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# Focussing Attention on Oneself Increases the Perception of Being Observed by Others

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## Abstract

Patients with Social Anxiety Disorder (SAD) often report elevated levels of self-focussed evaluative attention (SFEA), and seem excessively concerned with being observed by others. This study tested whether SFEA increases the perception of being observed by others. A sample of 52 high and 52 low socially anxious participants estimated the percentage of people 'looking at you' in several matrices of faces. A control task used matrices of clocks. SFEA was manipulated. As predicted, increasing SFEA led to significantly higher estimates of people 'looking at you' in both groups. Estimates on the control task were not affected by SFEA, thus the effects appear specific to social stimuli. These findings suggest that the increased levels of SFEA that characterise patients with SAD could contribute to their enhanced perception of being observed by others. The findings have implications for the role of attention training in the treatment of SAD.



Keywords: social anxiety, social phobia, self-focussed evaluative attention, self-focussed attention, cognitive model, perception of being observed

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## Table of Contents



## Introduction

Patients with social anxiety disorder (SAD) suffer from a persistent fear of one or more social situations (e.g. meeting strangers, starting conversations) accompanied by a feared outcome of the situation (e.g. being humiliated; American Psychiatric Association [APA], 2013). A popular cognitive model of SAD (Clark & Wells, 1995) suggests that when in a social situation, patients shift their attention to a detailed monitoring and evaluation of themselves, and use internal information (e.g. anxious feelings and negative images), to draw excessively negative inferences about how they come across to others. In line with this suggestion, Mansell and Clark (1999) found that high socially anxious (HSA) participants use the perception of their own anxiety-related body sensations to estimate how anxious they appear to others in a social situation, which results in them overestimating how anxious they appear. Thus demonstrating how self-focussed evaluative attention (SFEA) could maintain SAD.

It is possible that SFEA has another adverse consequence for patients with SAD. Clinically, patients seem extremely concerned with being closely observed by others (Bögels et al., 2010). There are two possible explanations for this phenomenon. Firstly, patients may indeed be under close observation. Some studies (e.g. Stopa & Clark, 1993; Rapee & Lim, 1992) found that highly socially anxious individuals were rated as showing more negative behaviours (including symptoms of anxiety, such as blushing or shaking), which could be drawing other people's attention. On the other hand, their concern could be due to a perceptual distortion – they may see more people watching them than others would. Finally, both these possibilities may apply.

There is clear evidence to suggest patients' concern with being observed by others is at least in part due to a perceptual distortion. Harbort, Witthöft, Spiegel, Nick, & Hecht (2013) used a 'cone of gaze' paradigm to investigate SAD patients' perception of gaze from an observer. Patients and controls were presented with a virtual head on a screen. Their task was to adjust the head's eyes to focus at the edge of their mutual gaze. A subjective 'gaze cone' was established for each participant (i.e. if the counterpart's gaze fell within the cone, participants felt they were being observed). Harbort et al. (2013) found that SAD patients have a significantly wider 'gaze cone' than controls, demonstrating the distortion in their perception of being observed. However, individuals with SAD report being concerned that people are staring directly at them, or that a whole crowd of people may be looking at them, whereas this paradigm models a single individual watching you out of the corner of their eye. Therefore, to better reflect the experience of individuals with SAD, a preferred paradigm would measure the perception of being directly observed by others, rather than from out the corner of someone's eye.

Bolt, Ehlers, and Clark (2014) developed an alternative method to objectively measure the perception of 'being observed by others'. Participants were presented with several grids of faces (either looking towards the camera or

away) for a short period of time. After each presentation, participants estimated the percentage of people 'looking at you' on the screen. Bolt et al. (2014) were able to show that, in this task, HSA participants gave higher estimates of the number of people looking at them than low socially anxious (LSA) participants, again demonstrating a perceptual distortion in HSA participants' estimates of how many people were looking at them.

Mansell and Clark (1999) demonstrated how HSA participants might mistake their own feelings of anxiety for an indication of how anxious they appear to others. If patients are focussing evaluative attention on themselves, this sort of deductive reasoning could also explain why they feel so observed by others; they could be confusing self-observation with observation from others. This would suggest that a manipulation which increases SFEA should also increase participants' estimates of how many people are looking at them.

Bolt et al. (2014) found preliminary evidence for this hypothesis. In their study, participants estimated more people looking at them when they were made self-conscious by the presence of a mirror, than when the mirror was absent. However, this effect was only present in the early phase of the experiment, not in the later phase, and was discovered through post-hoc analyses. Thus the causal role of SFEA on the perception of being observed by others has yet to be conclusively demonstrated. In addition, Bolt et al. did not investigate whether the effects of manipulating SFEA were specific to tasks involving social stimuli. Finally, it is not yet clear whether SFEA can increase the perception of being observed by others in everyone, or just in those with high levels of social anxiety.

The current study further investigates the role of SFEA in the perception of being observed by others. Bolt et al. (2014) hypothesised that their mirror manipulation only influenced the perception of being observed by others in the first part of the experiment because its ability to enhance self-focus may have diminished over time. In addition, the mirror manipulation does not have an explicitly evaluative component. Therefore, we need a different, more enduring, SFEA manipulation in which participants evaluate, as well as focus attention on themselves. A further limitation of Bolt et al.'s study was the lack of non-social control stimuli. Therefore it is unclear whether the observed effects were specific to social stimuli, or were more general. To address this issue, we included a control condition involving clock faces, pointed towards or away from the participants.

The study was designed to test two main hypotheses. Firstly, inducing SFEA will increase estimates of how many faces are 'looking at you' in a face perception task. Secondly, inducing SFEA will have no effect on estimates in the (non-social) Clocks Task. We also explored whether self-focussed evaluative attention would increase the perception of being observed in everyone, or whether the effect would be specific to people who are normally high on SFEA (i.e. people with high levels of social anxiety).

# Method

## Design

Participants were allocated to social anxiety groups based on their scores on the Brief Fear of Negative Evaluation Scale (BFNES; Leary, 1983). High socially anxious (HSA) and low socially anxious (LSA) participants completed both a face perception task, and a non-social control task while under conditions of both high and low self-focussed evaluative attention (SFEA). To counterbalance the order of the tasks and SFEA conditions, participants were randomly allocated to one of four subgroups (Faces first, High SFEA first; Faces first, Low SFEA first; Clocks first, High SFEA first; Clocks First, Low SFEA first). The critical dependent variables were the estimated percentages of people 'looking at you' in the Faces Task, and of clocks facing forwards in the Clocks Task.

## Participant Characteristics

52 high and 52 low socially anxious (HSA; LSA) students studying at Oxford University participated in the study. Mean age was 20.6 years (*SD* = 2.8), and each group contained 30 females and 22 males. To gather the sample, 299 participants were screened online with the BFNES and the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). Those who scored ≤ 33 or ≥ 40 on the BFNES were invited to participate in the experiment. The BFNES can be used to produce groups of HSA and LSA participants, with differences comparable to the differences between SAD patients and controls (Stopa & Clark, 2001). To take part, participants were also

required to score below 20 on the BDI, below 2 on question 9 of the BDI (suicidal ideation), and have no history of mental health treatment (psychological or pharmacological). This was to control for depression as a confounding variable, and protect any vulnerable individuals from participating. As guaranteed by the selection criteria, HSA participants scored significantly higher than LSA participants on the BFNES. They also scored significantly higher than LSA participants on the Albany Panic and Phobia Questionnaire, social phobia subscale (APPQSP; Rapee, Craske, & Barlow, 1994), the Self-Focussed Attention Scale (SFAS; Bögels, Alberts, & De Jong, 1996), the Self-Consciousness Scale (SCS; Fenigstein, Scheier, & Buss, 1975), and the BDI. Table 1 displays the means and standard deviations of the HSA and LSA participants' scores on all these measures, as well as the results of the independent samples t-tests comparing the two groups.

*Table 1: Baseline standardised questionnaires in HSA and LSA participants*

| **Baseline Measure** | **LSA (n = 52)** | **HSA (n = 52)** | ***t*** | **Sig.** |
|---|---|---|---|---|
| | ***M (SD)*** | ***M (SD)*** | | |
| BFNES | 26.77 (4.53) | 46.83 (5.16) | $t$ (102) = 21.07 | $p < .001$ |
| APPQSP | 16.35 (10.17) | 28.48 (13.41) | $t$ (102) = 5.20 | $p < .001$ |
| SCS Total | 43.87 (9.05) | 56.56 (10.30) | $t$ (102) = 6.68 | $p < .001$ |
| SFAS Total | 11.23 (6.86) | 17.13 (7.08) | $t$ (102) = 4.32 | $p < .001$ |
| BDI | 4.48 (4.21) | 7.19 (4.45) | $t$ (102) = 3.19 | p = .002 |

## Questionnaire Measures

In this study, participants completed five standardised questionnaires: BFNES, APPQSP, SCS, SFAS and BDI.

The BFNES consists of 12 items that assess the fear of being negatively evaluated by others and produces a score between 12 and 60. It has demonstrated both high internal consistency (α = .90 - .91) and test-retest reliability ($r$ = .75; Leary, 1983).

The APPQSP (Rapee et al., 1994) consists of 10 items that measure fear of different social situations, producing a score between 0 and 80. The scale shows both internal consistency (α = .91) and test re-test reliability ($r$ = .84).

The SFAS (Bögels et al., 1996) consists of 11 items measuring trait self-focussed attention (SFA), producing a total score between 0 and 44. The scale shows internal consistency (SFAS-arousal, α = .86; SFA-performance, α = .78; Bögels et al., 1996).

The SCS (Fenigstein et al., 1975) consists of 23 items measuring public self-consciousness (public awareness of the self as a social stimulus), private self-consciousness (private mulling over the self) and social anxiety. The scale shows good test-retest reliability on the public, ($r$ = .84), private ($r$ = .79) and social anxiety ($r$ = .73) subscales (Fenigstein et al., 1975).

The BDI (Beck et al., 1961) consists of 21 items that measure symptoms of depression. The measure produces a score between 0 and 63 and shows internal consistency (α = .81) and convergent validity ($r$ = .60 - .74) in non-clinical samples (Beck, Steer & Carbin, 1988).

## Stimuli and tasks

### Faces Task.

Participants were briefly presented with matrices of 18 different faces (Figure 1a). Their task was to estimate the percentage of people 'looking at them' in each matrix, by clicking on a visual analogue scale ranging from 0 (nobody) to 100% (everybody).

Each matrix consisted of 20 rectangles (5x4) with the 2 central rectangles left blank. The remaining 18 rectangles contained pictures of people with neutral facial expressions, with a proportion of the faces 'looking at you'. This proportion ranged from 22% (4/18) to 78% (14/18), in 11 steps. The remaining faces were either looking 45° to the left, right, up or down. Four matrices were created for each percentage, resulting in 44 matrices altogether. Half the

people were male, and half female. Fourteen of the people in the set were white, and the remaining four were black and minority ethnic.

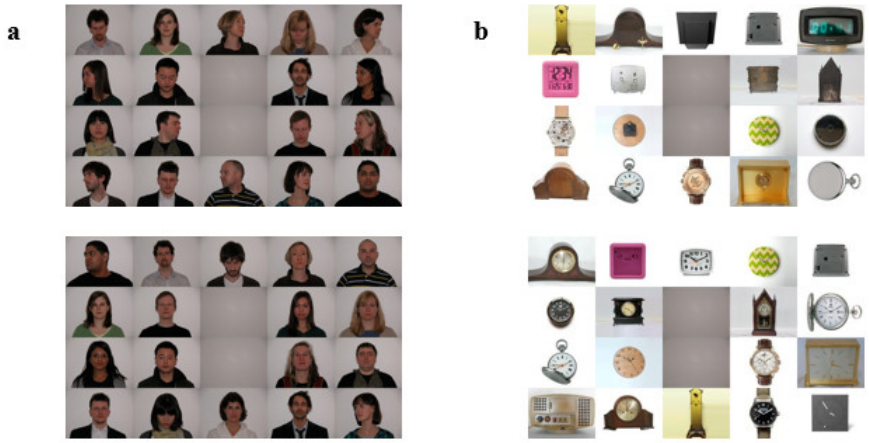


*Figure 1: The stimuli in the Faces and Clocks Tasks. a. Picture matrices displaying 22% (4/18; upper image) and 78% (14/18; lower image) of faces 'looking at you'. b. Picture matrices displaying 22% (4/18; upper image) and 78% (14/18; lower image) of clocks 'facing you'.*

For each trial, the fixation cross was presented for 1000ms, followed by the picture matrix for 2750ms. This was enough time for participants to scan the faces, but not long enough to count them (Bolt et al., 2014). Next, participants gave their estimate on an analogue scale (Nobody (0%) – Everybody (100%)), with no time limit. The inter-trial interval (blank screen) was 1000ms. The task had a total of 44 trials, in which the 44 matrices were presented once each, in a random order. It lasted approximately 5 minutes. Participants completed the task twice, once under High SFEA, and once under Low SFEA.

### Clocks Task.

Participants were briefly presented with matrices of 18 different clocks (found using an online search for clocks against a plain background; Figure 1b). Their task was to estimate the percentage of clocks facing them in each matrix. Clocks were used as stimuli as they are conceptually similar to faces. They can be facing or not facing you, and exemplars can be very diverse. Other non-social stimuli were considered (e.g. pens, cups); however clocks were preferred as they have a clear front and back. The task was designed to be as similar to the Faces Task as possible. In each trial, a proportion of the clocks faced forwards, and the remaining clocks faced backwards. Again, this proportion ranged from 22% (4/18) to 78% (14/18), in 11 steps, and 44 matrices were created. As with the Faces Task, participants completed the task twice, once under the High and once under the Low SFEA condition. The presentation of the matrices was identical to the Faces task.

## Attention Manipulation

For the SFEA manipulation, participants were given a laminated A4 sheet showing four photographs of strangers (139x99mm each). They were told that after completing four computer tasks, they would be taken into another room to meet the four people seen in the photographs. Both the High and Low SFEA conditions involved thinking about these four new people, in this scenario. In the High SFEA condition, participants were encouraged to focus attention on themselves with the following instructions: *I'd like you to imagine that you're entering the room with these four new people. Imagine what you think you'll look like to them when they see you for the first time, and how you think you'll be coming across*. In the Low SFEA condition, participants were encouraged to focus outwardly with the following instructions: *I'd like you to imagine that you're entering the room with these four new people. Think about which of them you would like to meet, and which of them you wouldn't, and why.* They were asked to keep imagining the scenario (with High or Low SFEA) as they carried out each of the Faces and Clocks tasks.

To evaluate the SFEA manipulation, participants completed single-item measures of self-focussed attention, self-evaluation, anxiety, and task focus after each computer task.

## Procedure

After signing the consent form, participants completed the BDI (on paper), and answered questions on their mental health treatment, for a second time. Those who scored 20 or above on the BDI, 2 or above on question 9 (suicidal ideation), or reported any mental health treatment did not take part in the study (they were given a neutral task instead). Next, the participants were given online versions of the SFAS and the SCS.

The computer tasks were then explained by saying: *In this task, 18 pictures of [faces/clocks] will flash up on the screen, but for a short period of time. These [people/clocks] will either be [looking at/facing] you, or [looking/facing] away from you. It's your job to estimate the proportion of [people/clocks] that were [looking at/facing you] by clicking on a horizontal line that goes from 0-100%.* First, participants were given 4-trial practice versions of each task. The matrices contained the same stimuli as the experimental versions; however the inter-trial interval was longer (3000ms), and only 4, 7, 11 or 14 faces/clocks faced forwards. Participants had opportunity to ask any questions before the experiment began. After the practice tasks, participants were shown the photographs of four strangers, and told they would be meeting these strangers after they had completed the computer tasks.

Depending on their counterbalancing group, the participants were first given the instructions for the High or Low SFEA manipulation, and either the Faces or Clocks Task. They took both tasks in one imagery condition, followed by both tasks in the second imagery condition, which they were reminded of before, and halfway through each task. Participants were also given single-item measures of self-focussed attention, self-evaluation, anxiety, and task focus (Kochuparampil; 2012) after each computer task. The task focus measure was not tested in the analysis as it was designed to disambiguate the self-focussed attention measure for participants. The single-item measures were all rated on a visual analogue scale ranging from 0 (not at all) to 100% (totally).

After completing all four computer tasks, the groups were told they would not be meeting anyone, and were fully debriefed as to why they were deceived. Finally, each participant completed an online version of the APPQSP. The experiment lasted approximately 50 minutes and participants were paid £5.

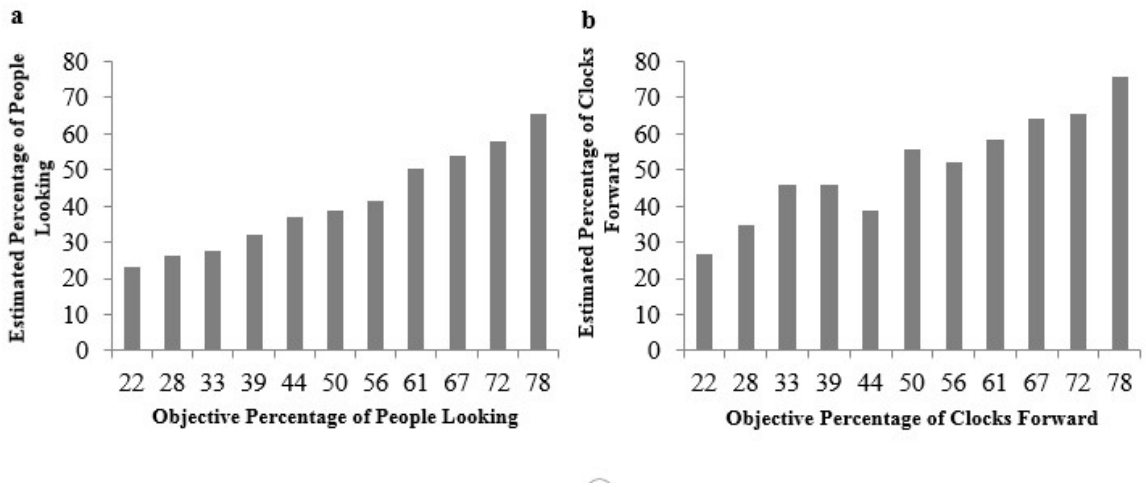


*Figure 2: a) The estimates of people 'looking at you' increases as the objective percentage increases in the Faces Task. b) The estimates of clocks facing forwards increases as the objective percentage increases in the Clocks Task.*

To test the main hypotheses we performed linear mixed effects analyses on participants' estimates of people/clocks looking towards them in the two tasks, using R (Team, 2012), package lme4 (Bates, Maechler & Bolker, 2012). SFEA condition (high vs. low), Social Anxiety Group (high vs. low social anxiety), Number Forward (the objective number of faces/clocks facing them), Stimulus Order (Faces vs. Clocks first), and Focus Order (High SFEA vs. Low SFEA first) were entered into the model as fixed effects. Participant ID was entered as a random effect around the intercept. Running all analyses on both the Faces and Clocks Tasks allowed us to investigate the differences in the predictors of the participants' estimates when viewing social and non-social stimuli.

# Results

## Validation of computer tasks

The linear mixed effects analysis revealed that the objective number of faces/clocks facing the participants (Number Forward) was a significant predictor of the number of faces/clocks participants estimated were looking at them in both tasks (Faces: $\beta = 4.16$, $SE = .05$, $t\ (9144) = 78.54$, $p < .001$; Clocks: $\beta = 4.17$, $SE = .05$, $t\ (9144) = 85.31$, $p < .001$). Participants' estimates increased as the number of faces/clocks facing forwards increased (Figure 2). Therefore they were attending to the displays in order to estimate the percentage of faces/clocks looking towards them, rather than guessing; thus validating the computer tasks. Stimulus Order and Focus Order had no significant effect in either task ($p > .05$).

## Self-Focus Manipulation checks

Participants rated self-focussed attention, self-evaluation and anxiety (0-100%) when in the High or Low SFEA conditions, after each computer task. Table 2 shows the means and standard deviations for these ratings. In order to check the SFEA manipulation was successful, a series of 3-Way Mixed Model ANOVAs were conducted with SFEA Manipulation (High vs. Low SFEA), Focus Order (High SFEA first vs. Low SFEA first) and Social Anxiety Group (HSA vs. LSA) as factors, for both the Faces and the Clocks Tasks.

*Table 2: Means and standard deviations for measures of self-focussed attention and self-evaluation*

| | **HSA** | | **LSA** | |
|---|---|---|---|---|
| **Faces Task** | **(n = 52)** | | **(n = 52)** | |
| | **High SFEA** | **Low SFEA** | **High SFEA** | **Low SFEA** |
| | ***M (SD)*** | ***M (SD)*** | ***M (SD)*** | **M (SD)** |
| Self-Focussed Attention | 38.8 (20.4) | 25.1 (23.4) | 29.2 (21.8) | 17.3 (18.1) |
| Self-Evaluation | 41.9 (23.2) | 26.0 (23.6) | 27.0 (22.9) | 14.9 (17.8) |
| | **HSA** | | **LSA** | |
| **Clocks Task** | **(n = 52)** | | **(n = 52)** | |
| | **High SFEA** | **Low SFEA** | **High SFEA** | **Low SFEA** |
| | ***M (SD)*** | ***M (SD)*** | ***M (SD)*** | **M (SD)** |
| Self-Focussed Attention | 35.1 (22.4) | 26.9 (23.5) | 23.9 (16.5) | 18.5 (20.5) |
| Self-Evaluation | 40.9 (23.2) | 24.3 (22.0) | 23.4 (19.5) | 12.9 (17.4) |

As expected, the ANOVAs revealed a significant main effect of SFEA Manipulation on self-focussed attention in both the Faces ($F\ (1, 100) = 41.72$, $p < .001$, $\eta^2 = .30$) and the Clocks Tasks ($F\ (1, 100) = 11.07$, $p = .001$, $\eta^2 = .10$), and a significant main effect of SFEA Manipulation on self-evaluation in both the Faces ($F\ (1, 100) = 43.41$, $p < .001$, $\eta^2 = .30$) and the Clocks Tasks ($F\ (1, 100) = 40.09$, $p < .001$, $\eta^2 = .29$). Participants showed significantly higher levels of both self-focussed attention and self-evaluation when in the High SFEA condition, in both tasks. In addition, a significant main effect of SFEA Manipulation was found on anxiety ratings in the Clocks Task ($F\ (1, 100) = 41.72$, $p < .001$, $\eta^2 = .30$), and close to significance in the Faces Task ($F\ (1, 100) = 3.78$, $p = .055$, $\eta^2 = .04$). Again, participants rated their anxiety as higher when in the High SFEA condition, in both the Faces (High SFEA: $M = 25.00$, $SD = 22.01$, Low SFEA: $M = 20.77$, $SD = 23.05$) and the Clocks Tasks (High SFEA: $M = 22.76$, $SD = 19.06$, Low SFEA: $M = 17.57$, $SD = 18.71$), which is consistent with the Cognitive Model of Social Phobia (Clark & Wells, 1995).

The ANOVAs also revealed a main effect of Social Anxiety Group on self-focussed attention in both the Faces ($F\ (1, 100) = 6.09$, $p = .015$, $\eta^2 = .06$) and the Clocks Tasks ($F\ (1, 100) = 7.42$, $p = .008$, $\eta^2 = .07$), and on self-evaluation in

both the Faces ($F$ (1, 100) = 43.41, $p$ < .001, $\eta^2$ = .30) and the Clocks ($F$ (1, 100) = 40.09, $p$ < .001, $\eta^2$ = .29) Tasks, demonstrating that HSA participants showed significantly more self-focussed attention and self-evaluation than LSA participants across tasks. A significant main effect of Social Anxiety Group was also found on participants' anxiety ratings in both the Faces ($F$ (1, 100) = 12.58, $p$ = .001, $\eta^2$ = .11) and the Clocks ($F$ (1, 100) = 10.03, $p$ = .002, $\eta^2$ = .09) Tasks, with HSA participants rating their anxiety levels as significantly higher than the LSA participants, both whilst performing the perception task with faces (HSA: $M$ = 29.39, $SD$ = 20.73, LSA: $M$ = 16.38, $SD$ = 16.10) and with clocks (HSA: $M$ = 25.38, $SD$ = 17.85, LSA: $M$ = 14.94, $SD$ = 15.22).

A main effect of Focus Order was found in self-evaluation for both the Faces ($F$ (1, 100) = 4.52, $p$ = .036, $\eta^2$ = .04) and the Clocks Tasks ($F$ (1, 100) = 5.60, $p$ = .020, $\eta^2$ = .05). In the Faces Task, participants exposed to the High SFEA condition first ($M$ = 31.16, $SD$ = 22.46) showed greater self-evaluation than participants exposed to the Low SFEA condition first ($M$ = 23.56, $SD$ = 16.76). A similar finding was found in the Clocks Task (High SFEA First: $M$ = 29.12, $SD$ = 22.47; Low SFEA First: $M$ = 21.49, $SD$ = 13.39). Focus Order was not found to produce a significant main effect in participants' self-focussed attention or anxiety ratings, and no significant interaction effects were found.

## Testing of main hypotheses

As predicted, the linear mixed effects analysis revealed a significant effect of the SFEA condition in the Faces Task ($\beta$ = 1.24, $SE$ = .34; $t$ (9144) = 3.70, $p$ < .001; Figure 3). Participants estimated the number of faces looking at them as significantly higher when performing the task in the High SFEA condition ($M$ = 41.88, $SD$ = 7.30), than in the Low SFEA condition ($M$ = 40.63, $SD$ = 6.57).

There was no significant effect of SFEA Manipulation in the Clocks Task, demonstrating that increased SFEA did not increase the perception of the number of clocks 'facing you' ($\beta$ = .08, $SE$ = .31; $p$ = .801; Figure 3). Nor was there a significant effect of Social Anxiety Group in the Clocks Task, ($\beta$ = .16, $SE$ = 1.10, $p$ = .885).

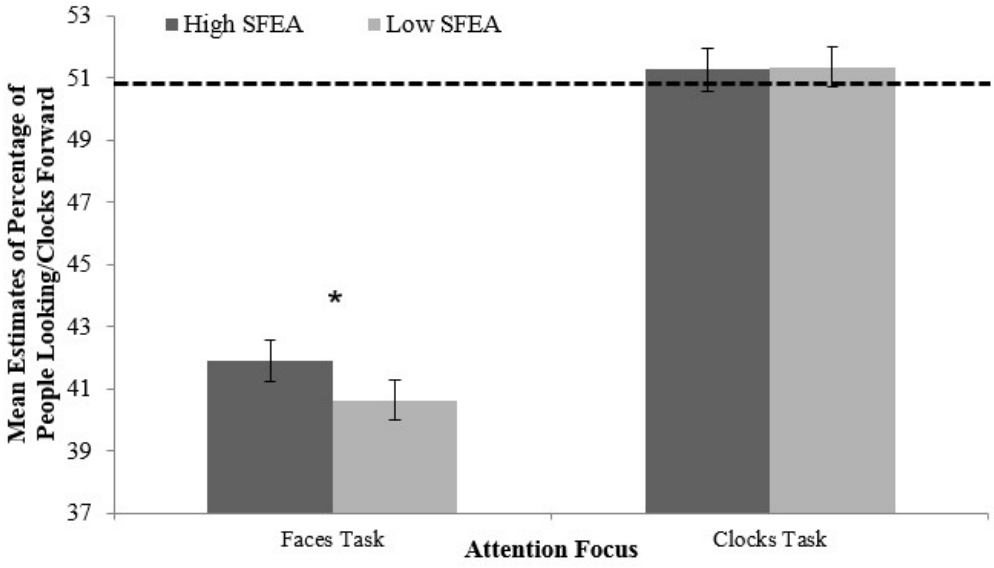


*Figure 3: Participants' mean estimates, with standard error bars, for the percentage of people looking at them in the faces task and the percentage of clocks facing them in the clocks task. * indicates p < .05. Dashed line represents the actual (objective) percentages for each task (M = 50.82).*

In contrast to the Bolt et al (2014) study, we did not observe a significant effect of Social Anxiety Group in the Faces Task ($\beta$ = 1.06, $SE$ = 1.18, t (9144) = .89, $p$ = .372), although HSA participants ($M$ = 41.80, $SD$ = 6.50) tended to give higher estimates than LSA participants ($M$ = 40.71, $SD$ = 5.89). When we compared the Bolt et al. (2014) sample with our own we found that the mean differences on measures of social anxiety between high and low socially anxious groups were substantially smaller in our study (only 56% of the Bolt et al. difference on APPQSP, 59% on SCS, and 44% on SFAS).

To investigate whether this might explain the lack of a social anxiety effect in our study, we created more extreme HSA and LSA groups (participants who scored ≤27 (LSA, n = 24), or ≥46 (HSA, n = 27) on the BFNES). These groups differed on most social anxiety measures to a similar extent as in the sample described by Bolt et al. Post-hoc linear mixed effects analysis of this reduced sample revealed a near-significant effect of Social Anxiety Group on the Faces Task ($\beta$ = 3.35, *SE* = 1.87; *t* (4480) = 1.79, *p* = .074). This effect was not found in the Clocks Task with this sample ($\beta$ = .87, *SE* = 1.72, *p* = .613), suggesting its specificity to social stimuli. Given the agreement between the patterns reported here and by Bolt et al. (2014), lack of significance in our sample could be explained by insufficient statistical power. Further research using larger groups of individuals who differ more substantially on measures of social anxiety is therefore warranted. The effect of SFEA on participants' estimates in the Faces Task remained highly significant in this subset of individuals ($\beta$ = 1.69, *SE* = .49, *t* (4480) = 3.42, *p* < .001).

For every matrix of Faces/Clocks, an estimation bias score was calculated by subtracting the objective percentage of items facing forward from the participant's estimate. The mean estimation bias for each task revealed that participants tended to underestimate on the Faces Task (*M* = -8.75, *SD* = 6.20), *t* (103) = 14.39, *p* < .001, *d* = 1.41) and overestimate on the Clocks Task (*M* = 1.30, *SD* = 5.68, *t* (103) = 2.33, *p* = .022, *d* = .23). Inspection of Figure 3 shows that in both high and low SFEA conditions, participants substantially underestimated the number of faces in the Faces Task, with the underestimation being smaller in the high SFEA condition. In contrast, in both the high and low SFEA conditions, participants overestimated the number of clocks facing them, and this effect did not differ between the two conditions.

## Discussion

The main aim of this study was to determine whether Self-Focussed Evaluative Attention (SFEA) increases the perception of being observed by others. As predicted, when participants focussed evaluative attention on themselves, they estimated that significantly more people were looking at them, than when they focussed their attention outwards. No effect of SFEA was found in the non-social (Clocks) Task. As people with high levels of social anxiety habitually report elevated levels of SFEA, it seems this effect may partly explain why high socially anxious individuals estimate that more people are looking at them than low socially anxious individuals (Bolt et al., 2014; Harbort et al., 2013), and are generally more concerned about being closely observed by others (Bögels et al., 2010).

Interestingly, although low socially anxious individuals do not normally report high levels of SFEA, when this state was induced in the laboratory, they also gave enhanced estimates of the percentage of people looking at them. This suggests that the mechanism which could induce this change in perception is present in all individuals. However, one would speculate that it is only regularly activated if a person is excessively concerned by the evaluation of others as is the case in social anxiety disorder.

The results of this study have several clinical implications. Firstly, it may be helpful for patients to be made aware that their perception of being observed by others increases when they focus evaluative attention on themselves. This information could be included in a psychoeducational part of therapy, or in a therapeutic intervention which demonstrates how their perception of being observed by others varies depending on where they focus their attention. This study also shows how focussing attention on others, rather than the self, decreases levels of self-focussed attention, self-evaluation, and anxiety, and significantly reduces estimates of people 'looking at you'. Therefore, a treatment intervention that involves training participants to focus attention externally rather than on their anxious feelings and images, could be beneficial. Consistent with this suggestion, several cognitive behavioural treatment programmes for social anxiety disorder that have strong empirical support (Mayo-Wilson et al., 2014) include systematic training in externally focussed attention, and there is evidence that a shift to externally focussed attention is one of the mediators of successful clinical outcomes (Hedman et al., 2013).

Bolt et al. (2014) found that HSA participants perceived significantly more faces looking at them during the Faces Task than LSA participants; however this effect was not observed in the current study. This might be considered surprising. However, the HSA and LSA groups in Bolt et al.'s study differed more strongly on several measures of social anxiety than the groups in the current study, which may explain the discrepancy in the findings. Support for this interpretation was provided by a post-hoc analysis in which groups that differed more extremely on measures of social anxiety were created. Analyses of this reduced sample indeed suggested patterns more in line with those

reported by Bolt et al. (2014), although due to reduction in power associated with decreasing the sample size, the effects in our sample were only near-significant. This should be explored further using larger groups that differ to a similar extent to the groups in the Bolt et al. study on measures such as the BFNE, APPQSP, SCS and SFAS. Rodebaugh et al. (2011) have also suggested that ignoring the reverse-scored items may enhance the validity of the BFNE to discriminate high and low social anxiety disorder, which may need to be considered for future studies.

Another interesting finding in this and previous studies is that participants underestimated the percentage of people looking at them in the Faces Task. This was found even in the High SFEA condition. Therefore, inducing high levels of SFEA led to higher accuracy on the task, rather than an objective overestimation. This finding fits with a longer tradition in psychopathology research which shows that negative emotional states may be associated with a more balanced perception of negatives to positives (e.g. Alloy & Abramson, 1979). People who are not depressed or anxious tend to bias their attention away from negative information to some extent (McCabe and Gotlib, 1995; Davidson, 2004), suggesting that good mental health may be supported by a mild Pollyanna effect (Matlin & Strang, 1978). A similar phenomenon is seen in other anxiety disorders. For example, panic disorder patients, who are often very concerned that they have a problem with their heart, demonstrate higher accuracy than controls when asked to count their heartbeats without taking their pulse (Ehlers & Breuer, 1992).

Despite the overall underestimation on the Faces Task, when SFEA was high (which is generally the case in patients with social anxiety) participants gave higher estimates of the proportion of people looking at them, than when SFEA was low. There are several possible mechanisms for this effect. Firstly, participants may partly be mistaking self-observation for the observation of others, leading to the relatively higher estimates. Secondly, and perhaps less likely, a heightened state of SFEA may make one better at identifying external stimuli. If that were the case, the enhancement would only apply to faces as the effect of SFEA was only found in the Faces Task. To fully rule out the second explanation, further research could explore whether low SFEA during the Faces Task is associated with poorer recognition memory for the faces of the people looking at you. The first explanation would predict no difference in recognition memory, however the second would expect such a difference.

To conclude, this study successfully revealed a causal link between SFEA and the perception of being observed by others. When participants focussed evaluative attention on themselves, they perceived more people looking at them than when they focussed attention on others. Naturally high levels of SFEA could contribute to the concern SAD patients have with observation from others. In this study, HSA participants demonstrated an increased awareness of the number of people looking at them compared to LSA participants; however this difference was not significant. Increased levels of SFEA had no effect on participants' estimates on a non-social task; therefore the effects seem specific to tasks using social stimuli. Finally, this research highlights therapeutic techniques, which could be effective in reducing patients' excessive concern with being observed by others.

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