Did I catch your eye: do high and low self-monitors differ in how they process gaze-directed and gaze-averted faces

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Did I catch your eye:

Do high and low self-monitors differ in how they
process gaze-directed and gaze-averted faces

by

Hillery E. Gross

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Abstract

Little is known about how social cues and individual differences affect face recognition ability. This study focused on whether the social cue of gaze, either directed toward the viewer or averted away from the viewer, and individual differences in self-monitoring level affect memory for static and dynamic faces. Gender differences in face recognition and self-monitoring status were also explored. Overall, participants' face recognition ability was significantly better for gaze directed versus gaze averted faces. There was also a slight tendency for women to do better than men. However, there was no difference in recognition ability for the dynamic and static faces. Scores on the self-monitoring scale were not significantly correlated with performance on the face recognition tasks. Women were more prevalent than men in the low self-monitoring category whereas men were more prevalent than women in the high-self monitoring category. The difficulty and advantages of using naturalistic socially-engaging stimuli in face processing studies are discussed.
Facial movements convey a wealth of social information. Subtle movements of the eyes, mouth, nose and eyebrows may indicate puzzlement, intent or interest. Facial movements indicate basic emotions such as fear, sadness, happiness, and disgust which can guide other's behavior. These social cues are vital to social interaction. Without them people would not know or understand how to behave or what to say around other people. Cues in facial expressions are a form of situational cues. Correct interpretation of these cues is necessary for adaptive social behavior. Indeed children and adults who show difficulty understanding social cues tend to demonstrate mal-adaptive behaviors, poor social adjustment, and a number of other life difficulties. Many theories have been suggested regarding the initial cause of this social situational cue misperception. One theory in particular has been well supported. Children and adults must first encode, represent and interpret situational cues before enacting a behavior the individual deems appropriate. However, what behavior is deemed appropriate is highly dependent on how those social cues are encoded, represented, and interpreted (Crick & Dodge, 1994).

Individuals differ in how attentive they are to these social cues which in turn could affect the cue encoding process. If the cues are not correctly encoded or not encoded at all, then that affects all subsequent steps leading to the choice of social behavior. At one extreme, research has shown that autistic children seem to exhibit attentional deficits which may hinder other functions, such as social perception. Specifically autistic individuals have been found to have difficulties with a number of social information processing tasks, including
understanding facial expressions of affect, interpreting faces, and expressing emotions (as cited in Pierce, Glad, & Schreibman, 1997).

In addition to developmental and mental disorders, personality might play a role in determining how much attention an individual gives to social cues. Previous research has suggested that extraverts gaze at others more frequently than introverts. Extraverts also look for longer periods of time and with longer glances than introverts (Argyle & Cook, 1976). If this extra attention creates more opportunities to encode social signals then perhaps these individuals are better at interpreting social cues than others. However, even though extraverts do look longer at their partner’s faces, there is no indication that they are especially tuned to the social signals afforded by the face. One group of individuals who do seem to be especially tuned to social cues is individuals who are high in self-monitoring status. Mark Snyder (1974) created the concept of self-monitoring. He describes self-monitoring as the idea that people’s actions and comments might be intentional attempts to create a particular persona that matches their current situational context. In other words, people may try to “appear to be the right person in the right place at the right time” (Snyder, 1979, p.86).

As people vary in the degree with which they engage in this self-monitoring behavior a continuum develops of low self-monitors to high self-monitors. A prototypic high self-monitor is someone who is attentive in social situations to social cues in other people’s expressions and behaviors and then uses these cues to monitor his or her own verbal and non-verbal behavior in order to behave appropriately for the situation. On the other hand, the prototypic low self-monitor does not attend as carefully to social information and as a result does not always behave in a situationally appropriate manner. Rather, the prototypic low self-
monitor seems to be managed more by his or her internal affect and beliefs. Given this idea, it is reasonable suppose that differences in self-monitoring status could result in differences in face recognition ability.

Since the high self-monitors place great emphasis on fitting in socially, they may be more inclined to watch faces for social cues that would indicate appropriate behavior for a particular setting. A simple hypothesis would be that high self-monitors would be more likely to recognize faces because they are more attentive to faces and the social cues that faces convey. However, a more complicated set of predictions follows if processing social cues and adjusting one’s behaviors in response to these messages leads to competition for a limited pool of attentional resources. High self-monitors focus on making situationally appropriate adjustments to their own behavior and this focus on the message, rather than the messenger, could lead to poorer face recognition performance. Complicating these predictions, the particular social signal conveyed might influence how intently high and low self-monitors attend to a face.

The present study explores how high and low self-monitors remember faces that gaze toward the viewer (gaze directed faces) and gaze away from the viewer (gaze averted faces). Direction of gaze is an important social cue that provides information about a partner’s interest and focus of attention. If, as the literature suggests, high self-monitors are more attentive to social cues than low self-monitors, then changes in the direction of a partner’s gaze should differentially affect high self-monitors’ memory for a face. Cues, such as gaze aversion, which indicate that the person is no longer sending a stream of relevant social signals could cause a high self-monitor to disengage and subsequently, to not attend as well.
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to the face. In contrast, a low self-monitor whose behavior is more static and inwardly controlled would be less inclined to watch for social cues to indicate appropriate behavior. Consequently, changes in the direction of gaze may have a more muted affect on low self-monitors' ability to recognize the face.

The present study seeks to examine how the social cue of eye gaze interacts with a person's self-monitoring type to affect face recognition ability. Social cues are conveyed by dynamic faces. This leads to the expectation that differences in high and low self-monitors' ability to recognize socially engaging and disengaging faces would be more pronounced when the eyes actually move, rather than when movement is implied as it is in a still photo of someone whose eyes look away.

Given the shortage of data on how social cues affect face recognition, the present study takes a two-prong approach to this question. The first issue addressed is whether face recognition is affected by the direction of the model's gaze. One set of analyses will focus on whether individuals are more apt to remember faces that gaze at them as opposed to faces that avert their gaze and whether this effect is stronger with dynamic rather than static images. The second issue addressed is whether a potent social cue, here gaze, differentially affects face recognition accuracy for high and low self-monitors. The second set of analyses will focus on whether individuals' scores on a measure of self-monitoring status are related to differences in the extent to which they show a differential recognition advantage for gaze-directed over gaze-averted faces and whether this correlation is stronger for dynamic as opposed to static images.
Faces are typically learned while two people are interacting in a social context. This raises the obvious question as to whether there are individual differences in the extent to which individuals attend to their partner’s face during an interaction. Unfortunately, given that laboratory based studies typically involve learning faces from photographs; our understanding of how people extract information from a face during an ongoing interaction is quite limited. It should be expected though that individuals differ in how attentive they are to the social cues conveyed by a moving face. In certain social situations, for example a face-to-face job interview, some individuals may be especially tuned to social cues conveyed by facial movements whereas other individuals may be so intent on the content of their answers that they fail to notice subtle nonverbal messages that their answers are boring the listener. This same premise could apply to any social interaction, including romantic relationships, friendships, and general peer gatherings. At this point, we know very little about how individuals deal with the competing demands of learning a face and processing the various social signals that are conveyed by the face during an interaction, and even less about whether there are individual differences in how people deal with these competing demands.

Recently Roark, Barrett, Spence, Abdi and O’Toole (2003) outlined the various roles movement might play in face learning. One option, which they labeled “the motion as a social signal hypothesis”, is that the social signals convey by the face affect how the identity of the face is processed. As there is little data that bear directly on this hypothesis, they allow for two possibilities: motion that activates social information processing either can help or can hinder face recognition ability. First, there is the chance that processing social cues given
in the face could cause someone to focus more attentional resources on the face than would otherwise be given. This could increase processing of the face and increase the likelihood of the face being recognized later. On the other hand, there is the possibility that processing the social information given in the face could interfere with learning a face by splitting limited attentional resources.

Increases in task demands have been shown to interfere with face learning. One of the most dramatic examples of this has been noted by Simons and Levin (1998) in change blindness tasks. In one version of this task, a confederate asks the subject for directions. During the conversation something unexpected happens, for example, a man walks by with a plank of wood and the subject’s view of the confederate is blocked. During this interlude, a second confederate takes the place of the first. Once the obstacle has passed, subjects almost always continue giving directions without noticing that their conversational partner has changed. Presumably, in this situation, the subject is so focused on the demands of the interaction that he or she fails to attend to the listener’s face. The demands of the social task seem to interfere with face recognition ability.

In other situations, however, the ebb and flow of the social interaction may facilitate the encoding of a face (see Roark et al. 2003). This idea, though speculative, is consistent with reports in the infant literature. As Stern observed, the temporal patterning of the facial movements during mother-infant interactions may maintain the infant’s interest and help the infant learn the identity of its mother’s face. Many different types of facial movements occur during adult-infant interactions. The adult’s face moves forward and back, up and down, and side to side. The internal facial features also move. Expressive movements of the mouth and
face accompany mother-infant speech. And, of course, the eyes move during these interactions as the partners continually make and break eye contact. In fact, eye gaze is so important to infants that in one study even at three to five months they were upset when partners averted their gaze during interactions, but were happy again when mutual gaze was reestablished (de Haan, 2001).

Eye contact, facial expressiveness, and other movement can all be considered social cues. Such movements can be quite subtle and still carry a great deal of meaning to an attentive observer. Emotions, such as happiness or anger, can be communicated through the eyebrows or mouth or other individual part of the face, and viewers can reliably interpret happiness and fear from the eyes alone (Argyle & Cook, 1976). Changes in the direction of gaze are another source of social information. One obvious inference that can be drawn from the direction of gaze is who or what is the object of the person’s attention (Argyle & Cook, 1976). Eye gaze can also signal where to look or alert someone to changes in the social environment. Eye movements also convey emotion; eye movements can convey interest, boredom and other emotions, including exasperation as is seen in the typical teenage eye roll.

Eye gaze is a particularly interesting social cue because attention to this cue is involuntary. A change in gaze triggers “rapid, reflexive shifts of adult participants’ visual attention,” whether it is a relevant gaze cue or not (Langton, Watt & Bruce, 2000, p.54). Even infants will shift their focus to follow an adult’s gaze (Bruce, Green, & Georgeson, 2003). While other social cues may be more subtle and harder to interpret, eye gaze will regularly catch a viewer’s attention. Eye gaze then is in many ways an ideal social cue to explore in face recognition studies. A change in gaze can be communicative and can redirect
attention without providing any additional information about the structure of the face. This is particularly important in face recognition studies. Eye gaze can be directed or averted without moving the face in the learning phase of a study. Then a completely separate view of the face, at a different angle with a different structure, can be used as a test stimulus. In this way the face may be dynamic and interactive without the viewer seeing alternative views of the face.

Hood, Macrae, Cole-Davies and Dias (2003) found that the position of the eyes in a photograph affects accuracy rates in a subsequent recognition task. During the learning phase in condition one, frontal views of the faces were presented with the eyes looking ahead (gaze-directed) or looking away (gaze-averted). The test images were the same frontal views with the eyes shut. In a second condition, the faces were presented with eyes shut during the learning phase and the test images were faces that looked either at or away from the viewer. Hood et al. found better face recognition for gaze-directed as opposed to gaze-averted faces; this was true in both conditions. Hood et al. attributed the advantage in the first condition to heightened encoding; "In the encoding version of the present task, direct gaze could activate mutual gaze detectors, thus triggering facilitated encoding relative to faces displaying deviated gaze. In turn, this facilitated encoding would prompt enhanced memory for faces with direct gaze" (Hood et al., 2003, p.70). They extend this notion of a shared attention mechanism to account for the gaze-directed advantage that emerged in the second condition.

"At test, shared gaze may prompt the elaborative processing of the available retrieval cue. In turn, this facilitated encoding would prompt enhanced memory for faces with direct gaze." (ibid).
Hood et al.'s findings suggest that implied movement is sufficient to produce enhanced encoding and retrieval of gaze directed faces. Actual movement may amplify this effect. The proposed study uses dynamic images as well as static images to gain a better understanding of the role that real movement, as opposed to implied movement, plays in a face recognition task. Static images, particularly the ones used in Hood et al.'s study have another drawback. When the view of the face used for encoding and testing are the same, individuals may rely on a picture matching strategy. That is, face recognition mechanisms which allow one to recognize an individual across changes in view may not be engaged by pictures that present the individual in the same orientation where the only difference in pictures is whether the eyes are open or closed.

Gender of the participant has been found to play a role in face recognition ability. It could also be considered an individual difference even as self-monitoring and other personality characteristics are individual differences. When gender differences emerge in face recognition studies, women have been found to do better than men at recognizing faces. In particular women do well when the task involves recognizing other women (Bruce, 1988). In the present study, only female faces serve as stimuli and participant gender will be included as a factor in the analysis.

Assessing Self-Monitoring Status

Snyder created a scale to determine where in the self-monitoring range a person falls: the Self-Monitoring Scale (SMS) (Snyder, 1974, 1986). The original scale consisted of 25 true-false, self-descriptive questions. This was later revised down to 18 of the original 25
questions to increase reliability, although both scales are considered reliable and the original scale was used to create the Junior Self-Monitoring scale for use with children and adolescents (Snyder, 1986; Graziano, Musser, Leone, & Lautenschlager, 1987). Through comparisons to other measures, the SMS has been shown to tap something unique. On a superficial level, the descriptions of the prototypic high self-monitor seem similar to the descriptions one might give of someone who is extraverted or high in need for approval. However, studies have shown that the SMS scale is not measuring extraversion or need for approval (Snyder, 1979).

Instead, factor analysis done by Snyder and Gangstedt (1986) has shown that both the original and revised scale reliably identify three factors within the SMS. These factors highlight traits that could potentially cause the high self-monitor to pay close attention to social cues in a way that extraversion or need for approval would not. The first cluster, called "expressive self-control", measures a person’s ability to actively control his or her expressive behavior. Items representing this cluster include true answers to "I would probably make a good actor" and "I can look anyone in the eye and tell a lie with a straight face (if for the right end)". The second cluster, "social stage presence", represents the likelihood a person will be on display in a social setting and attempt to attract attention to one’s self. Statements measuring this factor include false answers to "In a group of people I am rarely the center of attention" or "At a party I let others keep the jokes and stories going". The final cluster, "other-directed self-presentation" deals with one’s tendency to behave according to how others in a social situation expect one to behave. This is measured in true responses to statements like "I may deceive people by being friendly when I really dislike them" or "I
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guess I put on a show to impress or entertain people”. These three factors highlight traits that could potentially cause the high self-monitor to pay close attention to social cues in a way that extraversion or need for approval would not.

Moreover, a focus on these three factors suggests that the process of self-monitoring itself consists of two parts: self-observation and self-control. First a person must be aware of his or her own behaviors, actions and reactions. Then the person must be able to control and manage his or her own behaviors to achieve the desired effect (Kirk, 1998). However, there is an additional requirement for the process to be successful. As Snyder aptly notes, to achieve the desired effect one must have “an acute sensitivity to the cues in a situation which indicate what expression or self-presentation is appropriate and what is not” (Snyder, 1974). Thus, it becomes clear that people who are highly skilled in self-monitoring are paying close attention to the social cues around them. Since emotions and social cues are largely articulated through facial expressions there is a reasonable possibility that high self-monitors may be particularly attentive to faces when compared to low self-monitors (Bruce, 1988; Russell & Fernandez-Dols, 1997).

Unusual attentiveness on the part of the high self-monitor would allow for several possible reactions to face recognition tasks. A high-self monitor might remember faces better than a low self-monitor simply because he or she is paying closer attention to the face while looking for social cues. This extra attention could increase processing time and depth of processing, thereby making the high self-monitor more likely to remember faces. Snyder has shown through experiments that “according to the self-monitoring construct, high self-monitoring individuals ought to be particularly vigilant (sic) and attentive to social
comparison information that could guide their expressive self-presentation” (Snyder, 1979, p. 91). In fact, others have found that high self-monitors can more accurately recall information about another person from a social interaction. Additionally, several studies have shown high self-monitors to have a sensitivity to or a skill in correctly inferring emotional states through non-verbal behavior (Snyder, 1979). All of the findings would suggest that a high self-monitor should be paying closer attention to faces during a social interaction.

On the other hand, the high self-monitor might have a higher cognitive load due to the increased need to constantly monitor the social situation and therefore might be more selective when deciding which faces to closely monitor for cues. If a high self-monitor perceives someone as displaying cues that indicate that individual is not relevant to the social situation then the high self-monitor may not attend to that face and therefore not encode it effectively and resultantly, not remember it as well. Meanwhile, the low self-monitor, being more inwardly focused, might give the same amount of attention to each face and only lower or increase that attention due to internal states, such as fatigue. One might expect a low self-monitor to show no difference in face recognition ability on a task that manipulates only the social cues expressed in the face.

While no studies have shown gender to correlate with self-monitoring, it is a factor which must be considered. Snyder originally verified that people’s scores on the scale matched acquaintances observations of self-monitoring by using fraternity boys (Snyder, 1974). While the scale has been used with both genders since then with no gender correlation reported, studies have also not reported a lack of gender correlation. Thus, it is unclear whether gender has been looked at as a factor and is not correlated with self-monitoring or
whether this factor has been over-looked in analysis. Given the possibility that females may
do better than males in general on face recognition tasks, the correlation between self-
monitoring and gender will be examined. If women tend to score more at one end of the scale
then men this could lead to the false inference that self-monitoring status is correlating to
face recognition ability when really the effect is due to gender.

Method

Participants

Introduction to Psychology students in Bethlehem, PA were randomly selected for
course credit. The final data analysis was run on a total of 202 students. The dynamic stimuli
study had 100 participants and was evenly split by gender. The static stimuli study had 102
participants, 49 males and 53 females. 10 participants’ data had to be discarded due to errors
during the testing process. Subjects were screened to ensure that they had not participated in
previous face recognition studies in our lab.

Face Stimuli

Quick time movies were created from digital video clips taken at the University of
Texas at Dallas (UTD) face recognition lab. Female UTD students were videotaped in color
as each rotated her head 180 degrees. All heads turned at the same speed by following a
metronome and each turned her eyes as far as possible before rotating her head. The students
were draped with a gray cloth to cover clothing. They were not wearing eyeglasses, any
distinctive jewelry, nor had any distinctive hair color such as pink or green.
To create moving stimuli each learning stimulus was edited in i-Movie by first cropping the head rotation video clip to include just the time from when the eyes faced center up until the time that the eyes were as far to the side as possible and the head began to turn. These clips were then slowed down the maximum allowed by the program and any point in the clip that the eye did not move was cut out. This left a clip of each subject’s eyes gazing center and then slowly gazing off to her left (the viewer’s right). The stimulus gave the impression of the girl looking away (called the gaze-averted condition). Once this clip was created, the reverse clip option was used to create an identical clip, which gave the impression of the girl looking towards the viewer (called the gaze-directed condition).

Finally, each clip, both gaze directed and gaze averted, had the first frame of the clip duplicated for half a second and the last frame of each clip was duplicated for two seconds. The result was that for each face there were two stimuli clips. First, one of her momentarily looking to her left then gazing toward the viewer and holding the viewer’s attention (the “gaze directed” clip). Second, one of her momentarily looking at the viewer and then gazing away and watching to her left (the “gaze averted” clip). Each clip was a total of three seconds long. There were 26 faces for the learning phase, each with two clips, one gaze directed and the other gaze averted. Hence, a total of 52 clips were created for the learning phase. The gaze directed stimulus was designed to mimic the social interactional gaze of engaging the viewer. The gaze averted stimulus was designed to mimic the social interactional process of disengaging with the viewer.

To create static stimuli the same Quicktime movies were used again. The moving stimuli were exported back into i-Movie where the last frame of the clip was used to create a
three second long still clip. Two static clips were created for each of the 26 faces, one gazing toward the viewer and the other gazing away from the viewer. In the static condition, viewers experience either gaze-directed or gaze-averted faces, but without the movement, and presumably will not experience the mimicked social interactional process of engaging and disengaging with another person.

The test stimuli were created by taking the same 26 faces from the learning stage and creating in i-Movie a still clip of them gazing off to their right, just before the eyes began to move to the center. Although the test stimuli were created from the same clips as the learning stimuli, the slightly different position of the head and the different direction of the gaze provided a sufficiently different view of the face to test with. Additional test stimuli were made in the same way from 26 video clips of individual that were not seen in the learning phase. These clips were used as distractor clips in the recognition task.

The dynamic stimuli were run on an Apple performa (6214 CD) equipped with a 14-inch monitor. The static stimuli are presented on an Apple equipped with a 17-inch monitor. This is a slightly larger monitor than used for the moving faces; however, the actual images will be the same size. The experimental program was written in PsyScope and the same program was used for the dynamic and the static stimuli. Using the same stimuli, same length of presentation, and same mode of presentation will allow for a better comparison of results with dynamic and static images.

Self-Monitoring Scale

Snyder’s (1974) original Self-Monitoring Scale was administered as a paper and pencil test as prescribed in the original published scale (see appendix for scale).
Design

Each participant viewed all 26 faces in the learning condition. For the dynamic stimuli and the static stimuli, half of the faces gazed toward the viewer and the remaining faces gazed away. The learning stimuli were counter balanced between the two conditions, where if the gaze-directed clip of a face was used in the first condition, then the gaze-averted clip of that face was used in the second condition. The order in which the faces were presented was individually randomized for each subject. All subjects viewed 52 faces in the test phase; half of the faces were old (that is, the face was presented in the learning phase) and half of the faces were new.

Procedure

Each subject upon his or her arrival read and signed the consent form and then was assigned a subject number to protect his or her identity. Each subject was also assigned to condition 1 or 2, alternating as each subject came in. The experiment was explained to each subject as a basic face recognition task followed by a short questionnaire. With the subject seated in front of the computer the learning phase of the experiment began. The subjects were told during this phase they only needed to watch the faces presented on the screen and that they would afterwards be asked to identify faces that were seen during this learning phase. After the learning phase was finished subjects had a five-minute break where they remained in the room. (This prevented them from seeing other faces in the hallway.)

The break was followed with the test phase. Subjects were asked to look at a face on the screen and indicate if it was an "old face", one that was seen in the learning phase, or a "new face": one that they had never seen before. The experimenter emphasized that the
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directions were asking about the person, not the specific picture. Subjects were told that the pictures might not look exactly like what was seen in the learning phase and that hair, gaze, or expression might be different. However, as long as it was the same person from the learning phase then it should be considered an old face. The computer presented each face for three seconds and then the prompt “Press 1 for old and 3 for new” appeared on the screen. The subjects could not respond before the response screen, guaranteeing that each subject saw the faces for the same length of time. Subjects had as long as they needed to give their response by pressing the corresponding key on the keyboard.

When the face recognition task was finished the subjects were given the Self-Monitoring Scale. They were instructed to read the directions at the top of the page, to take as long as they needed, and were reminded that their answers were completely confidential. Once the participants were through they were debriefed and thanked for their time. The entire session lasted approximately 30 minutes.

Results

Face Recognition

Response accuracy in the face recognition task was measured with $d'$, a bias-free measure of accuracy based on signal detection theory (Green & Swets, 1966). This measure emphasizes the judgmental instead of the sensory aspect of the experiment and looks at the relationship between “hits” or correct yes responses and “false alarms” or incorrect yes responses (Kling & Riggs, 1971). For this experiment a hit would be indicating a face as old or familiar when it had been shown in the learning phase. A false alarm would be indicating a
face as old or familiar when it is actually new and was not shown during the learning phase. For each observer, two $d'$ scores were calculated: one for faces that were presented gazing toward the viewer during the learning phase and one for faces that were presented gazing away from the viewer during the learning phase.

These data were submitted to a two by two by two repeated measures analysis of variance (ANOVA) with gaze (on or off) as a within subjects factor, stimuli type (dynamic or static) as a between subjects factor, and gender (male or female) as a between subjects factor. A significant main effect for gaze was found, $F(1, 198) = 25.071$, $p<.0001$. Participants showed much better recognition ability for stimuli that gazed toward them ($M=1.217$) versus stimuli that gazed away from them ($M=1.010$) (see Figure 1).

A significant main effect was also found for gender, $F(1, 198) = 7.318$, $p=.007$. Women overall were much better at recognizing faces ($M = 1.226$) than men ($M = 1.001$) (see Figure 2). However, no main effect was found for stimuli type, $F(1, 198) = 0.337$, $p>.05$. Moving faces ($M=1.138$) did not promote better face recognition than static faces ($M=1.089$) (see Figure 3). There was also no interaction for gaze and stimuli type, $F(1,198) = 0.83$, $p>.05$. There was no interaction of gaze and gender, $F(1, 198) = 0.544$, $p>.05$. There was also no interaction for stimuli type and gender, $F(1,198) = 1.927$, $p>.05$. And finally, there was no interaction for gaze, stimuli type, and gender, $F(1, 198) = 0.00$, $p>.05$.

**Self-Monitoring**

The Self-Monitoring Scale was scored according to Snyder's method: in the direction of high self-monitoring. For each question that subjects responded to as a high self-monitor
they received a point. The points were then added to create a total score for each subject. The scores could be as low as 0 or as high as 25.

As planned, correlations were done to examine whether individual’s scores on the self-monitoring scale were related to a differential recognition advantage of gaze-directed versus gaze-averted faces. A differential d’ score was calculated for each participant by subtracting the d’ gaze-averted score from the d’ gaze-directed score. No correlation was found between the self-monitoring score and the d’ differential score with static stimuli, $r = -0.011$, $p > 0.05$ (see Figure 4). Also, no correlation between self-monitoring score and differential d’ score was found for the dynamic stimuli, $r = 0.032$, $p > 0.05$ (see Figure 5).

To examine the gender and self-monitoring relationship, self-monitoring scores were split according to Snyder’s (1974) standards of high and low self-monitors. Eighteen participants scoring below a 9 were assigned to the low self-monitoring group. Fifty-seven participants scoring above a 15 were assigned to the high self-monitoring group. The remaining 127 participants were assigned to the middle group. These three groups were submitted with the gender factor to a chi square analysis. A significant relationship was found, $\chi^2 = 6.97$, $p = 0.031$. There are more females ($n = 14$) than males ($n = 4$) in the low self-monitoring group and more males ($n = 33$) than females ($n = 24$) in the high self-monitoring group (see Figure 6). Since a gender effect was found on the self-monitoring scale, the self-monitoring score was again correlated with the d’ differential score for gaze. This time correlations were split by both stimuli type and gender. No correlation was found for dynamic stimuli with males, $r = -0.028$, $p > 0.05$, or females, $r = 0.093$, $p > 0.05$. Also, no
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correlation was found for static stimuli with males, \( r = -0.063, p > 0.05 \), or females, \( r = 0.066, p > 0.05 \).

Discussion

Consistent with previous findings and as predicted here, gaze-directed images were remembered much better than gaze-averted images. Clearly something about a viewer paying attention to someone helps increases the likelihood that the viewer will later remember that face. These findings are consistent with Hood et al.’s recent findings and extend that work by demonstrating that the advantage for gaze-directed faces holds when a different angle of the face is presented during the test phase. The robustness of these effects across changes in view suggests the gaze advantage is mediated by face-processing mechanisms.

In the present study, women were better than men at recognizing the test images. In past studies, when gender differences emerged, they also favored women. Women are also more likely to show this advantage when the stimuli are female faces. A perceptual learning explanation based on differential exposure could account for this effect. Given the prevalence of same gender companions during childhood and adulthood, men and women may differ in the extent to which they emphasize particular aspects of the face. Furl, Phillips & O’Toole (2002) have shown that differential exposure provides at least a partial explanation for why people are less adept at recognizing faces of other races. For their computational model, heavy exposure to faces of a particular race led to different aspects of the face being assigned more weight. This suggests an intriguing explanation for why women may have had an advantage in the present study: they may have placed more weight on aspects of the face that individuated female faces serving as stimuli.
One surprising, and somewhat disappointing, finding is that the dynamic images did not enhance overall performance or the strength of the gaze effect. Recall that in the dynamic condition, there was only 30 seconds of movement which was followed by a 2-second view of the static gaze on or gaze off face. It is possible then that participants reacted to both conditions as still images. Follow up studies would need to manipulate the dynamic stimuli in such a way to differentiate it from the static stimuli. In addition to longer periods of eye movement, perhaps the movement could come at end of the 3 second exposure. It is expected that with a clearer separation of the dynamic versus static conditions that a difference in face recognition ability would result from the two presentation methods.

The correlations between self-monitoring status and the difference in face recognition ability based on gaze showed that there is no relationship between the two. The gaze effect is clearly present so it is not hindering the correlation. Also there is a large number of participants and a wide range of self-monitoring scores so that is also not interfering with the correlation. The initial inference from these disappointing results is that eye gaze is not the kind of social cue that elicits self-monitoring behavior. However, several studies have supported the idea that high self-monitors should be hypersensitive to social comparison information that could help guide behavior. Before dismissing the self-monitoring idea, limitations associated with the current methodology should be noted.

Self-monitoring is a behavior that occurs during social interactions. The experimental setting of participants watching faces that they know they will subsequently be asked to recall may be too far removed from a social interaction to reveal an effect of self-monitoring status. In this study’s procedure participants never interact with anyone other than the
experimenter. They know that the experimenter is not observing their behavior. Participants also know that they will not meet the individuals on the screen. Essentially, the participants have no reason to engage in the self-monitoring process because they are by themselves.

A better experiment would combine elements to create an environment the participants would perceive as a social interaction that would sufficiently motivate them to engage in the self-monitoring process. One possibility is to use a procedure that leads participants to believe they are participating in a dating service. The participants would view faces speaking to them on the computer and be told that the people they are viewing can watch their reaction via a web cam. Although the participants would never interact with anyone or speak with the people they see, this might be a sufficiently realistic social interaction to prompt self-monitoring behavior, particularly if they believe there is a possible date present.

The final surprising finding is that there was a gender effect associated with self-monitoring scores. Men scored higher on the self-monitoring scale than women. On one level this finding seems counter-intuitive. Given society’s tendency to place women lower in power to men it would seem that women would be more in need of self-monitoring behavior. If women believe that they have little authority in a situation, and hence that their overt actions will have little affect on a partner, this may lead to high levels of self-monitoring behavior. That is, women might be more inclined to monitor others’ behaviors and willing to change their own behavior in order to bring about a desired outcome in the situation. On the other hand, societal norms teach women to be responsive to others and empathetic. If this is who they are all the time then they may tend to focus on situational needs and less on how
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others are responding to them. Men may be more intent on maintaining status within a group and hence may be more turned to others’ reaction and therefore more apt to change their behavior in various situations. It is also worth noting that Snyder’s self-monitoring scale was developed and the norms were established with male college students. A different set of items might better differentiate self-monitoring status in women.

Overall this study has added to the face recognition literature and provided some interesting and unexpected findings. Gaze clearly affects the face recognition process. This study however, only used a direct gaze on and a direct gaze away. In reality though gaze shifts occur frequently in conversation and are often rapid, back and forth, and inconsistent. This leaves studies such as this one and Hood’s a little bit contrived. Ongoing studies at Lehigh and the University of Texas at Dallas are exploring the effects of gaze shifts embedded in a longer sequence of movements. For example, in one study the model appears to briefly make eye contact with the viewer or a distant object in the middle of a sequence of eye movements. Such studies may better approximate the dynamics of eye contact during social interactions (Argyle & Cook, 1976).

Finally, it seems that self-monitoring status does not play a role in laboratory based studies of face recognition. Watching faces on a screen in a perception study does not appear to approximate a social situation enough to reveal a connection between self-monitoring and face recognition skills. However, people do interact socially everyday while they are learning faces so it is possible that in a more realistic setting self-monitoring would affect face processing. New methods that better approximate social interactions are needed to address this question. Gender differences in self-monitoring status are intriguing and worthy of future
study. If this difference is replicated, future questions to address include whether a different scale is needed for men and women and also, the extent to which social and cultural influences might lead to differences in self-monitoring behaviors among men.
Figure 1. Mean d' score for gaze averted and gaze directed faces.
Figure 2. Mean d' score by gender.
Figure 3. Mean d' score by stimuli type.
Figure 4. Correlation of self-monitoring to $d'$ differential score for static images.
Figure 5. Correlation of self-monitoring to $d'$ differential score for dynamic images.
Figure 6. Gender by self-monitoring group chi square.
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Appendix

Subject Number ______

The statements on the following pages concern your personal reactions to a number of different situations. No two statements are exactly alike, so consider each statement carefully before answering. If a statement is TRUE or MOSTLY TRUE as applied to you, circle True. If a statement is FALSE or NOT USUALLY TRUE as applied to you, circle False. Please answer every question.

It is important that you answer as frankly and honestly as you can.
Your answers will be kept in the strictest confidence.

1. I find it hard to imitate the behavior of people
   True   False

2. My behavior is usually an expression of my true inner feelings, attitudes, and beliefs.
   True   False

3. At parties and social gatherings, I do not attempt to do or say things that others will like.
   True   False

4. I can only argue for ideas which I already believe.
   True   False

5. I can make impromptu speeches even on topics about which I have almost no information.
   True   False

6. I guess I put on a show to impress or entertain people.
   True   False

7. When I am uncertain how to act in a social situation, I look to the behavior of others for cues.
   True   False

8. I would probably make a good actor.
   True   False

9. I rarely need the advice of my friends to choose movies, books, or music.
   True   False
10. I sometimes appear to others to be experiencing deeper emotions that I actually am.
   True False

11. I laugh more when I watch a comedy with others than when alone.
   True False

12. In a group of people I am rarely the center of attention.
   True False

13. In different situations and with different people, I often act like very different persons.
   True False

14. I am not particularly good at making other people like me.
   True False

15. Even if I am not enjoying myself, I often pretend to be having a good time.
   True False

16. I'm not always the person I appear to be.
   True False

17. I would not change my opinions (or the way I do things) in order to please someone else or win their favor.
   True False

18. I have considered being an entertainer.
   True False

19. In order to get along and be liked, I tend to be what people expect me to be rather than anything else.
   True False

20. I have never been good at games like charades or improvisational acting.
   True False

21. I have trouble changing my behavior to suit different people and different situations.
   True False

22. At a party I let others keep the jokes and stories going.
   True False
23. I feel a bit awkward in company and do not show up quite as well as I should.
   True False

24. I can look anyone in the eye and tell a lie with a straight face (if for a right end).
   True False

25. I may deceive people by being friendly when I really dislike them.
   True False
A. Personal History

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B. Educational History

Lehigh University, Bethlehem, Pennsylvania
Major: Developmental Psychology

Trinity University, San Antonio, Texas
Major: English and Psychology
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C. Professional Positions

1. Teaching Assistant (Introduction to Psychology), Lehigh University, Bethlehem, Pennsylvania. Part time, 2004. Duties: conference with and assist students in understanding the material, create and assess tests, plan and implement review sessions. Supervisors: Larry Upton, Ph.D and Laura Gonnerman, PhD.

2. Teaching Assistant (Research Design and Methods), Lehigh University, Bethlehem, Pennsylvania. Part time, 2003. Duties: conference with and assist students, create and assess tests, assist students in research project design and implementation, assess writing skills. Supervisor: Barbara Malt, Ph.D.


4. Social Science Research Associate I, University of Texas Health Science Center, San Antonio, Texas. Full time position, 2001-2002. Duties: collected data on human subjects, included setup and operation of optical instrumentation, evaluation and interpretation of research data using quantitative and qualitative analysis, coordinated research and lab-related efforts, managed grant budget, edited papers for publication. Supervisor: Raymond A. Applegate, OD, Ph.D.

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acquisition study, helped design studies, ran and coded experiments with team members, analyzed data, wrote reports and presented preliminary findings. Supervisor: Jane Childers, Ph.D.

6. Resident Assistant, Trinity University Residential Life, Texas. Part time position, 1999 – 2001. Duties: responsible for up to 120 students’ safety and well-being, gave guidance, mediation, counseling, and referrals as needed, presented students needs to administration coordinated hall activities, administrative support, and policy enforcement. Supervisor: Cara Dalton.

7. Lab Technician, Dow Chemical through Kelly Services, Texas. Full time summer position, 1998. Duties: assisted in preparation and execution of lab procedures for a bio-medical research team specializing in radioactive treatments, worked with animals, handled radioactive materials, wrote technical procedures, did background research. Supervisor: Alan Strickland, M.D., Ph.D.

D. Membership in Professional Associations


E. Publications


E. Conferences


END OF TITLE