UNCONSCIOUS PROCESSES IN SOCIAL PHOBIA

by

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Abstract

Many studies have demonstrated that there are unconscious processes in specific phobias. Their focus has been studying phobias of objects like snakes and spiders. The current study sought to enlighten aspects of unconscious processes in social phobia, a far more common affliction. 33 phobics and 17 non-phobic participants were identified by two social anxiety questionnaires. Participants' skin conductance was recorded during continuous presentation of facial stimuli. Participants were presented with two separate runs of stimuli: a masked run and a visible run. Masked runs were always presented first to avoid any priming by the visible stimuli. Within each run, there were two blocks of stimuli: pictures of the disgusted faces and pictures of the neutral faces. The phobic group nearly responded to the disgusted faces than the neutral faces, regardless of awareness (masked or unmasked). In both groups, visible stimuli caused higher skin conductance responses (SCRs) than masked faces regardless of type of face. These results show that phobics nearly respond to feared stimuli regardless of conscious awareness. These findings suggest that there are unconscious processes in social phobia, just like what has been found with specific phobias.

Unconscious Processes in Social Phobia

Human emotion is a conscious experience that is mediated by unconscious processes. Studies have shown that the unconscious processes can be activated by emotional stimuli that are presented outside of our awareness. For example, Ohman and Soares (1994) showed that skin conductance responses (SCRs) to masked phobic stimuli were as strong if not stronger than SCRs to visible phobic stimuli. Masked stimuli are very briefly displayed on a computer screen and immediately followed by a masking stimulus in order to prevent the participant from recognizing the target stimulus. Ohman and Soares (1998) next showed that fear responses can also be conditioned outside of conscious awareness.

To test if fear can be not only induced but also reduced unconsciously Siegel and Weinberger (2009) created a technique called very brief exposure (VBE). VBE is the repeated and continuous presentation of masked phobic images. VBE to masked images of spiders has been shown to reduce avoidance behavior of a live tarantula by spider phobic participants. Siegel, Anderson and Han (2011) included a baseline measure of avoidance behavior to see if VBE caused a reduction of avoidance. The experiment showed that there was a significant improvement in avoidance of the live tarantula after participants had VBE. Siegel and Weinberger (2012) built on these findings by manipulating awareness of the spider images by adding a clearly visible exposure (CVE) condition. They found that CVE increased subjective distress of spider phobic participants, but did not affect the approach towards the live tarantula. By contrast, VBE was shown to have no effect on subjective distress, but increased approach towards the live tarantula. Taken together, these VBE studies also show that fear processing occurs outside of awareness, yet still influences phobic behavior.

While many studies have shown unconscious processes in specific phobias such as spiders and snakes, not nearly as many studies have tested if the unconscious fear responses occur in social phobia/anxiety, which is much more common. The current investigated whether physiological fear responses, as measured by SCRs, occurs in people who self-report social phobia by presenting them with masked faces displaying a threatening expression. Before presenting the hypotheses and method by which they were tested, I will first present a review of the relevant literature in order to put the hypotheses in proper perspective.

Very Brief Exposure and Avoidant Behavior

Non-conscious exposure to phobic stimuli can also have a positive effect on approach toward a live tarantula. Siegel and Weinberger (2009) measured how close a spider phobic participant would get to a live tarantula after receiving VBE, the repeated presentation of masked phobic images. It is important to point out that VBE differs from methods used in previous studies. VBE is pure exposure to masked phobic stimuli that is presented continuously. For this study, spider phobic participants were identified by the Fear of Spiders Questionnaire (FSQ). They were then assigned randomly to three types of exposure; VBE to spiders, clearly visible exposure to spiders, and exposure to masked flowers (control). After exposure, participants were brought into a room with a caged, live tarantula and were asked to approach it gradually. Each participant was scored according to how close they got to the tarantula. The researchers called this measure the Behavioral Avoidance Test (BAT). The results showed that spider phobic participants who received VBE to spiders approached a live tarantula more than the other two groups. Therefore, VBE can have a positive effect on approaching a feared object. However, this study had a major limitation; there was no baseline measure of avoidance. Thus, it is possible that the VBE group was simply less fearful than the other groups and therefore were

better able to approach the spider. Furthermore, without a baseline BAT measurement, it cannot be determined whether or not VBE can improve one's approach to a fear object. Including a baseline BAT is necessary to see if there are potential clinical applications of VBE. Can VBE help a phobic participant get closer to the live tarantula?

Siegel, Anderson, and Han (2011) addressed the limitation by including a baseline BAT. A control group of non-phobic participants was also added to see if the effects of VBE were specific to phobic individuals. Furthermore, the effects of exposure on subjective distress was also measured. These Subjective Units of Distress (SUDs) were self-reported by participants immediately before and after exposure. If the effect of VBE is unconscious, exposure should affect behavior, but not subjective distress. Participants were randomly assigned to either VBE to masked spiders or to masked flowers (control). The results showed the phobic individuals who received VBE to masked spiders did better on the post-BAT; i.e. they got closer to the tarantula. These effects were specific to phobic participants. VBE did not affect SUDs. Improvement on the BAT was specific to the phobic group of participants. Thus, VBE affects phobic behavior, but not subjective distress. A limitation of this study was that it could not be concluded that the effect on phobic behavior was occurring due to unconscious processes because levels of awareness of the phobic stimuli was not manipulated.

Siegel and Weinberger (2012) addressed the limitation of the previous study by manipulating awareness of the stimuli. This study included a third, clearly visible exposure (CVE) condition. Ninety-nine spider phobic participants were identified by the FSQ and the BAT with a live tarantula. They were randomly assigned to one of three types of exposure: VBE to masked spiders, CVE to the same spiders, and control exposure to masked flowers. A baseline BAT was taken one week prior to exposure. Again, SUDs were reported immediately

before and after exposure. A BAT was also performed immediately after exposure in order to measure changes in phobic behavior. The results showed that CVE increased SUDs relative to control, whereas VBE did not. VBE reduced avoidance of the tarantula, whereas CVE did not. Thus, there was a double dissociation between the effects of VBE and CVE on avoidance behavior versus conscious distress. CVE affects SUDs while having no effect on avoidance of the tarantula. VBE had no effect on SUDs while improving the participants approach to the tarantula. This pattern of results strongly suggests that unconscious fear processes had more of an effect on reducing phobic behavior. However, these results do not indicate how long the effects on phobic behavior can last.

To measure the long-term effects of VBE on phobic behavior, Siegel and Warren (2013) asked participants from the previous study to return one year later to undergo another BAT. A total of fifty-three participants returned: nineteen who received VBE to masked spiders, seventeen who received CVE to spiders, and seventeen who received VBE to flowers. The results indicated that the effect of VBE on phobic behavior was maintained one year later. Among VBE participants who got closer to the spider, they maintained their improvement to a highly significant degree. The implication of this study is that unconscious exposure to phobic stimuli has long term effects on phobic behavior.

The four previous VBE studies all had one limitation. They were able to conclude that unconscious fear processes has immediate and long lasting effects on reducing phobic behavior while having no effects on subjective distress. However, there was no measurement of physiological arousal taken during VBE. Skin conductance is a very sensitive measure of such arousal and can be utilized to gain insight into the level of arousal that occurs under unconscious processing, if any. While Ohman and Soares (1994) took SCRs during presentation of masked

individual stimuli, skin conductance levels (SCLs) would be required to measure physiological arousal due to the continuous presentation of stimuli during VBE.

VBE and Electrodermal Activity

To investigate electrodermal activity during VBE, Siegel, Warren, Jacobson, and Merritt (2017) measured SCLs during VBE. VBE should cause minimal effects on arousal since VBE has been found to cause little to no distress. Because skin conductance is a very sensitive measure of arousal, such findings would confirm more strongly that VBE occurs unconsciously. There were three hypotheses. VBE would reduce avoidance without any awareness of the stimuli, SCLs would rise no more than during control exposure, and a negative correlation be associated with the unconscious processing of fear. That is, high SCLs during VBE would cause less reduction of phobic behavior. Sixty spider phobic participants, identified by the FSQ and BAT with the live tarantula, were randomly assigned to receive either VBE to spiders or masked flowers (control). There were three measures. SCLs were measured during exposure. Participants did the BAT one week before and immediately after exposure. SUDs were self-reported both immediately before and after exposure. The results showed no differences in SCLs and SUDs between the groups. VBE was also shown to improve the phobic participants' approach toward the live tarantula. Finally, the correlational hypothesis was confirmed showing a negative correlation between level of arousal and reduction of phobic behavior. This pattern of findings suggest VBE is reducing phobic avoidance without affecting SCLs. This study shows that VBE works best when there is little to no increases in skin conductance. However, a limitation of this study was that awareness was not manipulated meaning there was no clearly visible exposure group.

In the second experiment of this study, Siegel et al. (2017) added a manipulation of awareness of the stimuli. The hypothesis was that clearly visible exposure (CVE) would increase SCLs as well as distress. There were sixteen spider phobic participants as identified by a FSQ and the BAT with the live tarantula. A within-subjects design was utilized where all participants were given each of the exposure conditions: VBE, very brief exposure to flowers (VBF, control), and CVE. CVE was always presented last to prevent the participants from developing biases about the stimuli during the clearly visible exposure of the stimuli. The differences in skin conductance were compared for each participant in order to address individual differences in skin conductance. SUDs and SCLs were measured at the time of exposure. The results showed that SCL and SUDs increased significantly (under the CVE condition). They did not increase under VBE and VBF conditions. This pattern of results indicate that unconscious processing of feared stimuli has no effect on skin conductance.

Unconscious Activation and Conditioning of Fear

The studies involving the technique of VBE showed that fear can be reduced unconsciously. However, is it possible for fear to be activated unconsciously? The unconscious reduction of fear necessarily implies that fear can be unconsciously activated. Earlier studies have investigated the possible mechanisms of unconscious processes of fear.

Ohman and Soares (1994) measured the unconscious activation of fear by masked stimuli. They hypothesized that skin conductance responses (SCRs) would be elicited by masked phobic stimuli in phobic individuals who were identified by a questionnaire. SCRs were used because it is a very sensitive measure of autonomic arousal. Sixteen spider phobic participants, sixteen snake phobic participants, and sixteen non-phobic participants were examined in this study. Every participant underwent exposure to masked phobic (spiders or

snakes) and non-phobic (flowers or mushrooms) images. Then they were presented with unmasked images of phobic and non-phobic stimuli. SCRs were recorded during all types of exposures. The results showed that participants responded physiologically, in terms of SCRs, as much if not more to masked phobic stimuli than to unmasked phobic stimuli. That is, unconscious fear processing was as strong if not stronger than conscious fear processing.

Ohman and Soares (1998) next revealed that masked threatening stimuli can also be used to condition fear responses in non-phobic individuals. There were forty non-phobic participants. During a conditioning or acquisition phase, participants received either fear-relevant (spiders or snakes) masked images paired with a shock or fear-irrelevant (flowers or mushrooms) masked image with a shock, which was utilized as a means to condition the participants. SCRs were recorded for each trial. Next, in the extinction phase, the same stimuli were presented unmasked and without shocks to see if participants responded differently to fear-relevant versus fear-irrelevant stimuli, i.e. to see if conditioning effects occurred. The results showed that when the fear-relevant stimuli were presented without a shock, participants showed elevated SCRs during the extinction phase. Conditioning effects were specific to the masked fear relevant stimuli. Thus, fear conditioning can occur unconsciously with fear-relevant stimuli like spiders and snakes, showing that associative learning was possible even when the participant remained unaware of the stimulus.

A limitation of Ohman and Soares (1994, 1998) was that there was no measure of physical phobic behavior. They devised ways of measuring and conditioning unconscious fear processes, but did not indicate what effects these processes have on behavior.

A final unconscious conditioning study is directly relevant to the current study. Esteves, Parra, Dimberg, and Ohman (1994) utilized the same methodology as Ohman and Soares (1998),

but changed the conditioned stimuli to fear-relevant, facial stimuli (angry facial expressions) that were backwardly masked. They measured skin conductance of non-phobic participants to see if fear could be conditioned unconsciously with these fear-relevant stimuli. They utilized the same design as the previous study - a conditioning/acquisition phase which masked angry faces or neutral faces were paired with a shock, followed by the extinction phase in which the same stimulus was presented unmasked and without a shock. They found that associative learning was possible even when the participants remained unaware of the fear-relevant stimuli.

The Current Study

Esteves et al. (1994) showed that masked threatening faces can be used to condition SCRs in non-phobic participants. This raises the question of whether the same masked stimuli can activate SCRs in people who are socially phobic. Thus far in research on unconscious fear processes, there has been no study that has investigated possible physiological arousal in people who are socially phobic when presented with fear relevant stimuli. This could offer insight into the unconscious processes of social phobia, which is far more prevalent than specific phobias and is especially common among college students. Social phobia interferes with the daily lives of these people in particular. It prevents college students from succeeding in the classroom as well as making friends at a time in life when it is imperative to have a peer group. This can have a detrimental impact on crucial social development that occurs during this time. The unconscious processes of specific phobias of objects like spiders have been well established. The current study investigates the physiological mechanisms of unconscious fear processing in social phobic by comparing SCRs to masked and unmasked threatening facial stimuli in socially phobic and non-phobic participants. If unconscious processes are involved in social phobia, then masked threatening faces should activate SCRs in people who are socially phobic even when they are

unaware of the stimuli. The hypothesis were that phobic participants would be more aroused by disgusted faces than neutral faces relative to control, non-phobic participants. Secondly, visible faces would cause higher SCRs than masked images for all participants.

Method

Participants

33 phobic and 17 non-phobic participants were tested in the experiment. These participants were recruited from a public, northeastern college. To determine whether the participants were either phobic or non-phobic, two measures were taken prior to inviting them to the laboratory. The Social Phobia Inventory (SPIN-17) (Connor et al., 2000)(described in detail below) and the Liebowitz Social Anxiety Scale (LSAS) (Mattick & Clark, 1998)(also described below) were used to assess whether the participants self-identified as socially phobic or non-phobic. Those who scored in the top fifteen percent on both scales were identified as socially phobic and assigned to the experimental group of the study. The participants who scored in the lower thirty percent were assigned to the non-phobic control group. Upon arriving to the laboratory, participants gave informed consent. They received either fifteen dollars or one research credit as compensation for their participation in the study which took about a half hour.

Design and Overview

The experiment is based on a within subjects design. Participants were presented with two separate runs of stimuli: a masked run and a visible run. Masked runs were always presented first to avoid any priming by the visible stimuli. Within each run, there were two blocks of stimuli: pictures of disgusted faces and pictures of neutral faces. Thus, the masked run contained a block of masked disgusted faces and a block of masked neutral faces. The order of

faces was counterbalanced across participants. Immediately after each run, participants were given a funneled interview to assess their awareness of the stimuli (both masked and visible).

Measures, Materials, and Equipment

The first measures were the questionnaires that participants completed to determine if they can be categorized as phobic or non-phobic. The SPIN-17 consists of seventeen statements about the symptoms of Social Anxiety Disorder. Participants rate the extent to which they agree with each statement on a scale of one to five; one being "Not at all" and five being "Extremely". Some statements include, "I fear people in authority" and "Parties and social events scare me". (This inventory can accurately assess whether or not a person suffers from social anxiety disorder and can also gauge how severe the case may be).

The second measure taken to assess potential participants as either phobic or non-phobic was the LSAS. This questionnaire assesses the level of anxiety a person would encounter in a variety of social situations and also the potential for avoidance behavior in those situations (which increases the validity of the survey since avoidance behavior is a more accurate measure intrinsic to socially anxious individuals). For example, the questionnaire includes the situation of "Participating in a small group". The participant then rates their level of anxiety in this situation on a one to four scale, one being "None" and four being "Severe". They are then asked to rate their avoidance behavior on a one to four scale, one being that they "Never" avoid this situation and four being they "Always" avoid participating in a small group.

There were two types of facial stimuli, one where the faces exhibited a disgusted expression and one where the faces exhibited a neutral expression. These facial expressions were 64 color photographs images of thirty-two individuals' faces, all male (as in prior studies of

social phobia). Thus, there were two pictures of each person's face: one disgusted and one neutral. Since the disgusted and neutral expressions were of the same person, the visual features of the two different expressions were identical except for the emotional expression. Thus, the visual features of the faces couldn't confound the effects on skin conductance. The faces were selected from the Karolinska Directed Emotional Faces database (Lundqvist, Flykt, & Öhman, 1998) and the Umea University Database of Facial Expressions (Samuelsson, Jarnvik, et al., 2012). Karolinska pictures were 562 x 762 pixels in size, and 32-bit color resolution; the Umea pictures were 500 x 700 pixels, 32-bit color.

Each target image (facial expression) had its own masking stimulus. Each image was broken up into boxes of pixels (10 x 10 pixels per box). These boxes were then randomly scrambled to create a randomized collage – the masking stimulus. Thus, the target images were masked by stimuli that were made of the same visual elements. The masking image served to further prevent the participant from perceiving the facial photographs. The stimuli were presented by EPRIME 2.0 on a Dell PC monitor. The monitor resolution was 1024 X 768; the refresh rate was 60 Hz (screen regenerated every 1/60 or .0166 sec).

Electrodermal activity was measured as skin conductance levels (SCLs) in order to continuously monitor the trajectory during repeated and continuous presentation of the facial stimuli. SCLs were recorded during both the masked and clearly visible presentations/runs of the stimuli. SCLs were continuously recorded by the Biopac MP36 System, which applied a .5 v constant voltage. Two Biopac Ag/AgCl electrodes, 8-mm in diameter and containing an isotonic gel, were attached to the palmar surface of the distal phalanx of the pointer and middle fingers of the participant's non-dominant hand. SCLs were recorded at a sampling rate of 1,024 Hz with a 60 Hz low-pass filter. (Siegel et al, 2017)

Lastly, a funneled interview was used to assess the participants' awareness of the facial stimuli after each block was presented. The questions asked if they were able to see anything between the crosshair and the collage masking image. If they answered that they saw faces, they were asked to specify what type of face they saw. They were then handed the interview form and asked to indicate their experience when viewing the stimuli. They rated how aroused the stimuli made them feel and how pleasant or unpleasant it was to view the stimuli.

Procedure

Participants were first provided informed consent and completed a short demographics form if they were willing to participate in the study. It was then explained to them that this study would be measuring how the body responds to stimuli by attaching sensors to their fingers. It was clarified that they would not be in any discomfort. However, in order to obtain accurate measurements, the participants would need to have clean hands. They were asked to go to the bathroom and wash their hands with warm water and soap. Upon completion and their return from the bathroom, the participants' hands were checked to make sure they were clean. The sensors were then attached to the fingers on their non-dominant hand in front of the computer running E-Prime, as described above. Their forearm rested across a soft towel with their palm facing up.

It was explained to the participant that it is important to keep their hand and body as still as possible during the task and to avoid speaking as any movement or speaking would affect our measurements. To assure that the participant is not a non-responder (someone who has virtually no fluctuation in skin conductance) they were asked to inhale and exhale three times quickly. No participants were non-responders.

The participant are then given instructions on how the stimuli will be presented. There was by a two and a half-minute initial resting period to allow their bodies to reach a state of minimal arousal and to establish a baseline SCL. Then the actual task began. The participants were presented with a crosshair, a facial stimuli (either a disgusted or neutral expressions, depending on which block came first) then a collage/masking image. This sequence repeated ten times in rapid succession so that 10 trials of faces were presented. Then, there would be a minute of rest to allow the participant's skin conductance to reach another baseline level. The crosshair would appear five seconds before the next series of stimuli to cue the participant that the stimuli would be presented again. Then a second block of faces was presented, as described just above.

The skin conductance electrodes were then removed, the participants viewed the same stimuli presentations again and the funneled interview is conducted. They were asked about their awareness of the stimuli and then were handed a sheet to rate their experience during the presentations of the stimuli.

A three minute rest period followed the funneled interview to allow the participant's skin conductance to reach a baseline level before the start of the visible run of stimuli. Skin conductance was recorded during the second run: another two presentations of the the same, but clearly visible, faces in between the crosshair and the collages. Again, the type of face displayed first was counterbalanced across participants.

The funneled awareness interview and brief questionnaire was given once again, now after the participants viewed the clearly visible facial stimuli

Finally, the participant read a debriefing form and was given the opportunity to ask questions.

Results

Table 1 shows mean SCRs to masked and visible facial expressions in each group. The hypotheses were that phobics would have higher SCRs to both masked and visible disgusted faces than masked and visible neutral faces. In other words, a main effect of type of face was predicted for the phobic group. Unlike the phobics, non-phobics will not respond differently to the masked faces (disgusted vs. neutral). Since the hypothesis concerned each group separately (rather than a direct comparison), separate ANOVAs were conducted within each group.

However, a preliminary, between-groups ANOVA was conducted to compare the groups directly. In a 2 x 2 x 2, Group (phobic or non-phobic, between-subjects) x Masking (masked and visible, within-subjects) x Face (disgust and neutral, within-subjects), mixed ANOVA, the main effect of Group was significant, $F(1,48)= 5.51$, $p=.023$, showing a significant difference in SCRs between the groups: the anxious group showed higher SCRs than the non-anxious group. The main effect of Masking was significant, $F(1,48)=12.5$, $p=.001$, showing a significant difference in SCRs between the masked and visible stimuli: the visible faces showed higher SCRs than the masked faces (across groups, and regardless of face type). The main effect of Face approached significance, $F(1,48)= 3.13$, $p=.083$, showing a difference in SCRs between face types: disgusted faces elicited higher SCRs than neutral faces. No interaction effects were significant.

In a 2 x 2, Masking (masked and visible) x Face (disgust and neutral), repeated measures ANOVA of the socially anxious group, the main effect of Masking was significant, $F(1,32)= 10.7$, $p=.003$, showing that the visible faces caused higher SCRs than the masked faces. The main effect of Face approached significance, $F(1,32)= 3.54$, $p=.069$, showing that the disgusted faces nearly

caused higher SCRs than neutral faces, regardless of masking, which is consistent with the hypotheses. The interaction effect of Masking and Face was not significant, $F(1,32)= 1.38$, $p=0.25$. Post-hoc tests were not conducted because the main effect of Face only approached significance, and the interaction effect of Face and Masking was not significant.

In a 2 x 2, Masking (masked and visible) x Face (disgust and neutral), repeated measures ANOVA of the non-anxious group, the main effect of Masking was significant, $F(1,16)=4.94$, $p=0.041$, showing that the visible faces caused higher SCRs than masked faces. The main effect of Face was not significant, $F(1,16)=1.00$, $p=0.332$. The interaction effect of Masking and Face was not significant, $F(1,16)=0.565$, $p=0.463$. Thus, post-hoc tests were not conducted.

Discussion

The current study sought to uncover evidence regarding unconscious processes of social phobia. Is there unconscious activation of autonomic arousal when phobic stimuli are presented outside of awareness? We posited that socially phobic individuals would yield higher SCRs than non-phobics regardless of masking of the stimuli – for both masked and unmasked stimuli. This hypothesis was tested by presenting social phobic individuals with backwards masked, phobic stimuli and clearly visible stimuli, utilizing a within-subjects design. Both the phobic group and the non-phobic group were presented with the masked stimuli first so as to avoid any participant bias about the masked stimuli.

The main effect of Group in the three-way ANOVA shows that the phobic group had higher SCRs than the non-anxious group, regardless of the type of face and masking condition. This confirms the validity of the screening questionnaires that were used to identify phobics and non-phobics. Simply put, socially phobic people should be more aroused by human faces. For the phobic group, the main effect of face approached significance, showing that social phobics

nearly responded more to the disgusted faces than the neutral faces, regardless of masking condition. The nearly significant main effect of face, taken together with the non-significant interaction of masking and face, shows that the effect of disgusted faces nearly occurred across the masking conditions in the phobic group. In other words, the socially phobic participants nearly responded more to the disgusted faces, regardless of awareness.

For the non-phobic group, the only significant effect was that of masking. Visible stimuli caused higher SCRs than the masked stimuli, regardless of type of face. The non-significant effect of face showed that the non-phobics are not responding differently to the disgusted versus neutral faces. So overall, the results show that effects of the faces were specific to the socially phobic group.

Consistent with Ohman and Soares (1994), phobics nearly responded more to their feared stimulus regardless of conscious awareness, whether they were masked or unmasked. The current findings, taken together with Ohman and Soares (1994), may show that phobic people are more aroused by their feared stimulus, regardless of awareness. In that sense, the findings add to the growing line of research on unconscious basis and processing of fear.

Why would phobics nearly respond more to disgusted faces, regardless of masking - that is, whether or not they can clearly see the stimuli? Like other phobic people, social phobics must have autonomic and unconscious mechanisms for perceiving their feared stimulus before they even recognize it consciously. That is, the phobic person has a fear response to their feared stimuli before they even know it. Socially phobic persons especially fear negative evaluation or judgement, which is exactly what a disgusted face displays. Phobias are obviously maladaptive. The results may show how in phobia, unconscious fear mechanisms are taken to the extreme. If

there is any possible indication of what they fear, they respond to it on an autonomic and unconscious level before they are even aware of it.

There were several limitations to this study. First and foremost were the sample sizes of the groups. With half as many participants in the control group, no definitive conclusions can be reached about the effects on phobics versus non-phobics. Adding more non-phobics in future data collection can address this limitation. Secondly, neutral faces were used as control stimuli. Unfortunately, some phobics reported another expression other than neutral during the funneled interview after the clearly visible block. Some phobics stated that the neutral faces appeared angry or bored. It is not uncommon for people with social phobia to misinterpret facial expressions. Going forward, this limitation can be addressed by using happy faces as control stimuli because happy faces are non-judgmental just like neutral faces, but are less judgmental to a greater extent. However, it is possible that any type of facial expression other than neutral may elicit higher SCRs in general when it comes to social phobics, just because they show emotion. Happy faces can address this limitation because like the neutral faces, they are non-judgmental. They are far less likely to be misinterpreted by future phobic participants. Because they display an emotion, happy faces should be utilized as a control stimuli in future studies as a follow-up to the current study.

The studies discussed in the literature review point out that repeated exposure to phobic stimuli, specifically repeated and continuous presentations of said stimuli such as VBE, can be in reducing avoidant behavior without inducing any conscious distress. The current study may have revealed that there exists a mechanism for recognizing socially phobic stimuli unconsciously. Now that we know this, future studies should investigate if VBE can be as effective for people suffering from social phobia.

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Table 1

Mean Skin Conductance Responses in the Socially Phobic and Non-phobic Groups

Group	Condition	Face Type	
		Disgust	Neutral
Phobic	Masked	.61 (.12)	.36 (.06)
	Visible	1.50 (.40)	.82 (.15)
Non-phobic	Masked	.15 (.04)	.09 (.04)
	Visible	.77 (.37)	.45 (.17)

Appendix

The Funneled Interview

1. In between the crosshair and the collages that were presented on the computer screen, did you see something? If so, what did you see?

2. *If their response was "a flash" or "nothing, say*: Something was flashed between the crosshair and collages. What do you think it was?

3. *If they say "faces" in their response to #1 or #2, ask*: What kind of faces?

4. *If the saw certain faces – e.g., angry, disgusted, or just faces*: How many times did you see a(n) [angry/disgusted/just a] face? If you aren't sure, just estimate.

Ratings

Please rate how aroused – *awake or energized* – you felt when viewing the stimuli:

1: Not aroused at all 5: Moderately aroused 9: Extremely aroused

Please rate how *pleasant or unpleasant* you felt when viewing the stimuli:

-3: Very Unpleasant 0: Neither +3: Very pleasant