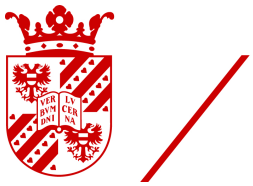

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Unveiling the Impact of Face Memorability on Bidirectional Recall in Face-Name Associations

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Abstract

Previous research has demonstrated that people more easily recall names when associated with a memorable face (Vermeer, 2024), but the underlying mechanism for this effect remains unclear. The present study investigates whether memorability strengthens the associative link between a face and its corresponding name. In a within-subjects design, 58 participants studied name-face pairs and later attempted to recall faces when presented with names. Mental imagery was assessed through participants' self-reports, including confidence and vividness ratings, as well as the perceived accuracy of the imagined faces. Results indicated that participants were significantly more likely to recall the correct face when it was memorable compared to non-memorable. Additionally, vividness ratings were higher for memorable faces, suggesting that memorability facilitates mental reconstruction of faces. However, confidence ratings did not differ significantly between conditions. These findings suggest that memorability plays a role in face-name associations beyond simple recognition, though it remains unclear whether it strengthens associative links or simply enhances retrieval efficiency. Future research should further investigate this distinction by testing false-positive recall rates.

Keywords: face memorability, associative memory, face-name recall, mental imagery, retrieval cues

Unveiling the Impact of Face Memorability on Bidirectional Recall in Face-Name Associations

Have you ever struggled to remember someone's name, even when their face is familiar? Or encountering a name and struggling to visualize the corresponding face? This everyday challenge highlights the complexity of remembering face-name associations, a process that relies on our associative memory (Avery et al., 2016). One factor that could facilitate the recall of information about a person is memorability (Bainbridge, 2017). Previous research found that participants could better recall the names of individuals with memorable faces than those with less memorable faces in a face-name recall task (Vermeer, 2024).

What is not clear, however, is the explanation behind this effect. One possible explanation is that a memorable face is a stronger retrieval cue than a non-memorable face since a memorable face may be more distinctive from other faces (Staugaard & Berntsen, 2019). Another explanation could be that the memorability of a face influences the strength of the association between the face and the name (Madan et al., 2010), with memorable faces producing a stronger associative link to the corresponding name.

To dive into these two explanations for the effect found in Vermeer (2024), the current study will use a task where the memory association between the face and the name is tested in the opposite direction. Instead of testing how well a person remembers the name connected to a face, the current study aims to find out how well a person can imagine a face that is connected to a name, by examining a name-face recall task. If memorability causes a stronger association between the face and the name of a person, it is expected that participants would more easily retrieve and visualize the correct face when cued by a person's name.

Associative Memory

To connect a face and a name, we rely on associative memory. Associative memory refers to the ability to link unrelated items in the mind (Suzuki, 2008). For example, if you

frequently see your grandmother sitting in her favorite chair, you unconsciously associate her with that chair. This association helps you predict future occurrences; when you visit your grandmother, you expect her to be sitting in that chair. In this way, associations play a crucial role in learning and remembering and are important in various aspects of everyday life (Albright, 2013).

Associative memory is also used when individuals learn a new language. They must connect words with their meanings and grammatical rules. Connecting the word to the related information in your mind relies on associative memory (Mårtensson & Lövdén, 2011). For spatial navigation, individuals also rely on associative memory. Individuals can remember the locations of landmarks and pathways because they create a mental map of their surroundings (Ngo et al., 2015). These associations are meaningful and stable, but the association between a face and a name poses a unique challenge to associative memory, as it involves forming arbitrary, cross-modal links between stimuli that lack inherent semantic connections (Flores et al., 2023).

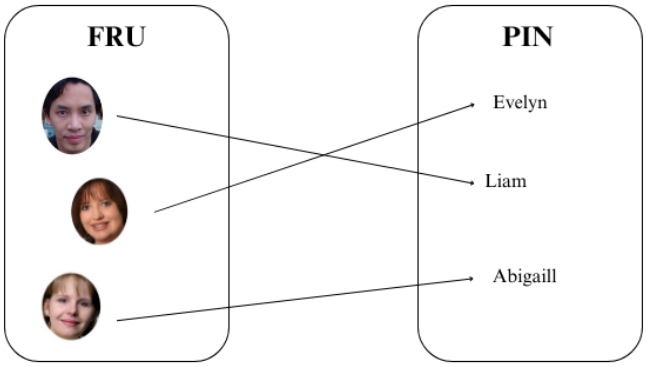
Importantly, research by Flores et al. (2023) has demonstrated that such associations are particularly vulnerable to disruptions in episodic memory function. This sensitivity makes face–name pairings a valuable tool for detecting early cognitive decline. Their effectiveness in cognitive assessment stems from their ecological validity, intuitive task structure, independence from prior knowledge, and the demand to bind novel information uniquely—features that make them especially suitable for identifying associative memory impairments characteristic of early Alzheimer's disease. For this reason, investigating face–name associations are also particularly relevant in the current study.

But how do we form mental associations between a name and a person's face? When someone introduces themselves to you, an association is formed between their face and name, which is stored in an engram (Josselyn & Tonegawa, 2020). The Face Recognition Unit

(FRU) is an essential concept in this process. The FRU stores the representation of a face. When a familiar face is encountered, the FRU is activated (Bruce & Young, 1986). Once activated, the FRU can trigger the corresponding 'Person Identity Node' (PIN). The PIN grants access to a pool of information about the individual, such as their name or other relevant details (Burton et al., 1990). Thus, when a familiar face is recognized, the FRU activates the PIN, enabling access to the information pool, and allowing the name to be retrieved and recalled. This mechanism is visualized in Figure 1.

Figure 1

Brain network with the FRU and PIN.



Memorability

We can form associative networks where different types of information about a person are interconnected. By presenting part of the information, the associated information can be retrieved from the engram (Josselyn & Tonegawa, 2020). But can this process be enhanced? Are there factors that influence the retrieval of this information? Face memorability may play a key role in this.

Previous research has found that across a group of observers, some faces tend to be remembered more easily than others. This is the concept of *face memorability*: the predictive value of whether a face will be remembered or forgotten (Bainbridge et al., 2013). Bainbridge et al. (2013) researched the concept of face memorability and developed a database of

memorable and non-memorable faces. To achieve this, participants were shown a series of faces and instructed to press a button whenever they recognized a face as one they had seen previously. When a face was correctly identified as having been seen before, this response was classified as a "hit." The hit rate (HR), defined as the percentage of times a face was correctly recognized as a repetition, served as the measure of memorability. A higher HR indicated a more memorable face.

Bainbridge et al. (2013) also investigated different attributes of a face that could affect its memorability, such as attractiveness, trustworthiness, or kindness. However, these features do not fully explain the variance in memorability scores for different faces. If you create a predictive model using all known predictors of face memory, its ability to distinguish between memorable and non-memorable faces will be less accurate than a prediction based on the actual memorability of the face, as determined by human face recognition performance (Bainbridge et al., 2013). The exact mechanisms of memorability therefore remain unknown.

The Influence of Memorability on Face-name Recall

Evidence has been found that memorability influences name retrieval when recognizing a familiar face. This hypothesis is supported by a study conducted by Van der Wal (2021). In this study, participants were presented with memorable and non-memorable faces. When seeing a face, participants heard the names connected to this person. After this, participants saw the faces again and were asked to type in the corresponding names. The findings showed a significant effect of memorability on face-name recall. Participants performed better when required to type in the name of a person with a memorable face, compared to a non-memorable face.

The effect of memorability of faces was further expanded by Vermeer (2024). In that study, participants were presented with the names, occupations, and faces of a person. Half of the faces were memorable, and the other half were not. They were asked to remember these

associations between the face and the other information. Later, when the face was shown again, participants were tasked with typing the corresponding name or occupation. The study found that participants were better at recalling the name or occupation of a memorable face compared to a non-memorable face.

These studies show the effect of memorability on the recall of associations between faces and names or faces and occupations, but the exact mechanism that is behind this effect remains unclear because there could be two different ways in which memorability enhances the retrieval of associated information from the brain. One way could be by strengthening the associations between faces and names in a neural network. Using a study of word pairs, Madan et al. (2010) also found evidence for this argument. Specifically, they investigated whether item properties such as imageability influenced association memory during a recall task. Imageability refers to the extent to which a stimulus can contribute to mental imagery related to that word. Madan et al. (2010) wanted to find out if these properties enhanced memory for the associations between the items, or if the properties simply only improved the retrievability of the items themselves.

In the study, Madan et al. (2010) used a paired-associate learning task, where participants were required to learn word pairs. These word pairs differed in their levels of imageability. Pure pairs (high-high or low-low imageability) and mixed pairs (high-low or low-high) were tested in both forward and backward directions. Their results showed that high-imageability words not only improved recall of the items themselves but also strengthened the retrieval of their associates. Next to this, they also indicated that the strengthening of the association between the two items caused a better recall of the items in both ways. So, if the participants were presented with item A, they could more easily recall item B, and this effect was the same the other way around, when shown B, they could more easily recall A. This finding is relevant to the current research as it demonstrates that certain characteristics of a stimulus (such as

imageability for words and memorability for faces) can have an intrinsic influence on how well the stimulus is remembered and related information can be recalled, in both recall directions.

Another way memorability could enhance the retrieval of associated information is through not impacting the association between two items, but through only impacting the cue. According to previous research, retrieval cue characteristics are a determining factor for retrieval success (Staugaard & Berntsen, 2019). A retrieval cue is a stimulus that helps access associated information stored in memory. In their study, Staugaard and Berntsen (2019) manipulated the distinctiveness of a cue to assess how this impacts the retrieval of the associated information. A cue that was only shown once, was more unique than a repeated cue, and therefore more distinctive. Their results indicated that distinctive cues led to better memory access than non-distinctive cues (Staugaard & Berntson, 2019).

Memorability enhances the ability to recall items, which means that a memorable item is encoded more strongly in memory. Research by Vokey and Read (1992) also found that memorability of faces enhances the discriminability between different faces in memory. Participants in the study were first asked to rate how memorable they thought a face would be and later tested their ability to recognize these faces among distractors. Although the study did not measure objective memorability directly, it relied on perceived memorability, which Bainbridge et al. (2013) identified as a strong predictor of memorability. The results showed that when memorable faces needed to be recognized, these faces were more easily identified, leading to fewer distractor faces being selected as incorrect responses. It could therefore be that a memorable cue, such as a memorable face, is more distinctive than a non-memorable cue. As a result, a memorable face causes the retrieval of related information to happen more easily. However, since the study by Vokey and Read (1992) was based on perceived rather than actual memorability, it remains uncertain whether the same results would hold when

using objectively measured memorability, especially considering that perceived memorability accounts for only a small proportion of the variance in actual memorability (Bainbridge et al. 2013)

To find out which of these mechanisms underlie the results found by Vermeer (2024) and Van der Wal (2021), the current study aims to expand their findings by looking into the recall in the opposite direction: can a memorable face also be more easily retrieved when the name is used as a cue? By reversing the direction of the association, this study explores whether the effect is due to the overall strength of the face–name association or specifically to the cue distinctiveness of memorable faces, which may facilitate retrieval regardless of cue direction.

Present Study

Previous research has investigated the process of recognizing a face and recalling associated information about an individual. Results showed that people were better able to remember the name or occupation of a person with a memorable face compared to a non-memorable face (Vermeer, 2024). As previously discussed, the mechanism underlying this effect remains unclear. The current research aims to reverse the task, to investigate if memorability strengthens the association between a face and its corresponding name, leading to a similar effect as observed in studies on face-name recall.

In the current research, participants are asked to study pairs of names and faces and to imagine a face based on the name shown. To recall a face upon encountering a name, the name serves as a cue to activate the visual memory of the individual's face (Albright, 2013). By employing mental imagery, you can imagine what the recalled face looked like. Mental imagery refers to the ability to create visual representations in one's mind (Albright, 2013). In the current study, mental imagery will be measured through self-report measures about the confidence in and vividness of their mental image. But to what extent can a person's self-

reported vividness of a mental image be interpreted as an indication of the presence of a mental representation?

Previous research demonstrates a correlation between the vividness of mental imagery of a face and the storage in visual working memory. McKelvie (1994) conducted a study in which participants completed the Vividness of Visual Imagery Questionnaire (VVIQ), a self-report measure assessing an individual's ability to form vivid mental images. Participants then performed a facial recognition task, and those who scored higher on the VVIQ also performed better on the recognition task. The study of McKelvie (1994) could be an example of the fact that mental imagery can be measured well through self-report measures, because participants with strong imagery abilities, as measured by the VVIQ, are likely to score higher on a facial recognition task.

Similarly, Baddeley and Andrade (2000) demonstrated that the vividness of mental imagery reflects the contents of working memory. In this study, participants were required to remember and visualize a specific unfamiliar stimulus. To determine whether this visualization process is influenced by working memory, the participants' working memory system was disrupted, after which they were asked to report the vividness of their mental imagery. Participants reported reduced vividness in their mental imagery because of this interference. These findings suggest that working memory is closely tied to the ability to generate vivid mental representations.

Research on aphantasia further highlights the relationship between mental imagery and visual memory. Aphantasia is a condition where a person reports being unable to engage in mental imagery, without having any problems with semantic memory and visual perception. Bainbridge et al. (2021) asked participants to draw scenes from their memory, after some time. The participants were divided into the aphantasia condition and the control condition using the VVIQ questionnaire. Participants with aphantasia drew significantly fewer

objects and colors than the control conditions. This again indicates that mental imagery and visual memory are related to each other. By letting participants imagine a face and rate their ability to do so, we can investigate the impact of memorability on the association between a face and a name. The self-report measures employed in the current study therefore are an accurate measure of mental imagery abilities.

If this study finds that people can more easily imagine a memorable face compared to a non-memorable face, and they imagine the correct face more often, the study supports the hypothesis that the association between the face and the name is strengthened by the memorability of the face, which enables a more vivid mental imagery of the face when it needs to be recalled. The effect is then observed in both retrieval directions. Conversely, if this effect is not found, it can be concluded that memorable faces serve as stronger retrieval cues, but that memorability does not influence the association between the name and the face.

Method

Participants

This study recruited participants from first-year psychology students at the University of Groningen. The participants volunteered to participate in return for partial fulfillment of a study assignment. The participants' native languages were diverse and not uniformly English.

According to Brysbaert (2019), a sample size of 52 participants is required for a two-level within-groups design with 1 independent variable for an effect size of $d = .4$. Since the current study uses this study design, with memorability as the independent variable, these recommendations were used. Therefore, a total of 58 participants participated in the current study. These participants were assigned to one of the eight versions of the experiment, as will be further explained below.

Materials

The experiment was designed using OpenSesame (v4.0.5; Mathôt et al., 2011). Participants could participate in the study from a computer with internet access and a keyboard in any quiet place without any source of distraction. The resolution of the display was set to 1024 x 768 pixels. The participants were instructed to put their web browser on full screen.

The images of faces that were used in the experimental task were sourced from the 10k US Adult Faces Database created by Bainbridge and colleagues (2013). From this database, 48 faces of different races were selected. The experiment included 16 faces with a white ethnicity, 16 with a Black ethnicity, and 16 of a different ethnicity, such as Asian, Hispanic, or Middle Eastern. Several ethnicities were used to represent the real-world situation of encountering a person. According to Hulsewiesche (2022), the memorability of a face has the same effect across seeing different races, so race will not be a confounding factor in the current research.

The images were selected so that half of the faces had a high memorability, and the other half had a low memorability. The photos are included in Appendix A for reference. The chosen faces were paired with American names, selected from a database of ethnically neutral names in the United States (Sisense, 2022; as cited in Hulsewiesche, 2022). The names are included in Appendix B.

The current study measures how well participants can recall a face when presented with a name. To recall the face, participants will use mental imagery. To assess mental imagery, we employed a trial-by-trial design, similar to the approach used by Baddeley (2000) and Bird et al. (2010). Every time a name was shown, questions about the participants' mental imagery abilities were asked. This study opted for a trial-by-trial design because, according to

research by Runge et al. (2015), this method is effective for measuring mental imagery abilities.

Design

The study used a within-subject design. The independent variable of the study was the memorability of the faces (memorable vs. non-memorable). The dependent variables were the confidence of the mental image, the vividness of the mental image, and the correctness of the mental image.

The study contained 48 face-name pairs, of which half were memorable, and the other half were non-memorable. Each face was shown with two different names. The names connected to the faces were counterbalanced to control for the potential differences in the memorability of the names themselves.

Procedure

Data was collected between February 17 and February 24, 2025. The study was deemed exempt from ethics review as based on the criteria set forth by the Ethics Committee Psychology, University of Groningen. The study was administered online, allowing participants to complete the study from home using a computer or a laptop, without any assistance from researchers. Upon clicking the provided link for the experiment, the experiment started on their personal computer.

Before starting the experiment, participants were presented with a general description of the study. After this, the participants received instructions on how the experiment worked and what was expected of them.

In the experiment, participants were presented with six blocks of eight face-name pairs, with each pair displayed for 12 seconds. After the encoding phase for each block, participants were shown only the names and were instructed to visualize the corresponding faces. Participants first answered the question, "Try to remember what [name] looked like.

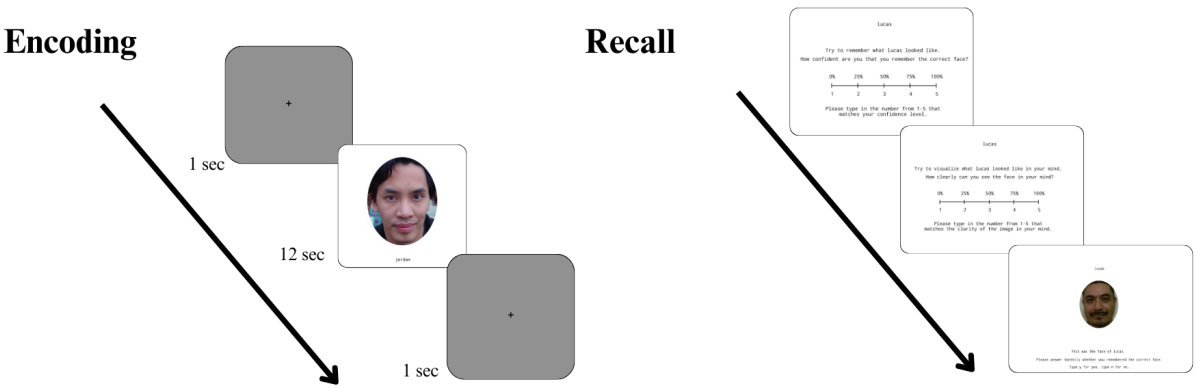
How confident are you that you remember the correct face?" Responses were recorded on a 5-point Likert scale, where 1 indicated 0% confidence, 2 indicated 25%, 3 indicated 50%, 4 indicated 75% and 5 for 100% confidence. The vividness of the mental image was assessed with the question: "Try to visualize what [name] looked like in your mind. How clearly can you see the face in your mind?" This was also assessed on the same 5-point Likert scale as in the previous question.

After these questions, participants were shown a face that corresponded with the name they had seen. Participants were asked, "This was the face of [name]. Please answer honestly whether you remembered the correct face." to which they responded with either "Yes" or "No."

At the end of the experiment, participants were debriefed and informed about the purpose of the study. Participants also got to see which of the faces were memorable and which were not. The whole experimental sequence can be found in Figure 2.

Figure 2

The encoding and recall phase of the experiment



Analysis

To assess the main effects of face memorability on the recall of face-name pairs during a name-face recall task, this study will conduct a paired samples T-test on the confidence that the participant is recalling the correct face, vividness of the mental image, and

correctness of the mental image. Memorability will be a within-subject factor for all these outcome variables.

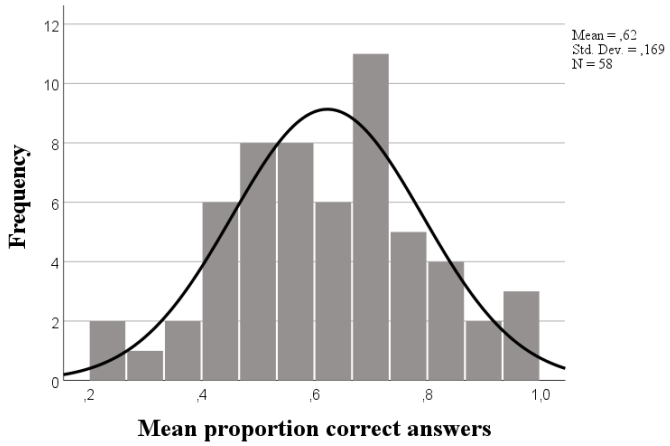
Results

Before analysis, the dataset was screened for severe outliers. The experiment was initially estimated to take approximately 30 minutes. The median study duration was 20.5 minutes, suggesting that most participants completed the study around this time. Three participants required significantly more time than the average—two completed the experiment in approximately 45 minutes, while one took 18 hours. The analysis described below was performed both with and without these outliers, but in both cases, it led to the same significant and insignificant results. Therefore, these cases were retained in the analysis, as external factors likely contributed to these deviations, and it was beneficial to do the research with as much data as possible.

The normality assumption was tested using a Shapiro-Wilk test, which showed that the proportion of correct answers was normally distributed (W [58] = .990, p = .912), which allowed us to perform a paired samples t-test on this data. The distribution of answers can be found in Figure 3.

Figure 3

The distribution of mean proportion correct scores.

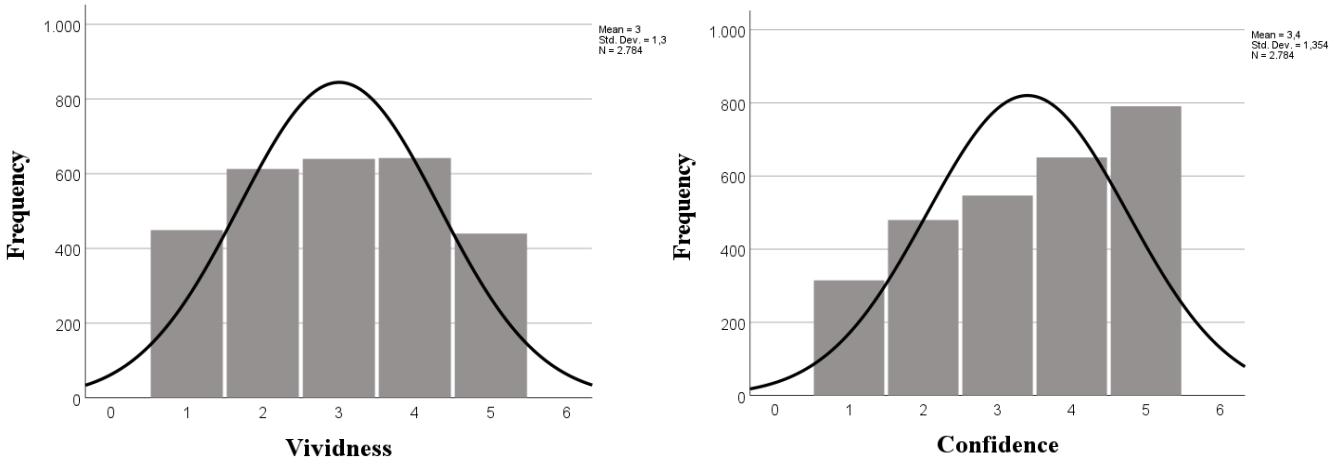


Note: The figure shows the normal distribution of the proportion of correct answers.

Unfortunately, the Shapiro-Wilk test showed that the distributions on the vividness and confidence scales were not normally distributed (W [2784] = .905, $p < .001$, and (W [2784] = .879, $p < .001$). The distributions of the scores on both scales can be found in Figure 4. When deleting the previously mentioned three outliers from the data, there was no change in the normality assumption. Therefore, the outliers remain in the data analysis, and it was decided to test the effect of these variables using a Wilcoxon signed-rank test.

Figure 4

The distribution of vividness and confidence scores



Note: The distribution of scores on the left represents the vividness scale, and the distribution of scores on the right represents the confidence scale.

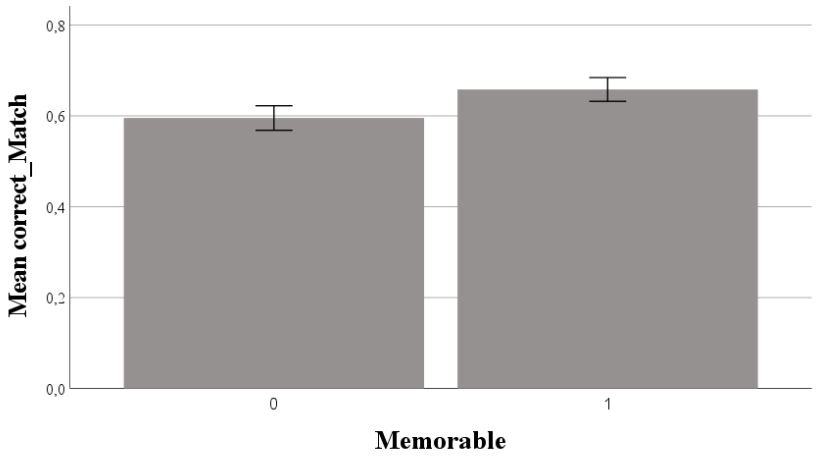
A paired samples *t*-test was conducted to test the study's hypothesis. The study hypothesized that a memorable face could be more easily imagined and recalled compared to a non-memorable face. Therefore, the difference in the proportion of correct face recollections between memorable and non-memorable faces was analyzed. Memorability was the within-subjects variable, and the paired samples *t*-test assessed differences in the proportion of correct answers based on face memorability.

The results revealed a significant average difference between memorable faces and non-memorable faces for the proportion of correctly recalled faces (t (57) = 3.24, p = .002, d = 0.14). On average, participants had a 0.06 higher proportion of correct recollections for

memorable faces than non-memorable ones (95% CI [0.02, 0.09]). This effect can be seen in Figure 5.

Figure 5

Proportion correct answers for Memorable vs. Non-Memorable Faces

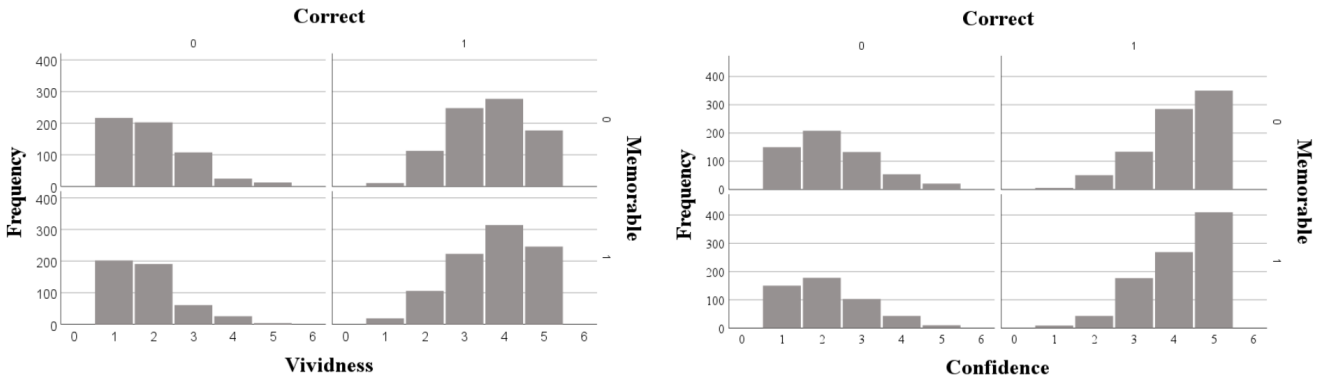


Note: This figure illustrates a significant difference in the average proportion of correct responses between memorable and non-memorable faces. '0' refers to non-memorable faces, while '1' indicates memorable faces. The error bars represent the standard errors of the mean.

Secondly, the relationship between accuracy and the self-reported vividness and confidence rating was examined. This analysis aims to determine whether there was a difference in participants' vividness and confidence of imagery for when they had the correct face in mind, compared to having the incorrect face in mind, for both memorable and non-memorable faces. The distribution of the vividness and confidence scores on correct, or incorrect faces, which could be memorable or not, are shown in Figure 6.

Figure 6

The distributions of vividness and confidence ratings for correct and incorrect recalled trials with memorable and non-memorable faces.



Note: Memorable 0 represents non-memorable faces and memorable 1 represents memorable faces. Correct 0 represents the incorrectly recalled trials and correct 1 represents the correctly recalled trials.

Since the normality assumption was not met for both vividness and confidence, a Wilcoxon signed-rank test was performed. There was a strong association between the correct recall of a face, and the self-report ratings of vividness and confidence of mental imagery. The vividness of the imagined face was significantly higher when participants reported having remembered a face correctly, compared to when they did not. This was the case both when remembering a non-memorable face ($Z = -6.54, p < .001$) and when remembering a memorable face ($Z = -6.57, p < .001$). The confidence in remembering the correct face was also significantly higher than the incorrect face. This was again the case for both memorable and non-memorable faces ($Z = -6.53$, $p < .001$, and $Z = -6.56$, $p < .001$).

It is now known that there is higher confidence and vividness when remembering a correct face compared to an incorrect face, but is there also a difference in these scores between memorable and non-memorable faces? The last analysis investigated whether remembering a memorable face leads to higher self-reported vividness and confidence

compared to a non-memorable face. For testing the hypothesis, only the results were analyzed where participants correctly imagined the target face, again using the Wilcoxon signed-rank test.

The analysis revealed a significant difference in vividness scores when participants correctly recalled the target face when it was memorable compared to when it was non-memorable ($Z = -2.61, p = .009$). Participants experienced higher vividness of their mental image when they remembered the correct face. The confidence scores, on the other hand, showed no significant results ($p = .64$), indicating no significantly higher confidence for memorable faces compared to non-memorable faces when the imagined face was correct.

Discussion

The current study aimed to expand the findings about the effect of memorability on face-name recall. Previous research has shown that individuals are better at recalling names when they are associated with a memorable face compared to a non-memorable one (Vermeer, 2024; Van der Wal, 2021). However, the underlying mechanism behind this effect remains unclear. Two main explanations have been proposed: one suggests that memorability strengthens the associative link between a face and its corresponding name, enhancing retrieval in both directions (Madan et al., 2010), while the other posits that a memorable face serves as a more distinctive retrieval cue, making recall of associated information easier without necessarily strengthening the association itself (Staugaard & Berntsen, 2019). To differentiate between these explanations, the current study reversed the recall task to a name-face recall task. To assess whether participants remembered someone's face, based on a retrieval cue of their name, we used a novel method in which participants first rated their confidence and vividness in imagining what the face looked like. Next, participants were shown the correct face and asked if they had imagined the correct face.

The results revealed that participants were significantly more likely to recall the correct face when it was a memorable compared to a non-memorable face, supporting the hypothesis that a memorable face causes a stronger association between a face and a name. This hypothesis is further supported by similar effects observed in previous research by Vermeer (2024) and Van der Wal (2021), as well as in the current study. These findings point to a bidirectional relationship, whereby the memorability of a face facilitates the recall of both the associated name and the face itself, depending on which element is used as a retrieval cue.

Additionally, participants reported significantly higher vividness of their mental imagery for memorable faces compared to non-memorable faces, especially when the face they remembered was the correct face. This shows that participants had a more vivid image of a memorable face. In addition, the results showed that self-reported vividness was also higher when the correct face was imagined, thereby showing that memory accuracy was strongly associated with vividness of imagery.

For the confidence ratings, there was again a significant difference between remembering a correct and an incorrect face. Participants were more confident in their mental image when they correctly recalled a face, regardless of whether it was memorable or not, before knowing this was the correct face. However, confidence ratings did not differ significantly between remembering a memorable vs. a non-memorable face when participants did imagine the correct face. This indicates that when remembering either a non-memorable or a memorable face correctly, the confidence levels for these faces were the same. This is remarkable considering a memorable face leads to more correct answers, and participants were more confident when giving the correct answer to a question. A possible reason for this result could be explained by the research of Bainbridge et al. (2013), who found that memorable stimuli are more often correctly remembered, but there is no clear evidence on how this process works. It could be that the influence of memorability is an unconscious

process where memorable faces are strongly encoded in memory, but participants do not necessarily consciously feel that this is the case (Xie et al., 2020). Because of this, participants could report the same confidence for memorable and non-memorable faces, because their reported confidence is based on accuracy, and not memorability.

Theoretical Implications

This study contributes to the theoretical framework of the research on the impact of memorability on associations between faces and names. Where previous research has focused on name recall (Vermeer, 2024; Van der Wal, 2021), this study adds a new aspect to this field: remembering a face. The current study supports the idea that memorability not only makes retrieval of faces and names easier but could influence the strength of the association between a face and a name. This supports previous research like that of Madan et al (2010). That study examined whether item properties like imageability influence association memory. Using a paired-associate learning task with word pairs of varying imageability, they tested recall in both forward and backward directions. Their results showed that high-imageability words not only improved recall of individual items but also strengthened their associations. The current research aligns with these findings of Madan et al. (2010), as it is found that highly memorable faces are more easily recalled. This supports the idea that intrinsic stimulus properties, such as memorability for faces and imageability for words, enhance both recognition and associative recall.

In addition, this study also contributes to research methods for studying visual memory. The current study employed a trial-by-trial self-report method to assess mental imagery, where participants rated the vividness and confidence of their mental image when presented with a name. This is a unique approach in face-memory research. The results of the study indicate that when participants reported having remembered a face correctly, they also reported significantly higher vividness and confidence in their mental image. This result

provides evidence that trial-by-trial self-report measures are a valid method for measuring visual memory, which can be used for future research on this subject.

Practical Implications

Research on face memorability could, in essence, contribute to several fields. For instance, in marketing and branding, selecting a spokesperson or model with a highly memorable face could enhance brand recognition or campaign effectiveness. Similarly, in political contexts, individuals with memorable facial features might be more readily recalled by the public when seeing their name on the voting bill. However, the practical implementation of these applications remains challenging. As previously described, Bainbridge et al. (2017) found that there is no perfect combination of facial features that makes a face memorable. Rather, memorability is an inherent characteristic of certain faces, rather than a quality that can be intentionally designed or manipulated. Because of this, selecting individuals based on facial memorability is almost impossible. To ensure that a given face is indeed memorable, empirical testing would be required, which is impractical in real-world scenarios.

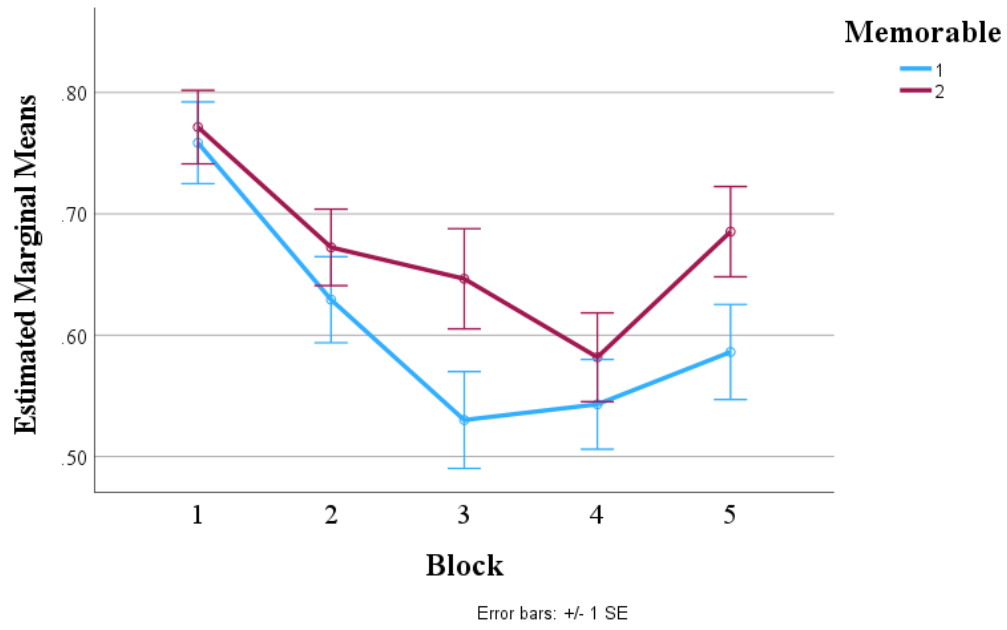
Limitations

During the research, participants were tasked with remembering eight face-name pairs and then answered the same questions eight times for the different names. These blocks were repeated six times throughout the experiment and contained four memorable and four non-memorable faces. This study design raises potential concerns regarding the internal validity of the study. Given that participants had to respond to the same three questions a total of 48 times, attentional fatigue or boredom may have emerged, particularly in the later stages of the experiment. These order effects could reduce the accuracy of the responses. Since this research relies on honest answers from participants regarding their mental imagery abilities, confidence, and vividness, it is possible that order effects influenced the results.

To assess whether the succession of several blocks of encoding and testing trials impacted the study, a repeated measures ANOVA was conducted with Block as a within-subjects factor. The results revealed that Block had a significant effect on the proportion of correct responses (F (4, 228) = 12.62, $p < .001$, $\eta^2 = .181$). This effect is visible in Figure 7. As participants progressed through the study, the proportion of correct responses decreased. The proportion correct responses increased a bit towards the end of the study but never got to the same level as the first block. Importantly, no significant interaction was found between Block and Memorability, indicating that the effect of memorability remained consistent regardless of which block the stimuli were presented in ((F (4, 228) = 0.996, $p = .410$, $\eta^2 = .017$). Thus, while the proportion of correct responses declined over time, the memorability effect was not influenced by the block order.

Figure 7

The effect of block order on the proportion of correct answers.



Note: Memorable 1 in the figure represents the results per block for non-memorable faces. Memorable 2 represents the results per block for memorable faces. We see a decrease in the mean proportion of correct answers, but no effect of block order on memorability.

While time-related changes did not affect the memorability effect, memory interference may have impacted participant performance. In the first block of the study, only eight face-name pairs are in memory. However, as the study progressed, participants were required to remember more face-name pairs, but the previous face-name pairs were not immediately forgotten. A study by Yin (2020) suggests that long-term associative memory can interfere with working memory processing, particularly as the amount of information in memory increases. This led to a decrease in working memory capacity and accuracy. In the current study, participants may have experienced a similar overload of associative memory as the number of face-name pairs accumulated. This overload could explain the decline in response accuracy observed over time that was found in the repeated measures ANOVA, as participants' working memory was increasingly burdened by the need to manage multiple associations simultaneously.

Future Research

The current research aimed to answer the question whether face memorability has a direct effect on the strength of the association between a face and name, or whether it only increases the effectiveness of the retrieval cue. The first explanation was based on research by Madan et al. (2010), who explained by a word test that certain characteristics, such as memorability, could strengthen associations in our memory. Another explanation was that of Staugaard and Bernsten (2019), who found that the distinctiveness of a retrieval cue plays a crucial role in determining retrieval success. A retrieval cue is a stimulus that facilitates access to associated information stored in memory. Staugaard and Berntsen (2019) found that cues shown only once were more unique and therefore more distinctive than repeated cues. Their results indicated that distinctive cues led to better memory access than non-distinctive cues. A memorable face could be a more distinctive cue, leading to better recall of memorable faces compared to non-memorable faces.

By reversing the recall direction in the current research, we found evidence that in a name-face recall task, memorability facilitates retrieval. This could indicate that the association between a face and name is stronger when the face is memorable, but it could also be the case that memorable faces are represented more prominently or strongly in memory, making them easier to recall.

Consistent with this last possibility, Xie et al. (2020) found that enhanced recall of memorable stimuli could also be caused by the fact that memorability leads to an easier recall of items, regardless of the retrieval cue. In the study, participants needed to remember certain word pairs, in which some of the words were memorable and some were non-memorable. The memorability of the word that had to be recalled had a strong influence on the success of the recall of memory. Importantly, however, the study also found that memorable words were more often retrieved and recalled incorrectly when they were not associated with the cue word. The memorable words have on average, the highest chance of being selected out of your memory during the search for an association. Next to this, when one retrieval fails, other memorable words from the task will also come up more easily, leading to more intrusions. So, the brain tends to bring up all memorable items during the search, even though these are not the ones you seek (Xie et al., 2020).

To determine whether the explanation by Xie et al. (2020) also applies to the recall of memorable faces, it is recommended for future research to modify the research questionnaire. In the current study, participants were shown the correct face corresponding to a given name. For future research, we suggest that participants should occasionally be presented with an incorrect face in this question, which could be either memorable or non-memorable. By examining false alarms to memorable and non-memorable face images, we can clarify whether memorable faces are more easily recalled, rather than merely being more strongly associated with their corresponding names. If this is the case, participants may be more likely

to respond “yes” when asked, “Is this the face you imagined?”, even when the face is incorrect but highly memorable.

Conclusion

The present study examined the influence of face memorability on the recall of a face out of memory when being presented with the name of this person. The findings revealed that participants were significantly more likely to recall the correct face when it was memorable. Additionally, vividness ratings were higher for memorable faces, suggesting that memorability facilitates mental reconstruction of faces. However, confidence ratings did not differ, indicating that participants did not feel more confident about their recall despite improved accuracy and vividness.

These results suggest that memorability plays a role in face-name associations beyond simple recognition, though it remains unclear whether it strengthens associative links or simply enhances retrieval efficiency. Future research should further investigate this distinction by testing false positives.

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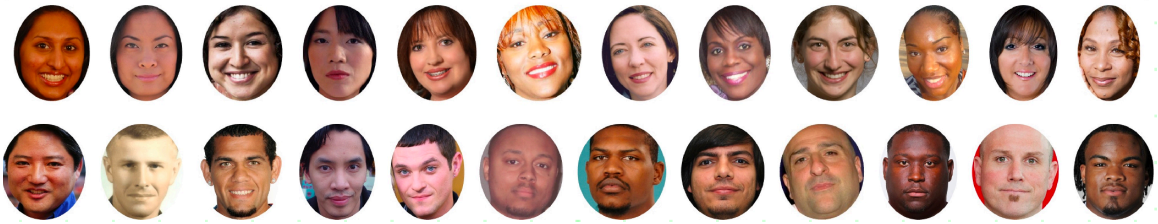
Appendix

Appendix A

Faces used in the experiment

Non-memorable:

Memorable:



Appendix B

Names used in the experiment

Kevin	Amanda	Angelina	Ariel	Jonathan	Hannah	Preston	Savannah
Michael	Lucas	Jordan	Michelle	Amelia	Elena	Fatima	Kayla
John	Marcus	William	Timothy	Natalie	Jessica	Emily	Emma
Lauren	Jacob	Alex	Aaron	Logan	Vivien	Madison	Bella
Olivia	Jasmine	Richard	Grace	Arianna	Tyler	Hunter	Brayden
Jason	Evan	Caleb	Summer	Riley	Tristan	Noah	Kai