Abstract

Background: Social Anxiety Disorder (SAD) is characterized by fear and avoidance in social situations where one is exposed to scrutiny by others. It is possible that automatic thoughts either cause the disorder or maintain it, and thus their examination is warranted.

Method: 30 SAD subjects diagnosed with the Mini-International Neuropsychiatric Interview (MINI) and 30 healthy controls were administered the Liebowitz Social Anxiety Scale (LSAS), the Automatic Thoughts Questionnaires (ATQ—Negative and ATQ—Positive), the Sheehan Disability Scale (SDS) and the Beck Depression Inventory (BDI). It was hypothesized that the SAD subjects would display more depression and disability, more negative automatic thoughts and fewer positive automatic thoughts than the healthy controls, and that the automatic thoughts will predict the severity of SAD.

Results: SAD patients had higher scores of depression and disability, higher scores on the ATQ—Negative questionnaire and lower scores on the ATQ—Positive questionnaire. The scores of the LSAS subscales were predicted by the scores of the ATQ—Positive and the BDI questionnaires.

Limitations: Moderate sample size and limits of the questionnaires used in the study.

Conclusions: Automatic thoughts may be an important area of research with larger samples. Further studies should be carried out in order to examine if strengthening positive thinking and ablation of negative thinking can reduce SAD symptoms during cognitive behavioral treatment.

Introduction

Social Anxiety Disorder (SAD) is a common condition characterized by fear and avoidance of situations where scrutiny by other people is possible and might lead to social embarrassment (1-3). The condition causes disability and is accompanied frequently by comorbid mental disorders, such as depression and substance abuse (1). It is possible that cognitive factors might play a part in the etiology or maintenance of the disorder. SAD subjects display thoughts and beliefs that are dysfunctional and cause anxiety and avoidance. The socially anxious person experiences the environment as threatening and dangerous (4-7). SAD persons claim to see the point of view of the other person and to believe that others' gazes indicate criticism and rejection. Their mental image is usually negative; they believe that they are failing and that the results of their behavior will be disastrous. These thoughts strengthen their negative feelings, creating a vicious circle.

On another vein, socially anxious persons lack the positive bias (healthy protective optimism) of non-anxious persons. There is an association between SAD and low positive affect. Also, socially anxious individuals more easily forget socially positive words than do non-anxious individuals (8). Moreover, there is evidence of a diminished attentional allocation for socially positive information in SAD (9). Furthermore, the SAD subject tends to discount positive social information and fails to accept others' positive reactions at face value (10).

Numerous studies evaluated the pathological cognitions characteristic of individuals with SAD (11-14). Turner and associates (11) discussed the importance of building a tool to assess pathological cognitions in SAD and constructed the Social Thoughts and Beliefs Scale (STABS), which showed good psychometric abilities. Boden et al.
(12) examined maladaptive beliefs of 47 individuals with SAD receiving CBT. They reported that these beliefs were associated with social anxiety at baseline and at treatment completion, were reduced and accounted for reductions in social anxiety after CBT. Koerner et al. (13) assessed beliefs of SAD patients following CBT in 77 adults with SAD and used the STABS. A positive change in the belief that others are more socially competent emerged as a significant unique predictor of social anxiety symptoms at post-treatment. Calvete, Orue and Hankin (14) evaluated 1,052 adolescents with measures of early maladaptive schemas, socially anxious automatic thoughts and social anxiety symptoms. The subjects were a non-clinical group of students with a mean age of 13.4 years. The study’s findings were consistent with hierarchical cognitive models of social anxiety given that deeper schemas predict more surface-level thoughts; however these more surface-level thoughts also contributed to perpetuating schemas. Thus, a bidirectional longitudinal relationship among schemas and automatic thoughts was found.

Maladaptive cognitions in SAD subjects may exist at various levels: negative automatic thoughts, maladaptive thinking patterns (cognitive distortions), core beliefs and schemas. Beliefs are central to one’s identity, are negatively biased, inaccurate and rigid (12), whereas automatic thoughts are less stable and on the surface (15). Automatic thoughts represent “what just ran through [the] mind” and can be defined as spontaneous, evaluative cognitions about oneself, the future and the world (see 15). While the identification of negative automatic thoughts is rather easy, the scrutiny of core beliefs and schemas is more complex and therefore more difficult to examine. Nevertheless, as will be later described, in comparison to the above-mentioned studies in SAD patients on core beliefs and schemas, much less has been written on the role of positive and negative automatic thoughts in SAD.

We believe that identifying automatic thoughts is important (15), as they might provide a first step in the elucidation of maladaptive cognitions in SAD. The better understanding of automatic thoughts in SAD patients may lead patients and clinicians to the identification of thinking distortions and also core beliefs.

In this study, we aimed to evaluate the bias in cognition in SAD subjects, as regards negative and positive automatic thoughts. Negative automatic thoughts in SAD have received little attention. Positive automatic thoughts are a new area of research in psychology (“positive psychology”) and have not been the main focus of research, either in depression or in SAD. In depression, several studies have shown that the score of the ATQ (16), and not an anxiety tool (the Beck Anxiety Inventory), predicted the BDI score (17). This study supported the cognitive content specificity theory, which suggests that particular cognitive content can be automatically activated and associated with specific psychological disorders (18). In another study on 200 community children and 160 adolescents with anxiety, depression or conduct disorder, automatic thoughts about loss or failure were the best predictor of anxiety (19).

Despite their centrality, very few studies examined automatic thoughts in SAD subjects. Stopa and Clark (20) outlined six different categories of automatic thoughts that were self-reported by a small sample of 12 individuals with SAD. They used a thought checklist generated by the researchers and a “think aloud” activity, and measured the frequency of thoughts, as well as belief ratings for each of the thoughts. The thoughts were categorized as (1) self-evaluative thoughts, (2) thoughts about the evaluation of others, (3) evaluative thoughts about the other person with whom they are interacting, (4) thoughts about coping strategies and behavioral plans, (5) thoughts of avoidance, and (6) any other thoughts that were not categorized. SAD participants had more negative self-evaluative thoughts than anxious or non-patient controls. Stopa and Clark (20) suggested that persons with SAD might react to social situations by running through a routine of negative thoughts without attending to the actual circumstances. In another study, Hope et al. (21) analyzed the semantic content of automatic thoughts reported in group cognitive behavior therapy (CBT) for 55 SAD subjects and found that the most common thoughts were related to poor social performance, negative labels by others, and anticipation of negative outcomes in feared situations.

In another study, Mortberg et al. (22) examined self-focused attention and negative automatic thoughts in 29 patients with SAD receiving individual cognitive therapy. They used the 22-item Social Cognitions Questionnaire (23) for the examination of negative automatic thoughts. Both self-focused attention and negative social phobia-related automatic thoughts changed in line with the overall outcome and were significantly reduced over the course of the treatment (22). The alteration from self-focused to externally focused attention mediated improvements in social anxiety one week later, whereas the change in frequency of, or belief in, negative automatic thoughts did not predict social anxiety one week later.

This study will focus on the role of automatic thoughts in SAD patients, and evaluate their cognitive bias toward more negative and less positive automatic thoughts. This
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is contrary to other studies that assessed both thoughts and beliefs (11-13). To the best of our knowledge, no studies have administered the ATQ in SAD subjects. A number of measures of automatic thoughts have been developed (24), but the most widely used is the Automatic Thought Questionnaire (ATQ) by Hollon and Kendall (16). Based on its good psychometric qualities, the ATQ might identify subjects with elevated anxiety (24) and be related to other measures of anxiety and depression, in ways which may increase our understanding of the role of automatic thoughts in SAD subjects.

STUDY QUESTIONS AND HYPOTHESES:
1. Do SAD subjects display more negative automatic thoughts and fewer positive automatic thoughts, as well as more social fear, social avoidance, disability, and depression, as compared to healthy controls? Based on the possible role of negative automatic thoughts in SAD patients (20) and the prevalence of depression and disability among SAD patients (1), we hypothesized they do.
2. Can the level of automatic self-reported negative and positive thoughts (i.e., scores on the ATQ-Negative and ATQ-Positive) predict the severity of reported fear and avoidance on the LSAS? In line with previous studies regarding the association between negative automatic thoughts and SAD (20-22), we hypothesized that the ATQ-Negative score will be positively correlated with fear and avoidance, and predict higher fear and higher avoidance in SAD individuals. In accordance with previous studies regarding the relationship between low positive affect, low recall of socially positive words, diminished attentional allocation for socially positive information, and a tendency among SAD subjects to discount positive social information and not to accept others’ positive reactions at face value (8-10), we hypothesized that the ATQ-Positive score will be negatively correlated with fear and avoidance and predict lower fear and avoidance among SAD.

MATERIALS AND METHODS
PARTICIPANTS
The sample included 60 participants, 20 males and 40 females, average age 38.10 ± 13.57 years, range: 19 to 72 years. The SAD participants were recruited consecutively during their first visit at a community mental health clinic and were all treatment seekers. Screening interviews were carried out by the first author. Out of 35 participants who agreed to be interviewed, 30 were selected. The remaining five subjects had difficulty in Hebrew, the language in which the therapy was conducted.

Thirty healthy controls were recruited from the technical and administrative staff of our institution (a large mental health hospital). These subjects had no psychiatric diagnosis and were not in treatment. Inclusion criteria were: MINI-diagnosed social anxiety disorder (25), no current alcohol or drug abuse, no health conditions characterized by body disfigurement or stuttering and Parkinson’s disease, and no active psychiatric disorder (e.g., schizophrenia, major depressive disorder, OCD, etc.). Exclusion criteria included severe cognitive impairment and psychotic symptoms secondary to acute intoxication or withdrawal from alcohol or other substances. The patient sample had in the past, but not during the time of the study, various conditions such as major depression (16%), bipolar disorder (3%), specific phobia (10%) and obsessive compulsive disorder (3%).

Axis II diagnoses were not examined in this study. Seven participants in the social anxiety group took psychotropic medications (1 venlafaxine, 1 paroxetine, 2 sertraline, 1 citalopram, 1 escitalopram and 1 calmanervin). There were no significant differences in the distribution of age, education, gender, income level, family status, country of origin, and number of children between the groups (p>0.05).

MEASURES
Automatic Thoughts Questionnaire–Negative (ATQ-N).
The ATQ-N (16) consists of 30 items which measure the frequency with which an individual experiences negative automatic thoughts over a 1-week period. It includes items such as “I’m not OK,” “No one understands me.” Respondents are required to rate their answers on a 5-point scale, ranging from 1 (not at all) to 5 (all the time). This scale has been reported to have excellent reliability (split-half and coefficient alpha were 0.97 and 0.96, respectively) (16) and was found to correlate significantly with other related measures. The Hebrew version of the questionnaire is reported to have reasonable internal consistency of α=0.80 (26). This inventory was included in order to measure differences in the extent of automatic negative thoughts between SAD and healthy controls. In the current study, it demonstrated a very high alpha reliability coefficient of 0.98.

Automatic Thoughts Questionnaire–Positive (ATQ-P).
The ATQ-P (27) was developed to measure the frequency of positive self thoughts over a 1-week period. It consists of 30 items on a 5-point scale, ranging from 1 (not at all) to 5 (all the time). It includes items such as “I will
succeed,” “It is fun to be with me.” Its internal reliability is very high (coefficient alphas reported as high as .95, (see 28)), and demonstrates adequate convergent and discriminate validity (29). The Hebrew version of the questionnaire is reported having reasonable internal consistency of α=0.78 (26). This inventory was included in order to measure differences in the extent of automatic positive thoughts between SAD and healthy controls. In the current study, it demonstrated a very high alpha reliability coefficient of 0.98.

The Beck Depression Inventory (BDI): This scale was developed by Beck et al. (30) in 1961 to measure depression, and is still in clinical and experimental use (31). Due to the comorbidity of depression among SAD patients (1), this inventory was included in order to measure differences in the extent of depressive symptoms between SAD and healthy controls as well as the association between the BDI score and the scores of the Liebowitz Social Anxiety Scale (32). The questionnaire includes 21 items referring to emotional, cognitive, behavioral, and physical aspects of symptoms and attitudes consistent with depression. Answers are scored on a scale ranging from 0 = nonexistent to 3 = very serious. The Hebrew version of the questionnaire is reported to have reasonable internal consistency of α=0.76 (31). In the current study it demonstrated a high alpha reliability coefficient of 0.91.

Liebowitz Social Anxiety Scale (LSAS) (32): It includes two subscales which measure social fear and social avoidance. The scale consists of 24 items that refer to performances in social settings (e.g. “participating in a small group”) and to social interactions (e.g. “going to a party”). Respondents are asked to rate both their level of anxiety when they experience the situation (0=“none” to 3=“severe”) and the frequency of their avoidance of the situation (0=“never” to 3=“usually [67-100%]”). The LSAS is used for screening LSAD in research settings. It has very good internal consistency (Chronbach’s α ranging from 0.81 to 0.92), and good convergent validity (33). It was translated to Hebrew and demonstrated strong test-retest reliability, internal consistency, and discriminant validity (34). Participants with mild SAD score 30-40, whereas those with moderate to severe SAD score 50-80. In the current study, the average scores for participants diagnosed by the psychiatrists as suffering from SAD were mild (33.60±12.39 for social fear and 30.19±12.46 for social avoidance), and differed significantly for social fear (t(58)=10.32, p < 0.001), and for social avoidance (t(58)=7.63, p < 0.001) from the average scores of the healthy controls (6.83±6.59 for social fear and 7.13±9.17 for social avoidance). In the present study, the alpha reliability coefficients were very high (0.95 for both social fear and social avoidance).

Sheehan Disability Scale (SDS) (35). This scale measures functional deficiencies in three inter-related life domains (work or school, social life and family life), and is widely used by researchers and clinicians. The respondent is asked to rate on a 10-point visual analog scale, the extent to which his or her social and leisure activities are impaired by his or her symptoms. The three items are summed into one score, ranging from 0 (unimpaired) to 30 (highly impaired). The scale demonstrated reasonable sensitivity (83%) and specificity (69%). In the current study, it demonstrated a very high alpha reliability coefficient of 0.93.

Background data. Age, gender, years of education, country of birth, family status, income level, medical conditions and medications, number of children and number of friends (the last two were regarded as measures that may reflect interpersonal functioning).

PROCEDURE
The study was approved by the Institutional Review Board. The questionnaires were administered individually in the clinic by the first author as a part of the intake procedure. The participants were asked to participate and if they agreed, they signed informed consent forms and were provided with the research instrument and filled out the questionnaire in the presence of the first author. Completed questionnaires were then placed together with other completed questionnaires in order to ensure anonymity.

DATA ANALYSIS
To examine hypothesis 1, the SAD group and the healthy control group were compared by series of Univariate Analyses of Variance (ANOVA) in which gender also served as an independent variable, and the following variables as dependent variables: the BDI score, the ATQ-N and ATQ-P score, the social fear and social avoidance scores, and the various disability measures (SDS scales and number of children and friends). In order to examine hypothesis 2, Pearson correlations were computed between the ATQ-N and ATQ-P score and the social fear and social avoidance scores. Two separate stepwise regression analyses were conducted to examine the relative contribution of a set of predictor (independent) variables to the variance of the social anxiety subscales’ scores. Participants’ sociodemographic variables (gender, age and number of friends), medical background (chronic disease), automatic thoughts
(the ATQ-N and the ATQ-P scores), and BDI score served as predictors in these analyses. The LSAS scores (fear and avoidance) were the predictive (dependent) variables in the analyses.

RESULTS

Hypothesis 1: SAD subjects will display more depression, more negative and less positive automatic thoughts, and more social fear, social avoidance and disability.

As demonstrated in Table 1, the ANOVAS revealed main effects for group so that in comparison to the healthy control group, the social anxiety group reported significantly more depression, more negative automatic thoughts, less positive automatic thoughts, and more social fear and social avoidance (p< 0.001).

Univariate Analyses of Variance (ANOVAS) conducted on the SDS score, and on two measures of interpersonal functioning (number of friends and children) by group (SAD/controls) and by gender, revealed as expected a main effect of group for the SDS score, a main effect for the number of friends, but not for the number of children. Therefore, hypothesis 1 was mostly confirmed. No main effects and no interaction effect of group gender were found regarding the ATQ measures. No main effects of group gender were found on the SDS score and number of friends (p> 0.05). No interaction effects of group gender were found on the SDS score and number of friends (p> 0.05).

Hypothesis 2: The ATQ-N will be positively correlated with fear and avoidance, and also predict higher fear and higher avoidance among SAD individuals, whereas the ATQ-P will be negatively correlated with fear and avoidance and also predict lower fear and avoidance among SAD individuals.

As demonstrated in Table 2, the ATQ-N score was positively correlated with the BDI and LSAS fear and avoidance scores, whereas the ATQ-P was negatively correlated with these three scores. Two separates stepwise regression analyses were conducted to examine the second hypothesis.

Table 3 summarizes the results of the two regression analyses and shows a pattern where the ATQ-P score and

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**Table 1.** ANOVAs results regarding the various dependent measures by groups

<table>
<thead>
<tr>
<th>Scores</th>
<th>Group</th>
<th>M</th>
<th>SD</th>
<th>F</th>
<th>P</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATQ-N</td>
<td>Social Anxiety</td>
<td>74.70</td>
<td>25.72</td>
<td>27.86</td>
<td>0.001</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>Healthy Controls</td>
<td>44.13</td>
<td>16.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATQ-P</td>
<td>Social Anxiety</td>
<td>83.30</td>
<td>21.10</td>
<td>42.96</td>
<td>0.001</td>
<td>0.43</td>
</tr>
<tr>
<td></td>
<td>Healthy Controls</td>
<td>118.20</td>
<td>22.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BDI</td>
<td>Social Anxiety</td>
<td>11.08</td>
<td>9.86</td>
<td>17.98</td>
<td>0.001</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>Healthy Controls</td>
<td>2.41</td>
<td>3.36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSAS Fear</td>
<td>Social Anxiety</td>
<td>34.00</td>
<td>12.39</td>
<td>95.53</td>
<td>0.001</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td>Healthy Controls</td>
<td>8.20</td>
<td>6.59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSAS Avoidance</td>
<td>Social Anxiety</td>
<td>29.90</td>
<td>12.46</td>
<td>53.38</td>
<td>0.001</td>
<td>0.49</td>
</tr>
<tr>
<td></td>
<td>Healthy Controls</td>
<td>8.33</td>
<td>9.17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDS</td>
<td>Social Anxiety</td>
<td>14.47</td>
<td>6.02</td>
<td>125.65</td>
<td>0.001</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>Healthy Controls</td>
<td>0.83</td>
<td>1.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Friends</td>
<td>Social Anxiety</td>
<td>3.07</td>
<td>2.83</td>
<td>23.73</td>
<td>0.001</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>Healthy Controls</td>
<td>9.14</td>
<td>6.70</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2.** Correlations' matrix of the ATQ-N, ATQ-P, and the LSAS subscales in the study groups

<table>
<thead>
<tr>
<th></th>
<th>ATQ-N</th>
<th>ATQ-P</th>
<th>LSAS Fear</th>
<th>LSAS Avoidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATQ-N</td>
<td>1</td>
<td>-0.786</td>
<td>0.457</td>
<td>0.429</td>
</tr>
<tr>
<td>ATQ-P</td>
<td>-0.786</td>
<td>1</td>
<td>-0.485</td>
<td>-0.444</td>
</tr>
<tr>
<td>LSAS Fear</td>
<td>0.457</td>
<td>-0.485</td>
<td>1</td>
<td>0.925</td>
</tr>
<tr>
<td>LSAS Avoidance</td>
<td>0.429</td>
<td>-0.444</td>
<td>0.925</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table 3.** The relative contribution of depression and positive automatic thoughts to social fear and avoidance using stepwise regression analysis

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE</th>
<th>b</th>
<th>t</th>
<th>p</th>
<th>R²</th>
</tr>
</thead>
</table>
| Significant predictors for the fear score of social anxiety
| ATQ-P score | -0.28| 0.06  | -0.47| 4.79  | 0.001 |
| BDI score | 0.78 | 0.18  | 0.43 | 4.32  | 0.001 |
| Significant predictors for the avoidance score of social anxiety
| BDI score | 1.25 | 0.16  | 0.72 | 7.75  | 0.001 |
| ATQ-P score | 0.23 | 0.06  | 0.40 | 4.08  | 0.001 |
the BDI score contributed significantly to the explained variance of the two LSAS subscales. The ATQ-P score contributed more to the social fear score than the BDI, whereas the BDI contributed more to the social avoidance score than the ATQ-P. The ATQ-P score and the BDI score explained 62% of the variance of social fear (F(2,55)=47.43, p<0.001). The ATQ-P accounted for 50% of the variance (p<0.001), and BDI score added 12% (p<0.001). The remaining predictors (including the ATQ-N) did not reach significance. The BDI score and the ATQ-P score explained 61% of the variance of social avoidance (F(2,56)=46.61, p<0.001). The BDI score accounted for 50% (p<.001), and the ATQ-P score added 11% (p<0.001). The remaining predictors (including the ATQ-N) did not reach significance. The β coefficients for ATQ-P scores in the regression analyses were negative indicating that the more frequent the positive automatic thoughts, the lower the extent of social fear and avoidance. The β coefficients for the BDI were positive, indicating that the higher the depression score, the higher the extent of social fear and avoidance. Therefore, hypothesis 2 was partially confirmed, mostly for the ATQ-P.

**DISCUSSION**

In line with hypothesis 1, the SAD group displayed more depression, more negative and less positive automatic thoughts, more social fear and social avoidance and disability as compared to healthy controls. These findings on the clinical and social consequences of SAD are in accordance with the results of other studies on SAD (1, 36). In accordance with hypothesis 2, the negative ATQ score was positively correlated with the LSAS scores and the positive ATQ score was negatively correlated with the LSAS scores. However, in partial accordance with hypothesis 2, only the positive ATQ score predicted lower fear and avoidance among SAD individuals. Moreover, the ATQ-P score contributed more to the prediction of social fear than the BDI score, whereas the BDI score contributed more to the prediction of the social avoidance score than the ATQ-P score. Our findings on the clinical and social consequences of being afflicted with SAD are in accordance with other studies on SAD (1, 36). In addition, most of our findings on the automatic thoughts are in accordance with the theoretical framework proposed for SAD (16).

As a significant portion of SAD patients do not respond to pharmacotherapy (1), we need to know more about developmental and maintaining factors of SAD, and also on effective components of treatment. One factor which is presumed to play a critical part in the onset and maintenance of SAD is cognition. Anxious cognition could be measured by automatic thoughts evaluation, although the literature is limited in this area. Our findings regarding the higher score of negative automatic thoughts in the SAD group as compared with the healthy control group are in accordance with the abovementioned cognitive theoretical framework proposed for SAD (21) and support the literature which is scant in this area. Muris et al. (37) studied the efficacy of CBT in anxious children (n=45; 22 with severe SAD, 18 with separation anxiety disorder and 27 with generalized anxiety disorder). The authors reported a decrease of the score on Children's Automatic Thoughts Scale (CATS), which measures negative automatic thoughts. They found that a reduction of anxiety disorders symptoms was significantly associated with a decrease in negative automatic thoughts and that the children felt more capable of controlling their anxiety. The researchers concluded that a reduction of anxiety symptoms after a CBT intervention in these young patients may be mediated by a lessening of negative automatic thoughts. Foa and colleagues (38) compared 15 patients in their thirties, who suffered from generalized SAD and 15 non-anxious controls over a 14 weeks period. At pre-treatment, the SAD subjects had higher scores on negative cognitions. The group of patients received CBT with combined exposure, cognitive restructuring and social skills training. The intensiveness of negative cognitions associated with social contexts and non-social contexts for the two groups was assessed prior to treatment and following treatment. Again, the researchers found that the reduction in the extent of negative cognitions associated with social contexts and non-social contexts (i.e., cost estimates for social events) mediated improvement in SAD in this case of adult patients. These two studies are in line with our finding regarding the higher score of negative automatic thoughts among the SAD group, but contradict our lack of findings regarding the predictive value of negative cognitions for the intensity of SAD. Moreover, the prediction of the LSAS scores by positive automatic thoughts and not by negative automatic thoughts is intriguing and might suggest that the “positive” bias in our subjects was greater than the negative one, and this should be reexamined in future studies, on a larger sample of SAD patients.

While our study shows differences between the study groups on positive and negative automatic thoughts, there are several models that assess this theoretical issue. Ryff’s cognitive model of psychological well-being puts an emphasis on counting negative thoughts and increas-
ing positive ones (39). This form of therapy, described as Well-being therapy, is structured, directive, and based on an educational approach (40). It emphasizes the development of a capacity to sustain attention to aspects of daily experience or emotions that are positive and pleasurable. Well-being therapy was successfully implemented in patients who suffer from generalized anxiety disorder (41) or from depression (42). In this form of therapy, the therapist reinforces and encourages pleasurable activities for a certain time each day, and counters the tendency of patients to focus exclusively on circumstances associated with lower levels of hedonia. In line with our findings regarding the relationship between automatic negative and positive thoughts and the severity of SAD, such interventions which are directed to decrease negative thoughts and increase positive ones, may be also beneficial for patients with SAD. Well-being therapy has been validated in a number of randomized controlled trials (43). Flourishing and resilience can be promoted by specific interventions leading to a positive evaluation of one’s self, a sense of continued growth and development, the belief that life is meaningful, the possession of quality relations with others, the capacity to manage effectively one’s life, and a sense of self-determination and autonomy.

Additional perspectives in the area include the States- of-Mind (SOM) model (44), which maintains that the balance of positive and negative thoughts is essential for psychological well-being. A ratio of 0.62 between positive and negative thoughts is considered optimal or healthy. A ratio less than 0.31 is related to depression or anxiety. A final additional model is the “power of non-negative thinking” that states that anxious children may benefit more from a reduction of negative thoughts than from an increase in positive thoughts (45).

It is also worth mentioning that the ATQ-P score had a more dominant role than the BDI score in the prediction of social fear, whereas the BDI score explained the variance of the social avoidance score more than the ATQ-P score. Is fear derived by lack of positive self-statements and avoidance constitutes rather a depressive derivate? We speculate that the absence of positive thinking might create fear, but it is mainly the depressive counterpart that predicts avoidance (low initiative and drive, or even learned helplessness) (46). The latter link is supported by the results of a recent study which demonstrated that the depression score was a predictor of the LSAS avoidance subscale score (47).

Our study has not shown differences across gender, which is not in line with the findings of Xu and associates (48), who reported that women with lifetime SAD had more lifetime social fears and internalizing disorders and were more likely to have received pharmacological treatment for SAD. This lack of gender differences may be due to the small sample size.

Our study has several limitations. The moderate number of patients included in the study is a limitation, although we nevertheless found significant differences between the study groups. Second, we tried to ensure that the controls were healthy; however it is unclear whether they are representative of the general population. Third, the ATQ-N measures general (negative) affect and not anxiety and/or depression separately, so it is difficult to examine content specificity. The items of the ATQ-P and the ATQ-N do not refer specifically to social contexts, which according to Foa et al. (38) and Hope et al. (21) pose a different kind of threat on the individual than in other anxiety disorders (poor social performance, negative labels by others, and the anticipation of negative outcomes in feared situations). It is improbable the ATQ will differentiate between patients with various anxiety disorders, whereas the STABS did show this ability (11). The use of the STABS which is more specific to SAD would have been more straightforward, although as explained above, in contrast to the ATQ, the STABS does not differentiate between thoughts and beliefs. A final limitation is that the study’s methodology does not allow us to speak about causality between the various constructs examined in this study. Taking in consideration all the above, the results of our study justify the further elucidation of the role of automatic thoughts in distress and dysfunction in SAD.

In conclusion, further research should examine whether indeed the strengthening of positive thinking and the ablation of negative thinking is crucial in the treatment of SAD. The identification of negative thoughts is the first step in their eradication and elements of positive psychology can assist in adopting a less anxious-prone view of life. Research is warranted on the question of the preferred sequential order of tackling specific automatic thoughts in CBT and whether some automatic thoughts change more in CBT.

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