Extending the Revelation Effect to Faces: Haven't We Met Before?

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EXTENDING THE REVELATION EFFECT TO FACES:
HAVEN'T WE MET BEFORE?

A Dissertation

Submitted to the Graduate faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Psychology

by

Jeffrey Roy Wilson
B.S., Willamette University, 1991
M.A., Sam Houston State University, 1994
M.A., Louisiana State University, 1997
May 2000
Thou shalt not sit
With statisticians nor commit
A social science.

W.H. Auden

W.H. Auden, apparently, did not think much of statistics or social sciences. However, I am glad that I have been fortunate to have mentors in my life that have helped me both to understand and use statistics and cognitive psychology together to shape my understanding of the world. This dissertation is dedicated to all those teachers who have helped my educational endeavors. One day I will look back upon graduate school and tell people that I proudly sat with statisticians and committed all sorts of social sciences.
Acknowledgements

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Abstract

The revelation effect is an episodic memory phenomenon where participants are more likely to report that they recognize an item when it has been revealed in some way than when it has not. Although this effect is robust with respect to words, it has not been demonstrated with faces. The present series of experiments examined whether a revelation effect could be produced in face recognition memory. A revelation effect was found in 2 of 3 experiments using only faces for stimuli. Surprisingly, an anti-revelation effect was found in Experiment 4 when words were revealed before face recognition. The findings are discussed in terms of the extant theories for the revelation effect.
Introduction

The revelation effect is an episodic memory phenomenon that has received considerable attention in recent years (see Hicks & Marsh, 1998 for a summary of the research). One reason for the interest in this effect is because of its odd nature. The revelation effect is demonstrated in a recognition memory test, where participants are more likely to report that they recognize words, numbers, or pictures when they engage in some interpolated task before making their recognition judgments. For example, participants are shown a list of words during the study phase. At test, participants are shown both the study words (i.e., targets) and new words (i.e., lures) and asked to identify the words they recognize from the study list. However, during the recognition phase, half of the words are "revealed" in some fashion (e.g., solving an anagram of the word to be recognized) with the result that participants report recognizing the revealed words (both old and new words) to a greater degree than words presented normally. Thus, the revelation effect demonstrates that retrieval conditions can be manipulated to influence people's memory.

A variety of interpolated tasks have been used to demonstrate the revelation effect. The most common revelation tasks include participants solving anagrams of...
the words before making recognition judgments (Frigo, Reas & LeCompte, 1999; Peynircioglu & Tekcan, 1993; Watkins & Peynircioglu, 1990; Westerman & Greene, 1996), unfolding the words by presenting the words letter by letter until the word is completed (Frigo et al., 1999; Hicks & Marsh, 1998; LeCompte, 1995; Peynircioglu & Tekcan, 1993; Watkins & Peynircioglu, 1990), and rotating letters and words at different angles (Frigo et al., 1999; Peynircioglu & Tekcan, 1993; Watkins & Peynircioglu, 1990). The revelation effect has also been found using degraded words and reverse typing (Luo, 1993).

The revelation effect is not just limited to words. Some research has investigated the revelation effect with numbers. For example, participants have been given Roman numerals and asked to convert them to Arabic before making recognition judgments about whether they saw that number on the study list. Also, participants at test have had to solve math problems and decide whether their answer was on the study list. Revelation effects were found for both tasks (Watkins & Peynircioglu, 1990).

The revelation effect has also been found with pictures. Luo (1993) presented pictures to participants at study and asked them if they recognized them at test (Experiment 2). However, for half of the participants the
name of the picture was revealed by presenting the name letter by letter until the word was completed. Luo found that participants were more likely to say they recognized the picture if the name of the picture was revealed to them. Although it is not clear whether a revelation effect would have occurred if the picture itself would have been revealed in some fashion, Luo's research did demonstrate that a revelation effect could occur for nonverbal study items.

A straightforward explanation for the revelation effect has proven difficult. Most of the early research on the revelation effect was spent trying both to rule out artifactual explanations of this phenomenon and extend its generality by using different interpolated tasks (Peynircioglu & Tekcan, 1993; Watkins & Peynircioglu, 1990). Explanations related to response biases or the additional time it takes to reveal items compared to seeing them intact have not received any empirical support (Peynircioglu & Tekcan, 1993; see also Westerman & Greene, 1996). Thus, the revelation effect does not appear to occur due to the obvious nature of the revelations manipulations or to the confounding of time.

The idea that the revelation effect somehow increases familiarity has received support (Luo, 1993; LeCompte, 1995). For example, LeCompte (1995) used Jacoby's (1991)
process-dissociation procedure and Tulving's (1985) remember/know procedure for separating recollection and familiarity judgments in recognition memory to study the revelation effect. LeCompte found that revealing a new word increased familiarity for that word. However, he did not find a similar effect for revealed words that had been previously studied or recollected.

Although LeCompte's (1995) research provided support for the hypothesis that the revelation effect increased familiarity, the most recent research on the revelation effect has created problems for a simple increased familiarity-based explanation for this phenomenon (Hicks & Marsh, 1998; Westerman & Greene, 1996). For example, Westerman and Greene (1996) found a revelation effect (Experiment 6) when they revealed a different word from the word used on the recognition test (e.g., revealing the word raindrop but asking participants if they recognize the word vineyard). As Westerman and Greene (1996) point out, this finding is very difficult to reconcile with a simple enhanced familiarity-based explanation of the revelation effect.

Westerman and Greene (1998) have suggested that the Global Matching Model (GMM) may provide an explanation for the revelation effect. The GMM is a more complex enhanced
familiarity-based explanation for the revelation effect. The model states that recognition is determined by the overall level of trace activation the test stimulus elicits during the recognition phase of a test. Therefore, Westerman and Greene argue that trace activation occurs during the interpolated task and that this trace activation contributes to the overall level of trace activation that occurs when the test item is shown to the participant. Thus, trace activation elicited by the interpolated task increases the likelihood for positive recognition decisions to be rendered for test items. The GMM explains why revelation effects are found when the revealed word (e.g., vineyard) is different from the test word (e.g., raindrop). The GMM can also explain other revelation effect results. For example, a revelation effect was not found if numbers were revealed and words were the test items (Experiment 6 in Westerman & Greene, 1998). If words and numbers are stored in two independent representational systems then, according to the GMM, no revelation effect would be found using one set of stimuli as the interpolated items and the other set of stimuli as the study and test items.

Finally, Hicks and Marsh (1998) have suggested the "cascading difficulty" hypothesis. They argue that the revelation effect actually produces a decrement to
familiarity. For example, they revealed items and then had participants perform a 2-AFC recognition test. They found that people were more likely to choose the item that had not been revealed as the item from the study list regardless of whether the two items were both targets or both lures (i.e., they found an 'anti-revelation' effect). Thus, revealing an item made that item less likely to be chosen if participants could choose another word. Hicks and Marsh (1998) suggest that revealing an item creates noise in cognitive processing, making it more difficult for participants to judge an item's status. Therefore, Hicks and Marsh (1998) concluded that participants in previous revelation experiments were actually loosening their decision criteria for recognition judgments, which translated into a positive recognition bias. These findings, however, are incompatible with enhanced familiarity based explanations of the revelation effect. If the revelation effect increases familiarity then Hicks and Marsh should not have found an anti-revelation effect.

One of the problems in explaining the revelation effect is that the revelation effect is continually being demonstrated using a variety of tasks and procedures. In fact, Westerman and Greene (1998) demonstrated that revealing words is not even necessary to produce the
revelation effect (also see Luo, 1993, Experiment 3). In their experiments, they found revelation effects using a variety of interpolated tasks. For example, they found a revelation effect using a memory span task where participants were shown and asked to recall a string of letters before making recognition judgments on a list of words (Experiment 2). They also found a revelation effect when participants generated synonyms of the word to be recognized, and when participants counted the ascending letters of the words on a recognition test (Experiment 4). Westerman and Greene argue that the GMM can explain these results because the tasks produce enough trace activation that contribute to the overall level of trace activation of the test stimuli.

However, there are certain limitations to this phenomenon. The revelation effect appears to be restricted to episodic memory (Frigo et al., 1999; Watkins & Peynircioglu, 1990). Early research showed that revelation effects were not found when words were judged based on lexicality, based on being a typical member of a category, or when the word was judged for its frequency of general usage (Watkins and Peynircioglu, 1990).

Other research has demonstrated that a participant's belief of being involved in an episodic memory task is a
necessary characteristic for the revelation effect. Frigo et al. (1999) demonstrated a revelation effect without presenting a study list. They told participants that words were presented subliminally and then at test they had participants make recognition judgments on words that they had never heard. However, half of the participants had to solve an anagram of the word before making their recognition judgment about that word. Although no study list was presented, Frigo et al. (1999) found a revelation effect. Further, no revelation effect was found when they revealed words and then asked participants to make semantic judgments about whether the words related to themselves in some meaningful way.

Thus, the revelation effect appears to be an episodic memory phenomenon which has been demonstrated using a wide variety of interpolated tasks. The empirical results of the revelation effect prompted Westerman and Greene (1998) to comment that "Attempts to determine the boundary conditions of the revelation effect have, so far, succeeded mostly in demonstrating its generality" (p. 378). Thus, the importance of continuing to define the boundaries or generality of the revelation effect is essential in terms of theory testing.
Face Recognition

One area that has not been investigated with the revelation effect is recognition memory for faces. As stated earlier, research on the revelation effect has mostly used words as the stimuli (see Watkins et al., 1990 and Westerman & Greene, 1998 for research using numbers; see Luo, 1993 for pictures). It is not clear whether a revelation effect would occur in face recognition memory. In terms of memory research, there has been research to suggest that face recognition memory does not differ from pictorial recognition memory and that both face and pictorial recognition memory are different from verbal memory (Church & Winograd, 1986). Although there is research that suggests that facial recognition and pictorial recognition may differ in terms of perceptual processing (Farah, Wilson, Drain, & Tanaka, 1998), there may be no difference in terms of memory performance. Based upon Luo's (1993) research, it may be inviting to think that a revelation effect would also occur for faces.

Luo's (1993) finding of a revelation effect with pictures and words can also be explained by assuming that pictures can be represented in a verbal system. In fact, Farah et al. (1998) recently concluded that face recognition and word recognition operate in two separate
representational systems, where pictures can be processed within either of the two systems. Therefore, a revelation effect may have been produced when words were used as the interpolated task in picture recognition because the pictures were processed verbally. Further, this conclusion is consistent with the finding that a cross-modality revelation effect did not occur between arithmetic and words (Westerman & Greene, 1998).

Faces are assumed not to be processed verbally (Farah et al., 1998). Based on the empirical findings of the revelation effect and the assumptions of the GMM, a revelation effect for faces should not occur if words are used for the interpolated task because revealing words should not contribute to the trace activation of faces. This same logic was used by Westerman and Greene to explain the absence of a revelation effect when numbers were revealed before words. In fact, if words did produce a revelation effect for faces then it would demonstrate that the GMM is an inadequate explanation of the revelation effect.

A cross-modality revelation effect between faces and words would also provide evidence that faces and words are not processed in two independent representational systems. Hicks and Marsh's (1998) conclusion that cognitive noise
creates the revelation effect would allow for a revelation effect between faces and words as long as the interpolated task produced enough noise and as long as the interpolated task and test items did not belong to two separate representational systems.

However, unless there is something special about faces as a class of stimuli, a revelation effect should occur for faces when faces are used in the interpolated task. If a revelation effect were not found using revealed faces for the interpolated task then it would suggest that faces may be immune to the revelation effect. The revelation effect appears to be a fairly robust phenomenon. It would be surprising not to find a revelation effect for faces. Regardless of the specific predictions, the fact that the revelation effect has not been studied with faces provides an opportunity to understand the generality of the revelation effect in recognition memory as well as to compare theoretical explanations of the effect.

The present research attempts to extend the study of the revelation effect to face recognition. This research is important for two distinct reasons. First, the revelation effect is an enigma. Enigmas are traditionally key to testing theories (Watkins & Peynircioglu, 1990). Therefore, it is important for research to continue to understand the
extent to which the revelation effect can affect recognition memory. If the revelation effect occurs for faces, it demonstrates the robustness of this phenomenon across stimuli (i.e., words and faces) that are typically considered to be entirely unrelated in terms of cognitive processing (Farah et al., 1998) and recognition memory (Church & Winograd, 1986). On the other hand, if the revelation effect does not occur for faces, then a specific boundary condition has been identified.

Second, there are practical implications to increasing familiarity for faces. If the revelation effect occurs for face recognition, then people could be exposed to conditions that would increase their likelihood of reporting that they recognized a face. For example, take a situation with faces that is analogous to a method used by words to produce a revelation effect. A person may see a photo of a face upside down and then turn the photo upright and be more likely to report that they recognize the person in the photo compared to just seeing the photo upright. Also, it is important to remember that the revelation effect occurs for lures and is, in fact, slightly stronger for them (see Hicks & Marsh, 1998). Thus, people could be exposed to conditions that would increase the likelihood of making a positive
recognition judgment on someone whom they have never seen before.

In terms of eyewitness identification, this could be very important because eyewitnesses may then be exposed to factors that would increase false positive identifications (Loftus, 1979). For example, if a person saw a face inverted first and then the face was shown normally, they may be more likely to say that they recognize the person. In eyewitness identification situations, it is common for people to look through pictures of criminal suspects. It is not hard to imagine a scenario where someone is looking through pictures of suspects where some of the pictures may actually be inverted. Thus, an eyewitness may see an inverted face and then turn it upright to make the recognition decision. This may cause a revelation effect and thus increase the likelihood of false positive identification. Considerable anecdotal and empirical research has documented that false positive identifications are a problem in eyewitness testimony (Wells, Small, Penrod, Malpass, Fulero, & Brimacombe, 1998). For example, a sample of 40 cases where the defendant was exonerated found that in 90% of those cases eyewitnesses reported that they saw the purported defendant commit the crime (Wells et al., 1998).
Therefore, it is important to minimize conditions which may contribute to false positive identifications.

**Experimental Overview**

The present series of experiments followed the general revelation effect method of previous experiments on this phenomenon. Although Luo (1993) used pictures as the test stimuli and words for the interpolated task, the interpolated tasks for the first three experiments used faces instead of words (see Experiment 4 for an examination of a cross-modality revelation effect). The revelation tasks for each of the four experiments are either analogous to or the same kind of revelation tasks that have been shown to produce the revelation effect with words.

The design and procedure were the same for all four experiments. A 2x2 (i.e., targets vs. lures; revealed vs. intact) within-subject design was used in every experiment. During the study phase, participants were shown a set of faces. At test, participants saw a subset of the faces from the study list (i.e., targets) and a set of new faces (i.e., lures). Participants were asked to make judgments on whether they recognized the faces from the study list. However, for half of the faces (i.e., both targets and lures), participants saw the faces presented normally and then were prompted with a command asking them if they
recognized the face from the study list. For the rest of the faces, participants were engaged in an interpolated task before making recognition judgments on the faces. Thus, participants made recognition judgments both on targets and lures and when the faces were presented normally or in the revealed condition.

The revelation effect has been measured in different ways by previous researchers. Most of the research on the revelation effect has compared the difference in the number of items called "old" by participants for the intact and revealed conditions (e.g., Westerman & Greene, 1998). However, signal detection measures have also been used to examine the nature of the responses given by participants when exposed to intact items compared to revealed items (e.g., Hicks & Marsh, 1998). For the sake of completeness, the data in the present research were analyzed both ways.

First, the data were analyzed using a 2X2 within-subject ANOVA where the number of dichotomous responses labeled as "old" were totaled within each condition. Therefore, the dependent variable, the number of items that were called "old" by the participants, was treated as a continuous variable. Race and sex also were included as covariates in the present study. However, neither of these covariates accounted for significant amounts of explained
variance in any of the four experiments. Therefore, they will not be discussed any further. Second, signal detection measures were used to examine the nature of the decisions made by the participants when exposed to different conditions.

Signal detection measures such as $d'$ and $C$ appear to offer some value in understanding the underlying causes of the revelation effect. For recognition memory, $d'$ is a measure of how well participants theoretically discriminate recognition memory between targets and lures and $C$ is a measure of response bias indicating whether participants respond in a differential manner for targets and lures. Luo (1993) found that the discriminability ($d'$) between revealed and intact items was not significantly different. However, Luo (1993) did find a liberal criterion shift ($C$) for revealed items compared to intact items. Therefore, signal detection analyses may provide support to the idea that participants loosen their decision criteria during the revelation condition. Thus, it is important to examine whether the same pattern occurs with the face recognition data.

In terms of theory testing, it is difficult to disambiguate revelation theories using signal detection measures (see Hicks & Marsh, 1998). On the one hand, the
cascading difficulty hypothesis proposes that the revelation effect produces a liberal criterion shift for judging which items are old. Therefore, a significant difference in the measure for response bias (C) between revealed and intact items would be expected according to the cascading difficulty hypothesis. On the other hand, the GMM would predict that the items in the revelation condition would appear more familiar compared to the intact items. Although the criterion for deciding which items are "old" would not have changed, this increase in familiarity also would produce a liberal criterion shift as measured by C. Thus, it is difficult to determine the predictions of the two theories using signal detection measures.

In general, the GMM and the cascading difficulty hypothesis both would predict a revelation effect to occur in face recognition memory when faces are used for the interpolated task. For a cross-modality revelation effect, the predictions between the two theories depends, in part, on the definition of cross-modality. If cross-modality is defined to mean that the two classes of stimuli belong to two different representational systems then both the GMM and the cascading difficulty hypothesis would predict no revelation effect for face stimuli.
However, if faces and words do not belong to two
different representational systems and if cross-modality is
defined to mean two different classes of stimuli then the
two theories diverge when it comes to predicting the
occurrence of a cross-modality revelation effect. The GMM,
again, would predict no revelation effect because words
should not activate memory traces for faces. On the other
hand, the cascading difficulty hypothesis could predict the
occurrence of a revelation effect because the noise produced
by the interpolated task could affect face recognition.
Inverted words have been used to demonstrate a revelation effect (Frigo et al., 1999; Peynircioglu & Tekcan, 1993; Watkins & Peynircioglu, 1990). Thus, showing faces upside down would be an analogous situation for determining whether a revelation effect can be achieved in face recognition memory. If a revelation effect occurs then the revelation literature has been extended to face recognition. Additionally, inverted faces may shed some light on the current explanations of the revelation effect.

Considerable research has demonstrated that face recognition for inverted faces is much more difficult than face recognition for upright faces (Yin, 1969). Therefore, the conclusions of Hicks and Marsh (1998) that a revelation effect may occur by creating noise in the cognitive system makes it plausible that a revelation effect would occur for upside-down faces because upside-down faces should produce considerable noise in the cognitive system. Further, participants should show a more liberal response bias for revealed items compared to intact items.

The GMM states that items are activated during the interpolated task and this creates an increased sense of familiarity when participants judge the test item. Therefore, participants must activate traces of upright.
faces when seeing inverted faces. Although inverted face recognition is difficult, it is not unreasonable to assume that memory traces for faces are activated when participants see inverted faces (i.e., an inverted face is still recognized as a face). Therefore, the GMM would also predict a revelation effect to occur for faces.

Given the robust findings of the revelation effect, it was hypothesized that exposure to the inverted faces (i.e., the revelation task) before making a recognition judgment of the same face upright would increase the likelihood of participants' reporting that the revealed faces came from the study list.

**Method**

**Participants.** The participants were 64 undergraduates from psychology courses at Louisiana State University.

**Materials.** 160 Caucasian female faces were collected from a high school yearbook. These faces were then pilot tested to eliminate distinctive faces that may influence participants' recognition judgments. Participants were asked to make judgments on the distinctiveness of each face by circling a number on a 7-point scale (1=not distinctive, 7=distinctive). Faces that received distinctiveness ratings significantly less than 4 were not considered to be distinctive. Out of the original 160 faces 140 non-distinct
faces were chosen for the present series of experiments. 100 faces from the 140 were randomly selected to be used in the first experiment.

**Design and Procedure.** A 2×2 (i.e., targets vs. lures; revealed vs. intact) within-subject design was used in the first experiment. Participants were tested in groups up to 10 people. During the study phase, participants were shown 60 faces. The first and last 10 faces from the study list were excluded from the test phase to reduce primacy and recency effects. Each face was displayed for 3 s. The presentation rate was also pilot tested. Performance with a 3-s presentation rate did not significantly differ from a 1-s presentation rate in recognition rates. Further, given the nature of the design for the present experiments, participants demonstrated moderate rates of recognition that were nowhere near ceiling. However, a 3-s presentation rate allowed participants ample time to process each face.

At test, participants saw 40 faces from the study list (i.e., targets) and 40 new faces (i.e., lures). Each face was seen for 4 s. Participants were asked to make judgments on whether they recognized the faces from the study list. For half of the faces (i.e., both targets and lures), participants saw the faces presented normally and then were prompted with a command asking them if they recognized the
face from the study list. The rest of the faces were presented upside down initially (for 2 s) and then the same face was shown normally (2 s). As an orienting task, participants were asked to make attractiveness ratings on a ten-point scale for the faces when they were presented upside down. Participants were told to wait until they saw the inverted face normally before making a recognition judgment. Thus, participants made recognition judgments both on targets and lures and when the faces were presented normally or in the revealed condition. The faces were counterbalanced across conditions and the sequence of revealed and intact was randomly determined with the constraint that an equal number of targets and lures and revealed and intact items occurred in the first forty items and the last forty items. The experiment lasted approximately 30 minutes, and when participants were finished they were debriefed and awarded their extra credit.

Results

The individual differences for "old" recognition responses ranged considerably within each condition. The "old" responses ranged from 1 to 18 within the different conditions of the experiment. There was considerable variability in how participants responded to test items.
**Recognition.** As expected, participants were significantly more likely to recognize targets (56.5%) than lures (34.5%), $F(1, 63) = 141.2$, $p < .001$, $MSE = 9.21$ (see Table 1). Thus, participants were significantly more likely to say they recognized faces that they had seen compared to new faces never seen before.

**Revelation.** A revelation effect was also found, $F(1, 63) = 5.32$, $p < .05$, $MSE = 6.35$ (see Table 1). Revealed faces (47.5%) were significantly more likely to be called "old" than intact faces (43.5%). The item by condition interaction was not significant ($p > .05$).

Signal detection analyses revealed that $d'$ was not significantly different between intact and revealed items ($p > .05$); however, $C$ was significantly greater for intact items ($C = .17$) than revealed items ($C = .06$), $t(63) = 2.53$, $p < .05$ (see Table 2).

**Discussion.** A revelation effect for faces was found in Experiment 1. Therefore, the revelation effect has been extended to a new class of stimuli: Faces. The revelation effect appears to be a highly robust phenomenon that is not just limited to verbal information.

According to the cascading difficulty hypothesis, the revelation effect may have occurred as a result of a more liberal response bias for recognition judgments. If this is
the case then participants are changing their decision criteria for judging which faces they recognize based on whether they see the face intact or in the revelation condition. Alternatively, the revelation condition may have produced an increased sense of familiarity compared to the intact condition. Thus, the significant difference in $C$ found between revealed and intact items also supports the GMM. However, as stated earlier, the significant difference in $C$ between revealed and intact items does not help discriminate between the extant theories of the revelation effect.

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Table 1  
Percentage of faces rated as "old" by condition: Experiment 1.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Revealed (%)</th>
<th>Revealed S.D.</th>
<th>Intact (%)</th>
<th>Intact S.D.</th>
<th>Marginal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targets</td>
<td>.58</td>
<td>.16</td>
<td>.55</td>
<td>.18</td>
<td>.565</td>
</tr>
<tr>
<td>Lures</td>
<td>.37</td>
<td>.16</td>
<td>.32</td>
<td>.15</td>
<td>.345</td>
</tr>
<tr>
<td>Marginal</td>
<td>.475</td>
<td></td>
<td>.435</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Marginal means are presented in bold.
Table 2
Signal Detection Measures by condition across the four experiments.

<table>
<thead>
<tr>
<th>EXPERIMENT</th>
<th>d'</th>
<th>C</th>
<th>d'</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment 1</td>
<td>.56</td>
<td>.06</td>
<td>.61</td>
<td>.17</td>
</tr>
<tr>
<td>Experiment 2</td>
<td>.50</td>
<td>.10</td>
<td>.54</td>
<td>.12</td>
</tr>
<tr>
<td>Experiment 3</td>
<td>.60</td>
<td>.20</td>
<td>.69</td>
<td>.31</td>
</tr>
<tr>
<td>Experiment 4</td>
<td>.59</td>
<td>.22</td>
<td>.60</td>
<td>.11</td>
</tr>
</tbody>
</table>

*d' measures how well participants were able to discriminate between targets and lures in recognition memory. C measures response bias.*
Experiment 2

Revelation effects have also been demonstrated by unfolding words letter by letter until the word is completed and then a recognition judgment is made on the completed word (Frigo et al., 1999; Hicks & Marsh, 1998; LeCompte, 1995; Peynircioglu & Tekcan, 1993; Watkins & Peynircioglu, 1990). A situation that would be analogous to this with faces includes covering up parts of the face. The face then would be "unfolded" to show the face normally with participants making recognition decisions about whether they saw the face in the study list. Based upon the empirical literature for the revelation effect and the theoretical arguments presented in Experiment 1, it was hypothesized that exposure to the half-covered faces (i.e., the revelation task) before making a recognition judgment of the same face upright would increase the likelihood of participants' reporting that the revealed faces came from the study list.

Method

Participants. The participants were 64 undergraduates from psychology courses at Louisiana State University.

Materials. The materials were identical to Experiment 1 except the nature of the revelation task. The faces in
the present experiment were disguised by covering the top half of the faces. Therefore, participants saw a face partially covered before seeing the same face presented in the normal fashion.

**Design and Procedure.** The design and procedure were identical to Experiment 1. A 2x2 (i.e., targets vs. lures; revealed vs. intact) within-subject design was used in the second experiment.

**Results**

The individual differences for "old" recognition responses ranged considerably within each condition. The "old" responses ranged from 1 to 18 within the different conditions of the experiment. There was considerable variability in how participants responded to test items.

**Recognition.** As expected, participants were significantly more likely to recognize targets (56%) than lures (36%), $F(1,63) = 136.85$, $p < .001$, $MSe = 7.51$ (see Table 3). Thus, participants were significantly more likely to say they recognized faces that they had seen compared to new faces never seen before.

**Revelation.** A revelation effect was not found, $F(1,63) = .27$, $p = .60$, $MSe = 5.17$ (see Table 3). Revealed faces (46.5%) were not significantly more likely to be called
"old" than intact faces (45.5%). The item by condition interaction also was not significant (p > .05).

Signal detection analyses revealed that both d' and C were not significantly different between intact and revealed items (p > .05). Therefore, there was no difference in performance between intact and revealed items as a result of either response bias or sensitivity (see Table 2).

Discussion. Interestingly, a revelation effect was not replicated in Experiment 2. There could be at least two reasons for not replicating Experiment 1. First, the finding of a revelation effect in Experiment 1 could simply be a Type I error. However, this is an unlikely conclusion given the general occurrence of revelation effects in the literature. It is true that faces are a new class of stimuli for the revelation effect. However, given the robust findings of the revelation effect and the results of Experiment 1, it is more likely that Experiment 2 failed to produce a revelation effect. The failure to find a revelation effect in Experiment 2 is best explained by the nature of the revelation task: Half-covered faces.

Theories of the revelation effect depend on the interpolated task producing either an increased sense of familiarity for the test items or a decreased sense of familiarity with the test item. If faces produce an
increased sense of familiarity then half-covered faces may not be strong enough to produce this increased sense of familiarity. However, it seems unlikely that half-covered upright faces would not be strong enough to produce an increased sense of familiarity. In fact, face recognition is more accurate for half-covered faces than upside-down faces (Church & Winograd, 1986). In other words, half-covered faces should be more likely to activate memory traces of faces than inverted faces. Although the results of Experiment 1 could support the GMM, the results of the first two experiments, taken together, do not appear to support the GMM.

However, if noise or disruption is the key to explaining the revelation effect then half-covered faces may have failed to produce enough disruption to produce a revelation effect (see Hicks and Marsh, 1998). Again, face recognition is more accurate for half-covered faces than upside-down faces (Church & Winograd, 1986). Thus, face recognition for upside-down faces appears to be a much more difficult task than face recognition for half-covered faces. Furthermore, in studies of the revelation effect using words, Watkins and Peynircioglu (1990) found that the size of the revelation effect increased as the degree of disguise the words received was increased. The half-covered faces
were completely revealed in one step which may not have produced enough cognitive noise to produce a revelation effect. However, if faces were 75% covered and required several steps to be completely revealed then this may increase the likelihood that a revelation effect is found with faces using this particular revelation task.
Table 3
Percentage of faces rated as "old" by condition: Experiment 2.

<table>
<thead>
<tr>
<th>EXPERIMENTAL CONDITION</th>
<th>Revealed (%</th>
<th>S.D.</th>
<th>Intact (%</th>
<th>S.D.</th>
<th>Marginal</th>
</tr>
</thead>
<tbody>
<tr>
<td>ITEM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Revealed (%</td>
<td>S.D.</td>
<td>Intact (%</td>
<td>S.D.</td>
<td>Marginal</td>
</tr>
<tr>
<td>Targets</td>
<td>.56</td>
<td>.17</td>
<td>.56</td>
<td>.14</td>
<td>.56</td>
</tr>
<tr>
<td>Lures</td>
<td>.37</td>
<td>.14</td>
<td>.35</td>
<td>.16</td>
<td>.36</td>
</tr>
<tr>
<td>Marginal</td>
<td>.465</td>
<td></td>
<td>.455</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Marginal means are presented in bold.
Experiment 3

The revelation effect has also been demonstrated by having the revealed word be different from the word in the test list (Westerman & Greene, 1996). Thus, a positive response bias is found if the word raindrop is revealed and participants are asked if they recognize vineyard. Therefore, using the same revelation task as Experiment 1, (i.e., inversion) Experiment 3 revealed new faces that were different from the faces that participants judged at test. Based on the results of Experiment 1, a revelation effect is expected to be found revealing new faces through inversion.

Method

Participants. The participants were 52 undergraduates from psychology courses at Louisiana State University.

Materials. The materials were identical to Experiment 1 with the exception that 40 new faces were used in the revelation task. The 40 new faces were selected from the pool of faces normed in the pilot study.

Design and Procedure. The design and procedure were identical to Experiment 1, with the exception that the revealed face was different from the face participants were asked to make a recognition judgment about at test. The revealed faces were new to the participants. Thus, on half the test trials, a new face inverted was displayed prior to
asking the participants whether they recognized the test item.

Results

The individual differences for "old" recognition responses ranged considerably within each condition. The "old" responses ranged from 0 to 15 within the different conditions of the experiment. There was considerable variability in how participants responded to test items.

Recognition. As expected, participants were significantly more likely to recognize targets (53%) than lures (29%), $F(1,51) = 267.54$, $p < .001$, $MSe = 4.37$ (see Table 4). Thus, participants were significantly more likely to say they recognized faces that they had seen compared to new faces never seen before.

Revelation. A revelation effect was also found, $F(1,51) = 4.98$, $p < .05$, $MSe = 4.08$ (see Table 4). Revealed faces (42.5%) were significantly more likely to be called "old" than intact faces (39.5%). The item by condition interaction was not significant ($p > .05$).

Signal detection analyses revealed that $d'$ was not significantly different between intact and revealed items ($p > .05$); however, $C$ was significantly greater for intact items ($C = .31$) than revealed items ($C = .20$), $t(51) = 2.71$, $p < .01$ (see Table 2).
Discussion. A revelation effect was found in Experiment 3 using the same revelation task as Experiment 1. Therefore, Experiment 3 replicated the revelation effect found in Experiment 1 and it also demonstrated that different faces can produce the revelation effect. Also, this finding is analogous to the empirical findings of the revelation effect for words. Thus, it appears that the revelation effect does occur in face recognition memory.

As stated earlier, theories of the revelation effect depend on the interpolated task producing either an increased sense of familiarity for the test items or a decreased sense of familiarity with the test item. It seems unlikely that half-covered upright faces that are the same as test items would not be strong enough to produce an increased sense of familiarity when upside-down different faces are producing this sense of familiarity. That is, half-covered faces that are the same as the test stimuli should be much more likely to activate memory traces of faces than inverted faces that are different from the test. Therefore, the results of the first three experiments do not provide strong support for the GMM as an explanation of the revelation effect.

However, the theory that noise or disruption is the key to explaining the revelation effect is consistent with the
results of the first three experiments. If the production of cognitive noise for revealed items compared to intact items explains the revelation effect, then revealed faces produced a more liberal criterion shift compared to intact faces. Since processing upside-down faces is a much more difficult task than processing half-covered faces, it may be that participants are more likely to loosen their decision criteria when it comes to calling a test item "old" if the interpolated task produces enough disruption. This is consistent with the results of the first three experiments: Upside-down faces have produced revelation effects and liberal criterion shifts, whether the revealed face was the same or different from the test item; whereas using half-covered faces as the interpolated task failed to produce a criterion shift or a revelation effect.
Table 4
Percentage of faces rated as "old" by condition: Experiment 3.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Revealed (%)</th>
<th>Revealed S.D.</th>
<th>Intact (%)</th>
<th>Intact S.D.</th>
<th>Marginal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targets</td>
<td>.54</td>
<td>.15</td>
<td>.52</td>
<td>.16</td>
<td>.53</td>
</tr>
<tr>
<td>Lures</td>
<td>.31</td>
<td>.14</td>
<td>.27</td>
<td>.15</td>
<td>.29</td>
</tr>
<tr>
<td>Marginal</td>
<td>.425</td>
<td>.395</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Marginal means are presented in bold.
Experiment 4

A revelation effect was found for two of the first three experiments using faces as the interpolated task. It is not clear what would happen if words were used as the interpolated task. Luo (1993) argued that he found a cross-modality revelation effect using pictures and revealing words. However, it has been argued that pictures can be represented verbally (Farah et al., 1998). In a pure sense, Luo's findings do not really demonstrate a cross-modality effect. Research has argued that faces and words are processed in different representational systems (Farah et al., 1998). A revelation effect should not occur using words as the interpolated task. If a revelation effect does occur using words as the interpolated task then it would demonstrate, at the least, that words and faces are not stored in different systems. Experiment 4 examined whether a revelation effect could occur for words and faces. In the present experiment, participants were asked mentally to rotate upside down words before making recognition judgments on faces.

Method

Participants. The participants were 72 undergraduates from psychology courses at Louisiana State University.
**Materials.** The materials were identical to Experiment 1 with one exception. Forty six-letter medium frequency words were chosen from the Gibson and Watkins (1988) word pool. These words served as the revealed items.

**Design and Procedure.** The design and procedure were identical to Experiment 1 with the following exception. For the revelation condition, participants saw a word presented upside down. Participants were asked to rotate the word mentally and write it down. After correctly writing it down, participants were asked whether they recognized the face from the study list.

**Results**

The individual differences for "old" recognition responses ranged considerably within each condition. The number of "old" responses ranged from 0 to 18 within the different conditions of the experiment. There was considerable variability in how participants responded to test items.

**Recognition.** As expected, participants were significantly more likely to recognize targets (55%) than lures (33%), $F(1,71) = 208.55$, $p < .001$, $MSE = 6.55$ (see Table 5). Thus, participants were significantly more likely to say they recognized faces that they had seen compared to new faces never seen before.
Revelation. Surprisingly, an anti-revelation effect was found, $F(1,71) = 7.53, \ p \leq .01, \ MSe = 6.13$ (see Table 5). Revealed faces (42%) were significantly less likely to be called "old" than intact faces (46%). The item by condition interaction was not significant ($p > .05$).

Signal detection analyses revealed that $d'$ was not significantly different between intact and revealed items ($p > .05$); however, $C$ was significantly less for intact items ($C = .11$) than revealed items ($C = .22$), $t(71) = 2.78, \ p \leq .01$ (see Table 2).

Discussion. The finding of an anti-revelation effect was counter-intuitive to any of the hypotheses for this experiment. Theoretically, words and faces are considered to exist in two separate representational systems (Farah et al., 1998). Thus, revealing words should exert no effect on face recognition memory. However, if words and faces are not stored in two separate representational systems then it may be possible for words to interfere with face recognition memory. Therefore, if revealing words can affect people’s judgments concerning face recognition then it suggests that it may be possible that faces and words do not operate in independent representational systems.

A more important question concerns whether the present theories of the revelation effect can explain these rather
bizarre findings. The answer to that question is "yes" and "no" depending on which theory is being discussed. Theories of the revelation effect depend on the interpolated task producing either an increased sense of familiarity for the test items or a decreased sense of familiarity with the test item. According to the GMM, revealed words should have no effect on face recognition. Therefore, the present research suggests that the GMM is inadequate as an explanation for the present anti-revelation effect.

The theory that noise or disruption is the key to explaining the revelation effect can be used to explain the present results. The cascading difficulty hypothesis rests upon the assumption that revealing items produces a criterion shift which translates into a response bias. In terms of signal detection analyses, $C$ was significantly higher for revealed than intact items. Revealing words before face recognition may have produced a more conservative criterion shift compared to intact faces.

Why would revealing words produce a more conservative decision criterion for face recognition? The answer seems to lie in the difficulty of the task. Signal detection research has shown that as the difficulty to discriminate items increases so does the likelihood that a liberal response bias will occur for the items that are hard to
discriminate (Hicks & Marsh, 1998). Therefore, if the revealed items, to some degree, are the same class of stimuli as the test item and the revealed items produce enough disruption then it appears that it makes recognition more difficult. Hence, a liberal criterion shift to adjust for the difficulty in discrimination occurs which produces the revelation effect. However, if the revealed items are from a completely different class of stimuli (e.g., words) than the test items (e.g., faces) then the revealed items may appear to help discriminate the test items. This, in turn, may produce a more conservative criterion shift because the test items appear more distinctive. Whatever the underlying theoretical implications may mean, it appears that revealing words makes it more likely for participants to report that they have not seen the face before.
Table 5  
Percentage of faces rated as "old" by condition: Experiment 4.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Revealed (%)</th>
<th>S.D.</th>
<th>Intact (%)</th>
<th>S.D.</th>
<th>Marginal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targets</td>
<td>.53</td>
<td>.16</td>
<td>.57</td>
<td>.15</td>
<td>.55</td>
</tr>
<tr>
<td>Lures</td>
<td>.31</td>
<td>.16</td>
<td>.35</td>
<td>.15</td>
<td>.33</td>
</tr>
<tr>
<td>Marginal</td>
<td>.42</td>
<td></td>
<td>.46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Marginal means are presented in bold.
General Discussion

The present series of experiments examined whether a revelation effect would occur for face recognition memory. In general, the answer is "yes" revelation effects do occur in face recognition memory (see the results for Experiments 1 and 3). However, implicit in the definition of the revelation effect is the idea that interpolated tasks produce higher recognition rates for test items than items presented in isolation. Surprisingly, when words were used for the interpolated task recognition rates were significantly lower for test items in the revelation condition compared to intact items (Experiment 4). Interestingly, this is the reverse of what is typically found in the revelation effect. Therefore, it seems that an anti-revelation effect can also be produced (not to be confused with the anti-revelation effects of Hicks and Marsh, 1998).

There are four issues that need to be discussed as a result of this research. First, the findings need to be incorporated into the general framework of empirical research on the revelation effect. Second, the theoretical explanations of the revelation effect need to be evaluated. Third, the findings need to be discussed with respect to
face recognition memory research. Finally, the direction of future revelation effect research will be considered.

**Empirical Framework**

The revelation effect has been found with a variety of stimuli: words, numbers, pictures and faces. The revelation effect has been found with a wide range of interpolated tasks. In the present series of experiments, the revelation effect for faces was replicated with upside-down faces; however, it was not found for half-covered faces. Therefore, it appears that half-covered faces do not produce a strong enough manipulation for the revelation effect to occur. This is also supported by the measures of effect size (i.e., partial eta squared) for the present experiments. Although the revelation effect does not generally produce large effects, the three experiments where revelation (or anti-revelation) effects occurred the effect sizes ranged from .08 to .09 (.10 for the ant-revelation effect), the effect size that was found using half-covered faces was negligible (.004). It could be possible that the manipulation failed to work simply because this kind of manipulation will not work with face recognition. However, given the variety of different methods with which the revelation effect has been produced and given the
replication of the revelation effect with inverted faces this seems an unlikely explanation.

Most of the research on the revelation effect has used the same class of stimuli for the interpolated stimuli and the test stimuli. In fact, until the present research only one study legitimately looked at whether a cross-modality revelation effect could be produced (Westerman & Greene, 1998). Although Westerman and Greene failed to find a revelation effect using arithmetic as the interpolated task and words as the test stimuli, the present research found that a cross-modality revelation effect using words for the interpolated task and faces as the test stimuli produces a more conservative response bias compared to intact items (i.e., an anti-revelation effect). This finding is definitely new to the revelation effect literature.

It is worthwhile to mention that Westerman and Greene (see Experiments 6 and 7) did find a non significant anti-revelation trend for targets in their cross-modality revelation effect experiments (the trend was opposite for lures). Therefore, previously studied words preceded by numbers at test were less likely to be called old than previously studied words presented in isolation at test. However, future research is needed to determine if this is a reliable trend. The revelation effect continues to
demonstrate that it is a ubiquitous phenomenon. The only real boundary condition that exists for the revelation effect is that it appears to be a retrieval phenomenon that is limited to episodic memory (Frigo et al., 1999; Watkins & Peynircioglu, 1990).

Theoretical Explanations for the Revelation Effect

There have been a variety of explanations for the revelation effect. However, the empirical evidence has only supported familiarity-based theories. There are two main familiarity-based explanations for the revelation effect (Westerman & Greene, 1998; Hicks & Marsh, 1998).

Westerman and Greene (1998) have proposed that the GMM may explain the revelation effect. This model suggests that revealing items generates trace activation for the particular class of stimuli being revealed. Thus, if the test item and revealed item are from the same class of stimuli this would produce an enhanced feeling of recognition for the test stimuli compared to intact items. Therefore, Westerman and Greene suggest that for the typical revelation experiment the interpolated task produces an enhanced feeling of familiarity for the test items.

Hicks and Marsh (1998) have suggested just the opposite. They have proposed the cascading difficulty hypothesis which suggests that the interpolated task creates
noise making recognition of the test items more difficult compared to intact items. Because of the noise produced by the interpolated tasks, participants tend to loosen their criteria for deciding which items they recognize. Therefore, interpolated tasks produce a liberal decision bias for test items compared to intact items.

Although the present research was not designed to test revelation theories, it does appear to support the cascading difficulty hypothesis over the GMM. The results of Experiment 4 are most intriguing regarding the theoretical explanations for the revelation effect. According to the GMM, revealing words should not have affected face recognition memory because although revealing words would activate memory traces of words, it should not activate memory traces of faces. Memory traces for words should not interfere with face recognition memory. However, Experiment 4 demonstrates that revealing words can affect face recognition memory. Therefore, the GMM is an inadequate explanation for the revelation effect.

However, the finding that revealing words affects face recognition memory does support the cascading difficulty hypothesis as well as the idea that words and faces do not belong to two disparate representational systems. In terms of signal detection theory, the research has shown that
liberal criterion shifts are more likely to happen as the signal-to-noise ratio becomes smaller. Thus, the noisier the background the increased likelihood of liberal criterion shifts. Therefore, the revelation effect literature can be explained in terms of how much noise the interpolated tasks produce during item recognition. Hicks and Marsh argue that an interpolated task that makes the recognition process more difficult results in a liberal response bias. This argument is based, in part, on the findings of Hirshman (1995) who demonstrated that the direction of criterion shifts was based upon the level of encoding for items: Items that were better encoded resulted in conservative criterion shifts whereas items that were poorly encoded resulted in liberal criterion shifts. This same process could occur at retrieval: Items that are difficult to retrieve result in liberal criterion shifts whereas items that are easier to retrieve result in conservative criterion shifts. This explanation is entirely consistent with the present results. As already explained above, revealing upside-down faces may make face recognition more difficult which results in a liberal response bias; whereas revealing half-covered faces may not generate sufficient noise to produce a liberal criterion shift. However, the contrast of revealing words before face recognition may have produced a conservative
criterion shift because face recognition may appear to be an
easier task.

Face Recognition

A revelation effect occurred in face recognition memory. Further, an anti-revelation effect occurred when words were revealed for faces. Therefore, it is important to consider how the present results fit into the literature on face recognition memory. There is research that suggests that face recognition memory does not differ from pictorial recognition memory and that both face and pictorial recognition memory are different from verbal memory (Church & Winograd, 1986). However, when words were revealed for pictures, Luo (1993) found a revelation effect. Therefore, if face recognition memory does not differ from pictorial recognition memory than a revelation effect should have also occurred when words were revealed for faces. This, simply, was not the case. Thus, face recognition memory and picture recognition memory may operate in a different manner. In fact, there is research that suggests that facial recognition and pictorial recognition may differ in terms of perceptual processing (Farah et al., 1998).

Luo's (1993) finding of a revelation effect using words as the interpolated task in picture recognition can also be explained by assuming that pictures can be represented in a
verbal system. As stated earlier, Farah et al. (1998) argues that face recognition and word recognition operate in two separate representational systems, where pictures can be processed within either of the two systems. Therefore, Luo's revelation effect may have been produced when words were used as the interpolated task in picture recognition because the pictures were processed verbally.

Faces are not assumed to be processed verbally. In fact, Farah et al. (1998) summarizes a long list of research studies supporting this claim. However, the anti-revelation effect found between faces and words provides evidence that faces and words are not processed in two independent representational systems. Although an anti-revelation effect occurred between words and faces, it does not mean that there is anything special about faces as a class of stimuli (see explanation in previous section). In fact, the revelation effect for faces when faces were used in the interpolated task suggests that face recognition memory is not immune to the same retrieval phenomena that affect words.

The present results also have implications in terms of working with eyewitnesses. The revelation effect typically increases the hit and false alarm rate. In terms of false alarms, certain factors at retrieval increase the likelihood
of participants' reporting that they recognize someone who, in fact, they have never seen before. False positive identifications are problematic in eyewitness memory (Loftus, 1979; Wells et al., 1998). Extending the revelation effect to face recognition memory demonstrates that the rate of false positives in face recognition (i.e., eyewitness memory) can be increased by retrieval factors that appear innocuous in nature.

Directions for Future Research

The research on the revelation effect has produced some intriguing results. However, there is further work to be done on this phenomenon. In general, more research needs to be conducted into cross-modality revelation effects. For example, further research needs to be conducted on the cross-modality revelation effect between faces and words to ensure that the finding was not spurious. Further evidence of an anti-revelation effect would provide continued support for the cascading difficulty hypothesis as well as support the case that faces and words are not stored in separate representational systems. Moreover, research should examine whether a cross-modality revelation effect occurs when faces are revealed for words. In other words, research should examine whether the conservative criterion shift is bi-directional.
If the revelation effect is caused by a change in criterion then some research should investigate whether participants are consciously aware of changing their criterion. If participants are unaware of the modifications they are making for their recognition judgments then this suggests that the cognitive system makes automatic adjustments to decision criteria based upon information it receives from the environment. Therefore, this criterion change can be examined in terms of decision heuristics.

A possible method for providing evidence to the criterion shift argument is to measure reaction times for test responses. If revealing an item that is from the same class of stimuli as the test item makes discrimination more difficult compared to an item presented in isolation, then revealed items should produce longer reaction times than control items. Conversely, if revealing items from a different class of stimuli as the test items makes discrimination easier compared to an item presented in isolation, the revealed items should produce shorter reaction times than control items.

Finally, it would be interesting to see these findings applied to an eyewitness memory paradigm. If research can demonstrate that memory in eyewitness memory paradigms is subject to influence by "revelation-type" factors that occur
at the time of retrieval then this would help the legal community considerably in developing procedures for eyewitness identification.

Conclusions

The present series of experiments examined whether a revelation effect could be produced with faces. The answer to that question appears to be "yes" if faces are also used as the interpolated task and the interpolated task is presenting faces upside down. When words were used for the interpolated task, revealed faces were more likely to be judged as new compared to intact faces. This finding is new to the revelation literature. Therefore, the revelation effect appears to hold new surprises and raise more questions as it continues to be studied. For example, the anti-revelation effect in Experiment 4 raises the question of whether words and faces are really stored in two separate representational systems. Also, it is not known if there are "revelation" like conditions in eyewitness identification that can lead to false positive identifications. Hopefully, future research will examine these questions and other aforementioned questions. The theoretical explanations for the revelation effect appear to narrow with the cascading difficulty hypothesis receiving further support. However, the only real thing that is
certain about the revelation effect is that more research is needed to define the boundaries of this phenomenon.
References


Vita

Jeff Wilson was born in Auburn, Washington, on October 22, 1969. He graduated from Amity High School in Amity, Oregon, in May of 1987. He went to college at Willamette University in Salem, Oregon, where he earned a bachelor of science degree in psychology in May of 1991. He then went to school in Huntsville, Texas, where he received his master of arts degree in clinical psychology. Jeff's journey in academia then continued at Louisiana State University where he received his master of arts degree in cognitive psychology in 1997 and earned the degree of Doctor of Philosophy in cognitive psychology with a minor in experimental statistics in 2000. He has presented articles on interpersonal perception, memory, and decision making and has published articles on interpersonal perception, memory and legal decision making. He also taught statistics and social psychology during his tenure at Louisiana State University. He currently works for BMC software in their usability engineering department as a usability analyst. He resides in Houston, Texas.
DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate:  Jeffrey Roy Wilson

Major Field:  Psychology

Title of Dissertation:  Extending the Revelation Effect to Faces:
Haven't We Met Before?

Approved:

[Signatures]

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:

October 29, 1999