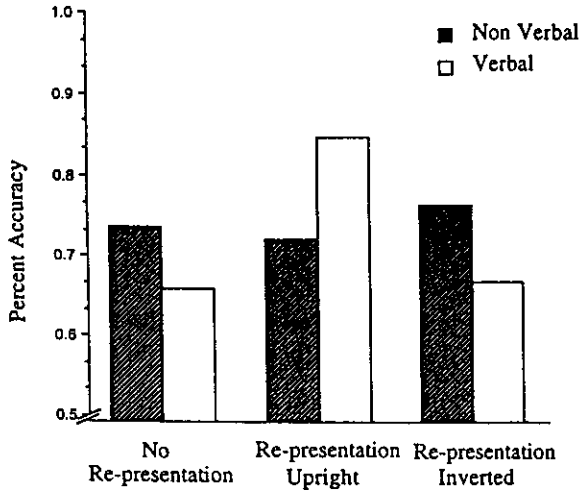


FIG. 4.2. A replication of the re-presentation study with the addition of an inverted re-presentation condition.

The impact of
subsequent ability
beneficial effects of
its solution. When s
often show better l
ously with the pro
subjects work on p
still benefit from w
(Needham & Begg
receiving a solutio
ability to appreciat
are given a solutio
aspects of the solut
why verbalization
who view re-preser
the aspects of the f
during verbalizatio
memories.

This account lea
used to repair thei
re-presentation of t
verbalization subje
that is extractable
remains: What exa
unavailable from t
upright face may
aspects of the face
zation. Neverthele
zation not only e
reversed it. Althou
the unique benefit
combination of bo
subjects' ability to
been available to
such an interpretat
that subjects' sens
configural propert
followed by re-pre
all of the facial in
reviewing the face
the otherwise de-e
hand, verbalizing
inspect the re-pre
correctly and whic

SCHOOLER, RYAN, REDER

[illegible] to verbalize a face on subjects' [illegible] from seeing it again is reminiscent of the [illegible] or a problem without immediately being given [illegible] required to solve problems on their own, they [illegible] when they are given the solutions simultaneously (Carney & Reder, 1986). Moreover, even when [illegible] that they are unlikely to solve on their own, they [illegible] the problems before being given the solutions [illegible] This benefit of working on a problem prior to [illegible] attributed to subjects' hypothesized increased [illegible] their knowledge. Accordingly, subjects who [illegible] working on a problem fail to recognize which [illegible] is the key. A similar account may explain [illegible] subjects to benefit from re-presentation. Subjects [illegible] following verbalization may be able to appreciate [illegible] they failed to generate or generated inaccurately [illegible] may be better prepared to fill in or correct their [illegible]

[illegible] question of what type of information subjects [illegible] The finding that subjects did not benefit from [illegible] when it was inverted argues against the notion that [illegible] resulting from the very basic featural information [illegible] inverted faces (e.g., moles, scars). The question [illegible] subjects extracting from the upright faces that was [illegible] faces? It seems likely that re-presentation of the

Although this account must still be considered somewhat speculative at this time, the general finding that re-presentation of the target face can reverse the negative effects of verbalization does offer some rather straightforward insights into the nature of the effects of verbalization. First, the fact that reencoding the face following verbalization eliminates the verbal overshadowing effect further supports the suggestion that the disruptive effects of verbalization are due to the inconsistency between the information emphasized under standard encoding conditions and the information emphasized following verbalization. Second, the fact that verbalization is actually helpful when combined with re-presentation of the face supports the claim that consideration of verbalizable aspects of a face can be helpful, particularly when it is done in such a way as to not be inconsistent with the manner in which the face was encoded.

The Relationship Between Verbalization and Interference

In the standard verbal overshadowing paradigm, subjects view a single face, verbalize it or not, and then are tested. However, real-world settings may not be as tightly controlled; subjects may see many faces at the time of the witnessed event, or they may be exposed to multiple mug shots after the event. Although a few studies have found that the deleterious effects of verbalization can persist for some time after subjects viewed and verbalized the face (2 days in the case of Schooler & Engstler-Schooler, 1990; 2 weeks in the case of Read & Schooler, 1994), it is still possible that the effects of verbalization would be quite different if subjects were exposed to multiple faces at the time of encoding. For example, Deffenbacher, Carr, and Leu (1981) found that exposure to multiple faces near the time of encoding of a target face produced a significant degree of interference, even though subjects were generally resistant to additional forgetting when tested 2 weeks later. This finding is also consistent with other demonstrations that the interference associated with seeing multiple faces primarily occurs from exposure to faces presented under comparable encoding conditions (e.g., Davies, Sheperd, & Ellis, 1979). Thus, although verbalization effects have been shown to be relatively unaffected by delay, it is an open question as to whether verbalization interacts with the effects of interference associated with encountering multiple faces within the context of the encoding situation.

In fact, there is some reason to believe that verbalization might help to insulate subjects against the interfering effects of seeing multiple faces. For example, Deffenbacher et al. (1981) also observed that, relative to faces, words were less susceptible to interference resulting from encountering intervening stimuli between encoding and test. Thus, another potentially useful characteristic of face verbalization is that it may provide semantic tags that

may help subjects keep track of the target face
multiple faces prior to being tested.

To address the relationship between verbaliz
and Schooler (1994) conducted a face verbaliz
the recognition test was introduced after subjects
if assigned to the verbal condition) four faces.
viewed a face, verbalized it or not, and then
the remaining three faces. Subjects were then g
nition tests presented in an order correspondin
faces originally appeared. The order of faces w
each face appeared equally often in each posit

The results are presented in Fig. 4.3. As ca
performance declined substantially for faces tha
later in the procedure (i.e., comparing perform
This result suggests the possible impact of both
encoding of faces occurring later in the sequenc
by prior exposure to earlier faces) and retroactiv
of faces that were tested in later trials may have
exposure to earlier recognition tests). What is
these data, however, is the fact that subjects w
showed markedly less interference than contro

Although it is not possible at present to deter
zation reduces the interfering effects of exposur
likely to do with the differential susceptibility
to interference. As mentioned, Deffenbacher et a

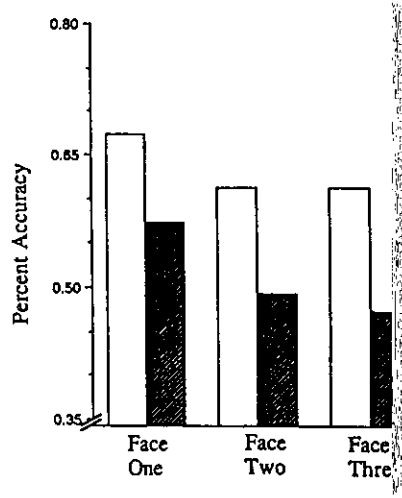


FIG. 4.3. The effects of verbalization and interfere
of interpolated faces.

(and landscapes) were more susceptible than words (nouns) to retroactive interference. Deffenbacher et al. speculated that this difference might be due to the relative role of phonological and semantic encoding mechanisms for visual and verbal stimuli. They suggested: "Interference is not initially observed for the nouns, however, because the phonological and semantic encoding mechanisms are much more successful with them than the landscapes and faces, activating already learned well established codes that could possibly serve as pegs on which to hang episodic information" (Deffenbacher et al., 1981, p. 304).

It may be that the verbalization of a face helps to associate it with a semantic code that provides a tag which enables subjects to differentiate it from other faces to which they have been exposed. In short, verbalizing faces may cause them to be treated more like words; on the one hand, this may disrupt the consideration of the unique configural properties of faces, but on the other hand, this may enable faces to be better tagged and therefore to withstand the interference associated with exposure to multiple faces.

CONCLUSIONS, CAVEATS, AND IMPLICATIONS

In sum, there appear to be both costs and benefits to verbal rehearsal of faces. On the down side, verbalization can deemphasize critical nonreportable task components associated with a variety of nonverbal activities. In the domain of face recognition, verbalization of faces appears to result in a deemphasis at the time of recognition of the configural information typically involved in the encoding of upright same-race faces. This disparity between the nonreportable configural information emphasized during encoding and the more readily verbalized information emphasized at test can result in reduced performance of subjects who attempt to verbalize a previously seen face.

On the positive side, when the disparity between the information attended to during encoding and postencoding verbalization is reduced through re-presentation, the negative effects of verbalization are not only reduced but actually reversed. This combination of verbalization and re-presentation may improve subjects' performance both by eliminating the inconsistency between encoding and postencoding activities and by highlighting differences between subjects' verbalized memories and the target, thereby providing subjects with an opportunity to fill in and correct their memories. Another positive effect of verbalization is to insulate subjects against the disruptive effects of interference, perhaps by providing semantic tags that enable them to better differentiate the faces.

The potential for practical applications of this research is quite substantial. First, it seems clear that we must not assume that asking witnesses to describe the appearance of the perpetrator has no consequence on the witnesses'

memory. Instead, it appears that verbalization may have both costs an benefits, depending on a variety of factors. With respect to the findin reported here, the observation that subjects benefit from verbalization whe seeing a face re-presented raises the possibility that it may be helpful during a crime, witnesses verbalize the perpetrator's appearance to then selves and then recheck the face to see how their verbalization fits. (C course, it is not clear how often witnesses would have the presence of mi to be able to engage in such complex processing activity!) There may al be some practical significance to the finding that verbalization may off insulation against interference. Specifically, verbalization may help to prote subjects against the interference that can result from exposure to multip mug shots (e.g., Davies et al., 1979).

Although this line of research has potentially important practical imp cations, some caveats should be considered before direct applications a contemplated. Most important, it should be noted that, although the negati effects of verbalization on face recognition have been replicated many tim in various labs, they are not always observed (e.g., S. Lindsay, persor communication, 1990; Lovett, Small, & Engstrom, 1992; Yu & Geiselma 1993). It is not entirely clear why these differential effects of verbalizati are sometimes observed; many possible factors may be involved. For e ample, in the studies reviewed here it has been seen that the presence verbalization effects depends on the degree to which subjects spontaneou rely on nonreportable face components (e.g., configural) at encoding, t degree to which subsequent recognition considerations are shifted aw from what was emphasized during encoding, and whether interference encountered. It is possible that some of the failures to find disruptive effe of verbalization may have been the result of variations in these variable

There also may be important population variables at play. It seems qu possible that subjects vary in the degree to which they spontaneously foc on nonreportable face components during encoding, which may medi whether or not they are subsequently impaired by verbalization. Consist with this view, Ryan and Schooler (1995) found that verbalization impai the performance of subjects who scored above the median on various vis memory tasks (e.g., embedded figures, general face recognition tasks), but subjects who scored below the median on these tasks. It is also possible t subjects may differ in their ability to apply verbal processes to faces, and t difference may also mediate the impact of verbalization. For example, Ry and Schooler also observed that subjects with above-average GPAs (a presumably higher verbal abilities) showed less impact of verbalization th subjects with below-average GPAs. Additional evidence for the importanc verbal ability comes from research in a very different domain: verbalizat and expertise in wine. Melcher and Schooler (in press) observed that verb zation impaired the wine recognition performance of nonexpert wine drink

Ryan, R. S., & Schooler, J. W. (1995
holistic processors more than a
of the American Psychological S
Schooler, J. W. (1989, November).
of visual memories. Paper prese
Atlanta, GA.
Schooler, J. W., & Engstler-Schooler
Some things are better left unsa
Schooler, J. W., & Melcher, J. (1995
R. A. Finke (Eds.), *Creative cog*
Schooler, J. W., Ohlsson, S., & Bro
overshadows insight. *Journal of*
Schooler, J. W., Ryan, R., & Reder,
entation reverses verbalization's
International Conference on Me
Schooler, J. W., & Wilson, T. W. (1
analyzing reasons. In M. Lynn &
Psychological Association (p. 29
Sergent, J. (1984). An investigation
preception. *British Journal of P*
Sieck, W. (1993). *Verbal overshad*
honors thesis, University of Pitts
Slamecka, N. J., & Graf, P. (1978). T
of Experimental Psychology: Hu
Tanaka, J. W. (1993). Parts and wh
Psychology: Human Experimen
Tulving, E., & Thompson, D. M. (19
memory. *Psychological Review,*
Wells, G. L., & Hryciw, B. (1984). M
& Cognition, 12, 338–344.
Westerman, D. L. (1991, April). *The*
presented at the North East Ohi
Wilson, T. D., Lisle, D. J., Schooler,
Introspecting about reasons ca
Psychology Bulletin, 19, 331–33
Wilson, T. D., & Schooler, J. W. (199
of preferences and decisions. *Jo*
Young, A. W., Hellawell, D., & Hay,
Perception, 16, 747–759.
Yu, C. J., & Geiselman, R. E. (1993). E
identification performance. *Crim*