Journal of Affective Disorders xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research paper

Are individuals diagnosed with social anxiety disorder successful in regulating their emotions? A mixed-method investigation using self-report, subjective, and event-related potentials measures

Yogev Kivity*, Jonathan D. Huppert

Department of Psychology, The Hebrew University of Jerusalem, Mount Scopus , Jerusalem 91905, Israel

ARTICLE INFO

Keywords:
Social anxiety
Emotion regulation
Cognitive reappraisal
Expressive suppression
Event related potentials

ABSTRACT

Background: Models of social anxiety emphasize the role of emotion dysregulation, but the nature of these impairments needs clarification.

Methods: We utilized a mixed-method approach to examine impairments in cognitive reappraisal and expressive suppression in social anxiety disorder. Forty nine treatment-seeking individuals diagnosed with social anxiety disorder and 35 healthy controls completed self-reports and a lab-based task of suppression and reappraisal. Unpleasantness ratings and event-related potentials (ERPs) were collected while participants regulated their emotions in response to shame-arousing pictures. ERP analyses focused on the late positive potential, a measure of increased attention to emotional stimuli that is reduced during emotion regulation.

Results: Participants with social anxiety reported less frequent and effective use of reappraisal and more frequent and effective use of suppression than controls. Counter to most models and our hypotheses, participants with social anxiety were *more* successful than controls in lab-based reappraisal as measured by unpleasantness ratings, but no differences emerged for ERPs. No differences were found in measures of lab-based suppression.

Limitations: Use of standardized, and not participant-generated, materials in the lab-based task of emotion regulation may limit the generalizability of the findings.

Conclusions: Subjective appraisals of self-efficacy and frequency suggest strong impairments in emotion-regulation in social anxiety that are not revealed in the laboratory. Models and treatment protocols should specify the exact nature of emotion dyregulation in social anxiety, highlighting difficulties in implementation of potentially intact emotion regulation abilities.

1. Introduction

Recent models of pathological anxiety, and specifically social anxiety disorder (SAD), have increasingly focused on emotion dysregulation as a core maintenance factor in anxiety disorders (e.g. Hofmann et al., 2012). Two emotion regulation strategies that may be of particular relevance for SAD are cognitive reappraisal, or reinterpreting emotional stimuli in less threatening ways, and expressive suppression, or inhibiting one's expression of emotions (Gross, 2015). For example, in Heimberg's updated model (Morrison and Heimberg, 2013), emotion dysregulation in SAD includes behavioral attempts to avoid feeling anxious (such as avoidance or escape from stressful situations) and expressive suppression due to believing that expression of emotions will lead to rejection or excessive focus on oneself. In the model, individuals with SAD are assumed to be less effective in cognitive reappraisal, and acquiring reappraisal skills is assumed to be one path that will likely lead to symptom reduction. Social anxiety is assumed to be characterized by exaggerated probability and cost of social rejection as well as negatively biased interpretations of social information. Therefore, reappraisal of such scenarios may be effective in reducing these biases as well as reducing anxiety. Thus, overreliance on suppression and ineffective use of reappraisal are theorized to be maintenance mechanisms in SAD.

In interviews and self-reports, individuals with SAD report difficulties regulating their emotions compared to those with low levels of social anxiety (e.g., Gaebler et al., 2014; Kivity and Huppert, 2016, 2018; Hayes-Skelton and Graham, 2013; Werner et al., 2011), including less frequent and effective use of putative adaptive strategies such as reappraisal and more frequent but less effective use of putative maladaptive strategies such as suppression. Similarly, daily diary studies show that individuals with SAD tend to over-rely on suppression (e.g., Farmer and Kashdan, 2012; Kivity and Huppert, 2016), and also believe

* Corresponding author.
E-mail address: yogev.kivity@mail.huji.ac.il (Y. Kivity).

https://doi.org/10.1016/j.jad.2018.02.029
Received 15 November 2017; Received in revised form 4 January 2018; Accepted 16 February 2018

they are less successful in reappraisal, despite using it at similar rates as controls (Kivity and Huppert, 2016).

Despite the relatively consistent picture of impaired emotion regulation in individuals with SAD when examining self-report measures and interviews, findings regarding impairments in lab-based reappraisal tasks have been less supportive. Most studies failed to find impairments in reappraisal on subjective ratings, neural and physiological outcomes (e.g., Beltzer et al., 2014; Gaebler et al., 2014; Kivity and Huppert, 2018; Yuan et al., 2014; but see Goldin et al., 2009 for significant effects on neural, but not subjective measures, and Ziv et al., 2013 for a significant finding in 1 out of 3 tasks). Thus, impairments in emotion regulation in social anxiety are suggested via self-report and daily diary measures, but less so via lab-based measures.

These findings may suggest that individuals with SAD have difficulty implementing their reappraisal abilities in daily life. They may also over-report their deficits or have inaccurate appraisals of their abilities. Given the small samples and large variability in lab-based designs, more studies are needed to arrive at conclusions from the current literature. Another limitation in the current literature is that few studies have included both lab-based and self-report measures (Gaebler et al., 2014; Goldin et al., 2009). In addition, we are not aware of any studies assessing lab-based expressive suppression in social anxiety despite its important role in models of SAD.

Use of more objective measures of emotional responding such as event related potentials (ERPs) may be instrumental in better understanding the discrepancy between self-report and lab-based measures of emotion regulation. ERPs have been successfully used to measure lab-based emotion regulation in studies of normal populations, and have highly accurate temporal resolution (Proudfit et al., 2013). Studies have mostly focused on the late positive potential (LPP), a positive component of the ERP with an onset around 250 ms after stimulus presentation and a posterior midline scalp distribution (Proudfit et al., 2013). The LPP arguably reflects sustained attention to visual stimuli and elaborative engagement with the stimuli in order to regulate the emotion it provokes (Proudfit et al., 2013). The LPP is sensitive to the emotional intensity of stimuli, and to emotion regulation instructions, with higher amplitudes for highly arousing stimuli that are reduced following instructions to regulate (Proudfit et al., 2013). The LPP shows less habituation over repeated exposure to emotional stimuli compared with other psychophysiological measures of emotion (Proudfit et al., 2013), which allows for repetition of stimuli and interpretation of changes in ERPs to the same stimuli as due to a product of regulation. Thus, ERPs are highly suitable for shedding light on the discrepancy between lab-based and self-report findings by providing a more objective measure of success in emotion regulation.

Thus, the current study examined emotion regulation among individuals with SAD and healthy controls (HC) using self-report, subjective and ERP measures. Given that fear of rejection and experience of shame are core characteristics of social anxiety disorder (Moscovitch, 2009), we focused on reappraisal and suppression of shame-arousing/social rejection stimuli. We specifically focused on reappraisal and suppression because of the major role these strategies are given in emotion dysregulation of anxiety and social anxiety (Hofmann et al., 2012; Morrison and Heimberg, 2013). We proposed that emotion regulation should be impaired among participants with SAD, as revealed by self-report, subjective and ERP measures (LPP). We hypothesized that participants with SAD would report using reappraisal less frequently and effectively and report using suppression more frequently but less effectively than HCs. We also hypothesized that participants with SAD would show smaller reappraisal- and suppression-related reductions in emotional reactivity during regulation of shame-arousing pictures, as measured by subjective ratings of valence and ERP measures. On an exploratory basis, we also examined whether impairments in emotion regulation in SAD might be explained by levels of depression.

Across groups, we expected reappraisal, but not suppression, to be effective in emotion regulation across subjective and ERP measures, but that there would be higher reactivity compared with the view-neutral condition.

2. Method

2.1. Participants

The current investigation was a cross-sectional experimental psychopathology study that examined participants with social anxiety disorder (compared to HCs) prior to their participation in a randomized controlled trial of cognitive-behavioral therapy (CBT) vs. Attention Bias Modification for SAD (See Huppert et al., 2018 for full details). Recruited participants were 50 treatment seeking SAD patients, unmedicated or on stable dose, who met DSM-IV-TR (American Psychiatric Association, 2000) criteria for primary generalized SAD with a higher than 50 score on the Liebowitz Social Anxiety Scale (LSAS; see below) and 40 HCs with no history of psychiatric disorders who had similar distribution of sex, age and education and a lower than 30 score on the LSAS. Exclusion criteria for patients included any history of psychosis, current diagnosis of bipolar disorder, severe suicidality, and active substance abuse or dependence and invalid performance on a cognitive reaction time measure (not reported here). One patient was excluded from analyses for not completing the baseline assessment due to a technical error and 5 HCs were excluded for not maintaining continued low social anxiety scores between screening and participation. The final sample consisted of 49 SAD patients (22 females, Mean age: 28.29) and 35 HCs (15 females, Mean age: 28.49). Demographic and clinical characteristic of the sample are shown in Table 1. The groups did not differ on demographic variables (all $ps > .05$). Many participants with SAD reported having been in psychotherapy in the past (53%), and fewer patients reported past use of medications (16%).

Table 1
Descriptive statistics and group differences of demographic variables.

	HC ($n = 35$)	SAD ($n = 49$)	HC vs. SAD
Age	28.49 (6.28)	28.29 (7.12)	$t_{(82)} = .13, p = .89$
Female	22 (45%)	15 (43%)	$\chi^2_{(1)} = .35, p = .85$
Family Status			$\chi^2_{(3)} = 4.17, p = .24$
Single	16 (46%)	30 (61%)	
In a relationship	6 (17%)	5 (10%)	
Married	13 (37%)	12 (24%)	
Divorced	0 (0%)	2 (4%)	
Education			$\chi^2_{(3)} = 4.11, p = .25$
High School or less	10 (29%)	10 (20%)	
Post-High School (non-academic)	3 (9%)	10 (20%)	
Academic (undergraduate)	13 (37%)	22 (45%)	
Academic (graduate)	9 (26%)	7 (14%)	
Socioeconomic status			$\chi^2_{(2)} = .78, p = .68$
Below average	28 (80%)	39 (80%)	
Average	2 (6%)	5 (10%)	
Above average	5 (14%)	5 (10%)	
Comorbidity			
Depression		14 (29%)	
Anxiety		6 (12%)	
Other		2 (4%)	
Number of comorbid disorders			
1		15 (31%)	
> 1		7 (14%)	
On medication		4 (8%)	

Notes. HC = Healthy controls; SAD = Individuals with social anxiety disorder.
* significant at the $p < .05$ level; ** significant at the $p < .01$ level.