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*Evidence from a probe detection paradigm*

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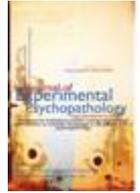
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## Does self-focused attention in social anxiety depend on self-construal? Evidence from a probe detection paradigm

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### Abstract

Cognitive models of social anxiety disorder propose self-focused attention as a key maintenance factor of the disorder. However, whether this holds true for different cultural contexts has not been investigated. The present experiment investigated the influence of self-construal (interdependent versus independent) on self-focused attention in high and low socially anxious individuals. Eighty-seven participants, divided into high versus low socially anxious and interdependent versus independent self-construal, performed a self-focused attention probe detection paradigm. A reaction time metric relating to attention deployment on the self versus the other served as an index of self-focused attention. In individuals with an interdependent self-construal those who are highly socially anxious showed decreased self-focused attention compared to those who are low socially anxious. In individuals with an independent self-construal the effect of social anxiety was less strong and in the opposite direction (but congruent with cognitive models). These results indicate that self-focused attention in social anxiety depends on self-construal. These findings implicate different therapies for people with social anxiety disorder, depending on their self-construal.

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Keywords: self-focused attention, self-construal, social anxiety, social phobia, interdependence, culture, cognitive-behavior therapy, exposure treatment

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## Introduction

Several cognitive models propose that social anxiety disorder (SAD, also called social phobia) is associated with increased self-focused attention (SFA) (Clark & Wells, 1995; Rapee & Heimberg, 1997). These models assume that in social situations patients with SAD excessively monitor themselves and their internal processes (which is called SFA) to find out how they are coming across to others rather than monitoring the audience or an interaction partner to find out what impression they are making. According to these models excessive SFA enhances fear symptoms and impairs social performance both of which maintain social anxiety. Consistent with these models, questionnaire studies (e.g. Perowne & Mansell, 2002; Voncken, Dijk, de Jong, & Roelofs, 2010) have shown increased SFA in high socially anxious individuals compared to low socially anxious individuals. The association between increased SFA and social anxiety was also investigated experimentally (e.g. Mansell, Clark, & Ehlers, 2003; Pineles & Mineka, 2005). Mansell et al. (2003) found in a probe detection task, that in an enhanced social stress condition (anticipation of giving a speech), high socially anxious women showed more SFA than low socially anxious women, whereas no such pattern was found in men. In a no social stress condition, high and low socially anxious participants did not differ in SFA in both women and men. However, when Mansell et al. (2003) divided the sample into high and low speech-anxious individuals, they found that high speech-anxious women *and* men showed more SFA in the social stress condition than low-speech anxious individuals. Mansell et al. (2003) suggested as a possible explanation that when participants are divided on social anxiety, the difference in speech anxiety between high and low groups was greater in women than in men. Again, in the no social stress condition there were no differences between the speech-anxiety groups. In contrast, Stevens and colleagues (Stevens, Cludius, Bantin, Hermann, & Gerlach, 2014) found that high socially anxious individuals focused more on external probes than on internal probes, whereas for controls no differences were found between internal and external probes. High socially anxious individuals were also more externally focused than controls, but there was no difference between groups for internal probes. Their explanation for the contradictory findings was that samples of earlier studies (e.g. Mansell et al., 2003) were based on predominantly speech anxious individuals, whereas the sample of Stevens et al. (2014) was screened with the Social Phobia Scale (Mattick & Clarke, 1998), which contains a broader band of social situations. Research investigating the effect of experimentally heightened SFA on social anxiety usually finds that the latter increases if the former is enhanced (Bögels & Lamers, 2002). For a review of the evidence on the role of SFA in social anxiety, see Bögels and Mansell (2004). Based on the result of this body of research, cognitive behavioral treatment programs have started to include attention trainings (i.e. the patient learns to focus externally during a social task) into their SAD

interventions (Bögels, 2006; Bögels & Lamers, 2002; Clark et al., 2003; Kitanishi, Nakamura, Miyake, Hashimoto, & Kubota, 2002).

Despite growing recognition that cultural variables should be added to models of SAD (e.g. Dinnel, Kleinknecht, & Tanaka-Matsumi, 2002; Heinrichs et al., 2006; Hong & Woody, 2007; Kleinknecht, Dinnel, Kleinknecht, & Hiruma, 1997; Takahashi, 1989; Tanaka-Matsumi, 1979; Vriends, Pfaltz, Novianti, & Hadiyono, 2013), the influence of cultural variables on SFA in social anxiety has not been investigated. One cultural variable that has been proposed as a factor that might play a role in models of SAD is self-construal (also called self-concept) (Dinnel et al., 2002; Kleinknecht et al., 1997), which has two culturally based dimensions, namely an interdependent and an independent self-construal (Markus & Kitayama, 1991).

Interdependent self-construal emphasizes the relatedness of the self to a collective, the feeling to be part of a larger whole. The self is defined and experienced within the context of relationships and group memberships. Independent self-construal emphasizes individual autonomy, and defines the self as a bounded and distinctive locus of awareness and action, separate from the collective. Although both dimension of self-construal can be found in all cultures, an interdependent self-construal has been observed more in so-called collectivistic cultures of East Asia (Markus & Kitayama, 1991; Triandis, 1989; Triandis, Chan, Bhawuk, Iwao, & Sinha, 1995), whereas independent self-construal has been observed more in so-called individualistic cultures of North America and most Western European countries (Markus & Kitayama, 1991; Triandis, 1989; Triandis et al., 1995).

Social anxiety has been reported to be higher in Eastern cultures (with a more interdependent self-concept) than in Western cultures (with a more independent self-concept) (e.g. Heinrichs et al., 2006; Vriends et al., 2013). Moreover, an interdependent self-construal correlates positively with social anxiety and an independent self-construal correlates negatively with social anxiety (Vriends et al., 2013). Based on these correlations between these different types of self-construal and social anxiety, we assume that self-construal might influence SFA in socially anxious individuals. Socially anxious people with an interdependent self-construal may tend to focus more externally in social situations – they might focus on other people to monitor expressions relating to social norms besides focusing on their own behavior. Focusing on the external social norms might prevent them from breaking them and risking social costs such as exclusion from the group. Fear of offending *others* has been recognized more often in cultures with a predominant interdependent self-construal, which is in line with this hypothesis (Kleinknecht et al., 1997; Nakamura, Kitanishi, Miyake, Hashimoto, & Kubota, 2002). In cultures with a predominant independent self-construal, however, fear of embarrassing *oneself* is reported more often (Norasakkunkit, Shinobu, & Yukiko, 2012). Therefore, it is possible that in individuals with an interdependent self-construal social anxiety is not maintained through the same processes as proposed in maintenance models for social anxiety that were developed based on predominantly Western patients by Western researchers. An extension of models of SAD with self-construal might therefore be clinically relevant, so that patients with different culture backgrounds can benefit from adapted interventions.

The present study investigated the influence of a primarily interdependent versus primarily independent self-construal on SFA in social anxiety. SFA was measured using a modified probe detection paradigm (Mansell et al., 2003) which is one of the few paradigms that measures SFA using reaction times and is considered to be more objective than self-report measures of SFA. Self-report biases may be particularly a source of error when assessing cultural differences. For example, social desirability response tendencies may be associated with interdependent self-construal. Participants, divided into high versus low socially anxious and independent versus interdependent self-construal groups, performed the modified probe detection paradigm. They watched pictures on a computer screen and were asked to react as fast as possible to a self-focused (vibration on skin) and an other-focused (letter on pictures of persons) stimulus. Assuming that reaction time is longer when attention needs to shift from the place of interest (or socially relevant place) to the target stimulus, the SFA score is derived from *comparing* reaction times between the self-focused stimuli and the other-focused stimuli. Half of the participants were randomized to a social stress condition. Based on the cognitive model of SAD we expected an interaction between social anxiety and social stress showing that in the social stress condition, high socially anxious individuals show more SFA than low socially anxious individuals. For the no social stress condition, we did not expect a difference between the groups. Based on our assumption that in social situations socially anxious people with an interdependent self-focus might focus more externally on other people than on themselves to monitor the social norms of the collective, we expected self-construal to interact with social anxiety. High socially anxious individuals with an interdependent self-construal were

expected to show less SFA than high socially anxious individuals with an independent self-construal. For low socially anxious individuals we expected no significant differences. Based on Mansell et al.'s (2003) finding that only socially anxious women, and not men, showed higher SFA in a social stress condition, we investigated whether social anxiety would interact with sex to determine the level of SFA under social stress.

## Methods

### Participants

The present sample consisted of 87 participants and was recruited through advertisement on the homepage of the University of Basel and through advertisement at pin boards of local restaurants and libraries. To try to enhance variance in self-construal, we explicitly also invited participants with an Asian origin<sup>1</sup> (from China, Korea, Japan, India, Tibet, Thailand, Iran and Turkey). Participants with a non-Asian background were Caucasian and came from Switzerland, Germany, England and Italy. Two participants were excluded from the analyses, as the experimental software (E-Prime) did not properly record their reaction times during the attention task. Table 1 shows the sample characteristics. Participants received vouchers (15 Swiss Francs) for study participation.

*Table 1: Characteristics of the total study sample (N = 85) and comparison of the independent self-construal group (N = 55) with the interdependent self-construal group (N = 30)*

	Total sample	Independent self-construal group	Interdependent self-construal group	Test	
				t <sup>a</sup> /χ <sup>2</sup> <sup>b</sup>	p
Age (M, SD)	28.1 (8.09)	28.4 (8.16)	27.6 (8.05)	.434 <sup>a</sup>	n.s.
Female sex (N, %)	49 (58)	30 (55)	19 (63)	.614 <sup>b</sup>	n.s.
Asian origin (N, %)	45 (53)	24 (44)	21 (70)	7.49 <sup>a</sup>	.006
Independent self-construal (M, SD)	2.60 (0.41)	2.76 (0.35)	2.30 (.35)	5.42 <sup>a</sup>	<.05
Interdependent self-construal (M, SD)	2.29 (0.51)	2.07 (0.44)	2.68 (.38)	-6.34 <sup>a</sup>	<.001
Social Phobia Scale (M, SD)	34.6 (10.3)	31.7 (9.33)	39.2 (10.04)	-3.419 <sup>a</sup>	<.001
High social anxiety (N, %)	46 (54)	26 (48)	20 (67)	2.94 <sup>b</sup>	n.s.

Note. M = Mean, SD = standard deviation, n.s. = not significant, <sup>a</sup> t-Test, <sup>b</sup> Chi-square test

## Materials

### Self-report measures

#### Social anxiety.

Social anxiety was measured with the German version of the Social Phobia Scale (SPS; Mattick & Clarke, 1998; German; Stangier, Heidenreich, Berardi, Golbs, & Hoyer, 1999). This 20-item scale measures anxiety symptoms related to performing various tasks while being observed. Each SPS item is rated on a 5-point Likert-type scale that ranges from 0 (not at all characteristic or true of me) to 4 (extremely characteristic or true of me). A total score is obtained by summing the ratings of all the items, resulting in scores ranging from 0–80. Scores above the cut-off of 24 indicate social phobia for Western populations (Heimberg, Mueller, Holt, Hope, & Liebowitz, 1992). No cut-off scores for Asian populations have been established so far. The scale shows high internal consistency and moderate test-retest reliability (Heimberg et al., 1992). In the present study the Cronbach alpha was .86. The groups high versus low social anxiety were formed by median-split on the SPS scores (Median = 32; high social anxiety N = 45,

<sup>1</sup> Research into collectivism and individualism has shown that collectivistic (interdependent) self-concepts are more common in Asian cultures than in Western cultures and individualistic (independent) self-concepts are more common in Western cultures than in Asian cultures (Hofstede, 1984; 2001).

low social anxiety  $N=40$ ). Some of the low socially anxious individuals ( $n=26$ ) were above the clinical cut-off defined in Heimberg et al.'s (1992) paper. We assume that this is the case because we specifically also recruited participants with a higher likelihood of interdependent self-construal. In Eastern cultures social anxiety scores might be higher than in Western cultures, although no social phobia can be diagnosed (Heinrichs et al., 2006; Vriends et al., 2013). Therefore overall social anxiety scores in our sample were higher than would be expected in a purely Western sample of participants.

### Self-construal.

The German version of the Singelis Self-Construal Scale (Mokry, 2011; Singelis, 1994) consists of two 12-item subscales, assessing interdependent and independent self-construal. An example from the independent self-construal scale is "I enjoy being unique and different from others in many respects" and one from the interdependent self-construal is "I will sacrifice my self-interest for the benefit of the group I am in". The participants responded on a 5-point Likert-type scale from "strongly disagree" to "strongly agree". The mean score of the 12 items of each subscale was computed. Multiple studies have shown the subscales to have acceptable internal consistency (Norasakkunkit & Kalick, 2002; Sato & McCann, 1997; Singelis, 1994; Singelis & Sharkey, 1995), although lower reliability estimates have also been reported (Levine et al., 2003; Okazaki, 2000). In the present study the Cronbach alpha was .48 for the interdependent self-construal scale and .70 for the independent self-construal scale. Both subscales were normally distributed. Based on the difference between the two self-construal subscales and following recommendations of Singelis (1994), author of the Self-construal Scale, participants were divided into two groups: an independent group including participants with a dominance for an independent self-construal (difference between interdependence and independence scale was negative,  $N=55$ ) and an interdependent group including participants with a dominance for an interdependent self-construal (difference between interdependence and independence scale was positive,  $N=30$ ). Table 1 shows demographic and questionnaire information comparing the groups.

### Experimental task

#### Social stress manipulation.

Before the SFA probe detection task, the experimenter informed half of the participants that after the computer task they would have to give a 2-minute speech about genetic engineering and to do a short intelligence test (social stress condition). The experimenter showed the participants a large VHS camera standing 2 meters in front of them and told them that the speech and test would be recorded, so that psychology students, who will be depicted on the pictures of the following computer task, could rate the speech, as well as the social and intelligence skills of the participant. This social stress manipulation was based on Mansell et al. (2003), but we also added an intelligence test next to giving a speech in order to broaden the social stressor to a non-speech task, and thus incorporate other fears of socially anxious individuals. To find out whether the manipulation made participants in the social stress condition more anxious the German version of the Spielberger's State-Trait Anxiety Inventory, State Scale (STAI-state) (Knight, Waal-Manning, & Spears, 1983; Laux, Glanzmann, Schaffner, & Spielberger, 1981; Ramanaiah, Franzen, & Schill, 1983; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) was applied before and after the social stress manipulation. At the end of the experiment, the participants in the social stress condition were asked to rate on a 0 to 100% scale how much they had believed that they had to give a speech and had to perform an intelligence test. They were also asked how much they had believed that the persons depicted in the computer task were psychology students who would rate their speech and intelligence test.

#### Self-focused attention paradigm.

The self-focused attention task was a modified version of Mansell and colleagues' probe-detection task (2003). The task started with the instruction that the participants had to react as fast as possible, by pressing a response button, to two target stimuli, namely to the character *E* (other stimulus) and to a vibration of a tactile stimulus on the upper arm (feels like soft vibration of a cell phone) (self stimulus), both presented during a stream of pictures on a 19" PC monitor. In the original paradigm (Mansell et al. 2003), the vibration had been delivered to a finger of the non-dominant hand and participants had been led to believe that the vibration happened due to changes in their

physiological arousal. No such instruction was given in the present study due to concerns that participants may not believe it. However, the self stimulus was on the upper arm, close to the body area that is often monitored and focused on by people with social anxiety. The pictures consisted of a set of 20 full screen pictures: 12 pictures of faces of two men and two women, one from each sex and origin (Asian or European), with three different emotional expressions (neutral, critical and friendly; Tottenham et al., 2009), four pictures of neutral objects, and four pictures related to the theme genetic engineering (to remind the participants in the social stress condition of their speech task). The experimenter informed the participants in the social stress condition that the people depicted on the pictures are the judges of their speech and intelligence test. In the original version of the paradigm, no pictures related to the content of the speech that was supposed to follow the attention task had been used, only 12 pictures of faces and four pictures of neutral objects. Before the task started, the participant practiced the task on a picture of a light bulb. If the participant successfully understood the task, the experimenter turned on the video in the social stress condition and left the room. During the task the participant watched the 20 pictures in random order. The self and the other stimuli were presented each three times at random intervals during the presentation of each picture and disappeared or stopped vibrating either if the participant pressed the response button or if the participant did not react 3'000 ms after onset of the target stimulus. To keep the participant actively involved and focused, the first target stimulus was presented either 150 or 500 ms after the onset of the picture (building up of picture took approximately 120 ms). The inter-trial intervals of the remaining five target stimuli during each picture were 2'250 (2x), 3'000 (2x) or 3'700 ms (1x) (randomized). As such, each picture presentation took a minimum of 15'370 ms and a maximum of 32'820 ms. The total duration of the SFA task was approximately 9 min. In the original paradigm, four self and other stimuli had been presented on each picture. We reduced this to three stimuli per picture, as we included four more pictures (genetic engineering) and did not want to increase the length of the task too much.

## Procedure

After the participant provided informed consent and filled out the questionnaires (SCS, SPS, and STAI-State), the experimenter prepared psychophysiological measurements (heart rate, facial temperature and respiration)<sup>2</sup>. Then the participant was asked to sit quietly for the assessment of the physiological baseline measure. After this, the experimenter gave half of the participants the social stress induction instruction. The other half did not receive any instruction at this point. Before starting the SFA paradigm, both groups filled out the STAI-State a second time and then started with the paradigm. After that, the experimenter told the participants in the social stress condition that they did not have to give a speech or do an intelligence task, and asked the participants to retrospectively rate how much they had believed the information on the speech task and rating of judges (see above, Social Stress Manipulation). Finally the participants were debriefed, thanked, and reimbursed for their time.

## Statistical analyses

Self-construal group differences (independent versus interdependent) on sample characteristics were analysed with *t*- and Chi-square tests. Participants were divided into high versus low on the Social Phobia Scale based on a median split. Despite the limitations of a median split, we wished our design to be comparable to Mansell et al. (2003) in terms of having a high versus low social anxiety group, and the median approximated previous clinical cut scores (e.g. Heimberg et al., 1992).

STAI-State scores were analysed as a manipulation check for social stress versus non-social stress condition using a repeated measures general linear model (GLM), including 'Condition' (social stress versus no social stress), 'Self-construal' (independent versus interdependent) and 'Social anxiety' (high versus low) as between-subjects factors, and 'Time' (before and after the social stress induction) as within-subject factor. A significant condition x time interaction or a significant condition main effect would indicate that the social stress induction was successful, namely that participants in the social stress condition indeed felt more anxious after the social stress manipulation than

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<sup>2</sup> Physiological results are not presented here. Physiological measurement was unobtrusive and was not expected to influence the present data directly.

beforehand. We also analysed if the participants in the social stress manipulation believed that they would have to give a speech and do an intelligence test judged by a jury.

Reaction times to the self-focused and the other-focused target stimuli below 100 ms and above 1,000 ms were recoded into missing values (Mansell et al., 2003). Reaction times below 100 ms are expected to be arbitrary, not reflecting focus of attention, and reaction times above 1,000 ms would represent other attention processes that were not the focus of this study. Reaction times were log-transformed to better meet model assumptions (normality and homoscedasticity of residuals). Self-focused attention was computed through the difference of the mean reaction time to the other-focused target stimuli and the mean reaction time to the self-focused target stimuli. Higher values indicated that the participant reacted relatively faster to the self-focused target stimuli compared to the other-focused target stimuli.

The hypothesis that self-construal will interact with social anxiety for SFA during a social stress situation was analysed with a GLM including the between-subjects factors 'Self-construal' (independent versus interdependent), 'Social anxiety' (high versus low), 'Condition' (social stress versus no social stress) and 'Sex (male versus female)'. First we entered all effects in the model (including all higher order effects) and then removed all effects with  $F$ -value  $< 2$  (Green & Tukey, 1960). Main effects were only dropped from the model if their terms were not included in significant interactions. The following interactions were included in the reported model: Social anxiety  $\times$  sex, social anxiety  $\times$  condition, social anxiety  $\times$  self-construal, and social anxiety  $\times$  self-construal  $\times$  condition. Figures display the estimated means of the factor interactions. An alpha level of .05 was considered statistically significant. A  $\eta^2$  level of  $< .01$  was considered as small effect size, of  $< .06$  as medium and of  $< .14$  as large (Cohen, 1988).

## Results

### Manipulation check

A significant main effect for social anxiety ( $F(1, 77) = 7.54, p = .008, \eta^2 = .09$ ) indicated that participants with high social anxiety were generally more anxious independently of condition and time. However, this main effect was qualified by a significant condition  $\times$  time interaction for STAI-State ( $F(1, 77) = 11.25, p = .001, \eta^2 = .13$ ), which indicated that anxiety was successfully induced in the social stress condition. No main or interaction effects for self-construal were revealed, indicating that self-construal groups did not differ in their anxiety levels. All other main effects and interactions were not significant ( $p > .05$  for each effect)<sup>3</sup>.

The mean rating of participants in the social stress condition about their conviction that they had to give a speech and perform an intelligence test was 89% ( $SD = 18.05$ ), indicating that this manipulation was believed. The mean rating of participants in the social stress condition regarding the belief that some pictures of the attention task depicted the students, who would judge their skills, was 71% ( $SD = 38.50$ ). As expected GLM including social anxiety and self-construal as between-subjects factors revealed no significant group differences or interactions on credibility of the social stress manipulation ( $p > .05$  for each effect). Thus, both groups believed to the same extent that they would have to give a speech and perform an intelligence test that would be judged.

In sum, the stress manipulation was successful, but participants with high social anxiety were more anxious than participants with low social anxiety throughout the experiment.

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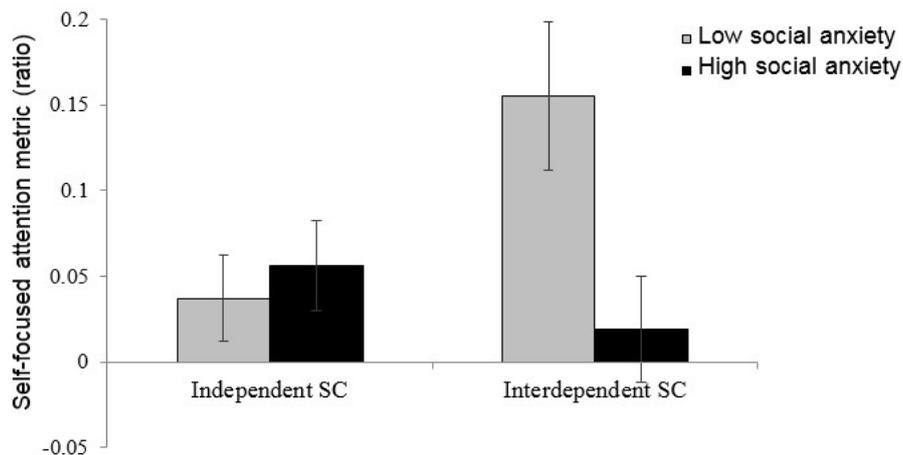
<sup>3</sup> Details about the  $F$ ,  $p$  and  $\eta^2$  values of the non-significant effect can be requested at the corresponding author.

**Table 2: Main and interaction effects of the ANOVA model including the factors social stress condition (stress versus no stress), sex, self-construal (independent versus interdependent) and social anxiety (high versus low) (Model A) and the same model without the factor social stress condition (Model B)**

	Model A			Model B		
	<i>F</i> (1, 75)	<i>P</i>	$\eta^2$	<i>F</i> (1, 79)	<i>p</i>	$\eta^2$
Social stress	.04	n.s.	.00	-	-	-
Sex	.73	n.s.	.01	.90	n.s.	.01
Self-construal	1.43	n.s.	.02	1.73	n.s.	.02
Social anxiety	2.53	n.s.	.03	3.37	n.s.	.04
Social stress x social anxiety	1.31	n.s.	.02	-	-	-
Social anxiety x sex	8.26	.005	.10	8.18	.005	.09
Social anxiety x self-construal	5.00	.028	.06	6.16	.015	.07
Social stress x social anxiety x self-construal	1.02	n.s.	.03	-	-	-

### Self-construal and self-focused attention in high and low social anxiety

In our model, including self-construal, social anxiety, sex, and social stress condition as between-subjects factors (model A, Table 2), the interaction between social anxiety and sex, as well as the interaction between social anxiety and self-construal were significant. All other main and interaction effects were not significant. Because the social stress condition did not show a significant main effect nor any significant interaction effects ( $F$ -value  $< 2$  for the main effect and each interaction effect involving social stress condition) we repeated the analysis using a simplified model without this factor (model B). The model was robust with respect to the significant interactions of model A (see model B, Table 2). The other main and interaction effects remained non-significant. The significant interaction between self-construal and social anxiety is illustrated in Figure 1. In participants with an interdependent self-construal, high socially anxious participants showed less SFA ( $M = 0.019$ ,  $SE = 0.031$ ) compared to low socially anxious participants ( $M = 0.155$ ,  $SE = 0.043$ ), whereas in participants with an independent self-construal, high socially anxious participants showed slightly more SFA ( $M = 0.056$ ,  $SE = 0.026$ ) compared to low socially anxious participants ( $M = 0.037$ ,  $SE = 0.025$ ).



**Figure 1: Self-focused attention metric (estimated means) in independent self-construal and interdependent self-construal groups divided into low and high socially anxious participants. Error bar presents +/- 1 standard error.**

The significant interaction effect between sex and social anxiety is depicted in Figure 2. SFA was lower in high socially anxious men ( $M = -0.018$ ,  $SE = 0.031$ ) compared to low socially anxious men ( $M = 0.124$ ,  $SE = 0.037$ ) whereas in

women no such differences were observed (high socially anxious women:  $M = 0.094$ ,  $SE = 0.026$ ; low socially anxious women:  $M = 0.068$ ,  $SE = 0.031$ ).

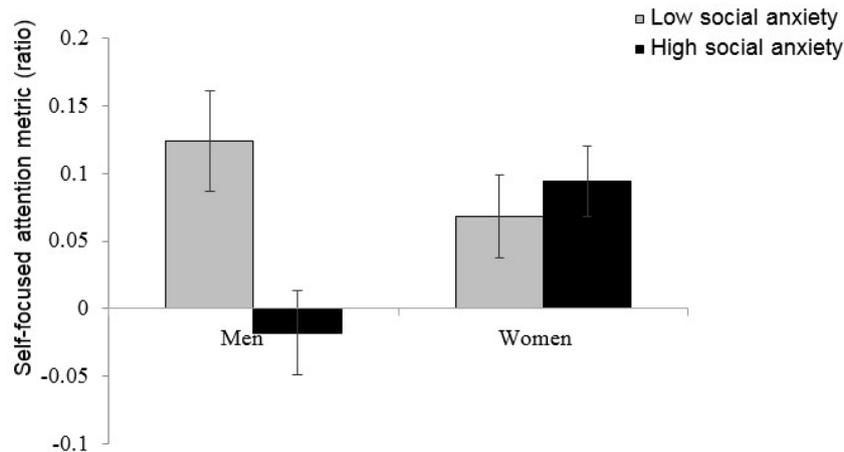


Figure 2: Self-focused attention metric (estimated means) in men and women divided into low and high socially anxious participants. Error bar presents  $\pm 1$  standard error.

## Discussion

The present study showed that self-construal (independent versus interdependent) and sex moderate the relationship between social anxiety and self-focused attention (SFA). Whereas high socially anxious participants with an independent self-construal were more self-focused than low socially anxious participants with an independent self-construal, the opposite was found for participants with an interdependent self-construal – those with high social anxiety showed *less* SFA than those with low social anxiety. The result in participants with an independent self-construal is in line with contemporary conceptualizations of social anxiety disorder, in which SFA is assumed to be a central factor in the maintenance of the disorder (Bögels & Mansell, 2004; Clark & Wells, 1995), because indeed high socially anxious participants showed somewhat increased SFA compared to low socially anxious participants. The result of the participants with an interdependent self-construal that high socially anxious participants show *decreased* SFA compared to low socially anxious participants support our hypothesis and has a less good fit with these conceptualizations as it does not support the idea of SFA being a maintaining factor of social anxiety. Note that these conceptualizations are based on research in individualistic, Western cultures, and were not adapted for cultural differences.

Socially anxious participants with an interdependent self-construal might show less SFA because they fundamentally embed themselves within a larger social whole (Markus & Kitayama, 1991), have more interests to focus on the social situation (e.g. social interaction partner), and focus on the social norms that apply in the given situation rather than on internal processes. They might want to monitor external indicators of how to behave correctly and appropriately to the social context. Namely, if an individual from a collectivistic culture (which is associated with an interdependent self-construal) deviates from social rules, they tend to be threatened by sanctions, such as exclusion from the group. It is therefore highly relevant for such individuals that their social behavior is evaluated as appropriate and positive (Suh, Diener, Oishi, & Triandis, 1998). In that sense, socially anxious persons might think that it is useful to keep an eye on the group or on the other to notice signals about the social norms that have to be met. One might assume that excessively monitoring the social other to find out whether one is not breaking the social rules could be as anxiety provoking and performance lowering as excessively monitoring oneself. This hypothesis is supported by a recent study that asked participants during a social situation to either focus on themselves (their thoughts, feelings, body sensations), or on their conversation partner to find out how well they were coming across (Bolt, 2011). Results showed that both conditions were equally anxiety inducing and lowered the performance of participants. However, further studies are needed to investigate the influence of enhanced external focus of attention on social anxiety in individuals with an interdependent self-construal.

Results indicate that the effect of social anxiety on SFA depends on sex. SFA was lower in high socially anxious men than in low socially anxious men, whereas in women no such differences were found. This finding is in line with Mansell et al. (2003) who developed the present paradigm. However, they found that the association between social anxiety and SFA was only supported in women under social stress, unless they divided their sample in high versus low speech anxious individuals. In sum, the results indicate that the model that social anxiety is maintained by SFA might not hold for persons with an interdependent self-construal and for women.

The finding that social stress did not have an effect on SFA was not in line with Mansell et al. (2003) and unexpected, as the manipulation checks indicated that the manipulation was credible and had heightened state anxiety. However, we also found that high socially anxious participants were more anxious than low socially anxious participants throughout the experiment. Perhaps this level of state social anxiety in high socially anxious participants was (independent from the social stress manipulation) sufficiently high for SFA to show its effects.

The present findings of individual differences influencing attention processes in social anxiety might be of relevance for the etiology and treatment of social anxiety disorder, as well as for methodological considerations. With regards to the etiology of SAD, in line with the notion that models of social anxiety should be extended by cultural variables (Heinrichs et al., 2006; Norasakkunkit, Kitayama, & Uchida, in press; Rapee et al., 2011), the present findings indicate that individual differences such as self-construal and sex might have to be added to current models of SAD. Possibly, in individuals with an interdependent self-construal social anxiety is not maintained through the same processes as proposed in Western maintenance models for social anxiety. Whereas in cultures with a predominately independent self-construal enhanced SFA is considered to be an important maintenance factor of SAD, social anxiety may be maintained by an enhanced focus on the social other in cultures with a predominantly interdependent self-construal. Should this be confirmed in future studies, also including clinical samples, it might indicate that specifically for individuals with a predominantly interdependent self-construal an attention training that focuses on a reduction of external focus of attention or cognitive restructuring regarding the importance of others' opinions about oneself may be helpful in therapy.

The methodological relevance of the present results lies in the fact that for the participants with an independent self-construal we replicated (to our knowledge for the first time) some of the findings of Mansell et al. (2003), using their paradigm (with slight modifications). Thus, the paradigm of Mansell et al. (2003) has been shown to be effective in measuring self- and other focused attention in another laboratory. Even though Mansell et al. (2003) did not measure self-construal, it might be assumed that their sample included rather independent self-construal participants, as they did not explicitly include a group of non-Caucasian participants. Additionally, the present study showed that experimental designs might be useful when investigating cultural differences in social anxiety. So far, social anxiety across cultures has mainly been investigated by questionnaire and interview studies. A shortcoming of these studies is that they rely on subjective ratings, which may be subject to cultural biases. Particularly individuals with an interdependent self-construal might respond to questions in a manner that will be viewed favorably by other. In contrast, experimental paradigms have the potential to provide more direct measures of attention. The present results might be encouraging future studies into cultural and sex differences in social anxiety using experimental designs.

Besides these advantages, the present investigation has some limitations. The sample consisted of non-clinical participants and was rather small. Also, the groups were not equally distributed, because of the natural correlation between social anxiety and an interdependent self-construal (e.g. Dinnel et al., 2002), and because of the lower proportion of individuals with an interdependent self-construal compared to the individuals with an independent self-construal. Future studies should increase sample sizes and use groups with more extreme values on the self-construal scales to better balance cell sizes. Furthermore, although seventy percent of the interdependent group contained Asian origin, we did not especially compare Asian participants with participants from other cultural backgrounds because in this study we were specifically interested in the influence of self-construal on social anxiety. Many of our Asian participants had a high independent self-construal and therefore comparing Asians with other ethnicities would not have answered our research question. However, future studies might want to investigate self-focused attention in a cross-cultural setting (i.e. comparing samples from diverse cultural backgrounds). In addition, the present results do not necessarily imply causal association of enhanced SFA increasing social anxiety (as it is proposed in the cognitive models), but rather represent an individual-difference correlation that may be bidirectional or influenced by third variables. Furthermore, the Cronbach alpha for the interdependent self-construal of the Self-

Construal Scale was low with .48. We employed this scale, which is widely used, to allow for comparison with other studies that have investigated self-construal in cross-cultural settings and defined our groups based on this measurement. As we were interested in the balance between interdependent and independent self-construal within a person, using only independent self-construal to define the groups of comparison would not assess what we were interested in. Finally, it is not clear yet what the correlates, causes and consequences of enhanced external attention are in socially anxious individuals with an interdependent self-construal. Future studies should examine the cognitive and affective processes associated with external focus in these individuals.

Despite these limitations, the present study demonstrated that individual differences in self-construal and sex moderate the relationship between social anxiety and SFA. Etiological models of social anxiety disorder might have to be extended by these factors. If these findings will be replicated, patients with social anxiety disorder could profit from culturally and gender sensitive prevention and intervention programs focusing on distorted attention processes.

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