Resilience against social anxiety
– The role of social networks in social anxiety disorder

Återhämningsförmåga från social ångest
– Betydelsen av sociala nätverk inom social fobi

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Resilience refers to the capacity to quickly return to normal levels of functioning in the face of adversity. This capacity has previously been linked to social support. The purpose of this study was to investigate the role of social networks in the association between resilience and social anxiety in a clinical group with social anxiety disorder (n = 41) and a control group of university students (n = 40). The results showed that controls were significantly more resilient than the clinical group. Controls had significantly larger, more diverse and active social networks than the clinical group. Resilience was negatively associated with social anxiety in both groups. In the clinical group, there was a significant partial mediation effect of resilience on social anxiety through the size of the social network, $a \times b = -0.33$, 95% CI $[-0.718, -0.111]$. Potential clinical applications of these results were discussed.
Abstract

Resilience refers to the capacity to quickly return to normal levels of functioning in the face of adversity. This capacity has previously been linked to social support. The purpose of this study was to investigate the role of social networks in the association between resilience and social anxiety in a clinical group with social anxiety disorder ($n = 41$) and a control group of university students ($n = 40$). The results showed that controls were significantly more resilient than the clinical group. Controls had significantly larger, more diverse and active social networks than the clinical group. Resilience was negatively associated with social anxiety in both groups. In the clinical group, there was a significant partial mediation effect of resilience on social anxiety through the size of the social network, $a \times b = -0.33$, 95% CI $[-0.718, -0.111]$. Potential clinical applications of these results were discussed.
Preface

I would like to express my utmost gratitude to Kristoffer NT Månsson, without whom this thesis would not have been possible. Thank you for sharing data, for methodological guidance, for always being available even at the most peculiar working hours and for all your encouraging words throughout the writing process. I am most grateful. I would also like to thank Hugo Hesser for valuable input prior to the study and additional advice for improvements before publication.
Resilience against social anxiety
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Beyond their individual agency, people are always embedded in social networks. Supportive relationships with others are important resources for a rewarding life, but also important means of overcoming adversity. The more feelings of social isolation, the more vulnerability to negative life events. Those who are socially anxious may therefore be at particular risk of avoidant behavior that makes it difficult to connect with others and impairs the ability to withstand the problems that life brings over time. The establishment of social networks ought to be understood in depth as a means of accumulating resources that buffer against hardships and, in turn, facilitate coping with social anxiety. The purpose of the present study was to investigate the relationship between social networks and the ability to resist social anxiety.

Previous research

Resilience: A protective mechanism

A common argument is that adaptability to adversity varies with regards to what is referred to as resilience. Resilience is generally described as the capacity to quickly return and bounce back to normal levels of functioning in the face of stress (Richardson, 2002; Ryff & Singer, 2003; Wagnild & Young, 1993; Wong, 2011). Specifically, Wagnild and Young (1993) conceptualize resilience as characteristics of equanimity (a balanced view of the course of live events), self-reliance, meaningfulness, existential aloneness (a sense of unique life path) and perseverance. Narrative studies highlight a distinct feature of personal agency among resilient individuals that enhances the capacity to reshape adverse experiences into meaningful sources of learning (Hauser, Golden, & Allen, 2006). Resilience lays a foundation for a clear sense of ability to endure stressful events and makes the person less likely to succumb to modicums of pressure. As a buffer against adversity, resilience has indeed been found to be negatively associated with anxiety and depression (Beutel, Glaesmer, Wiltink, Marian, & Brähler, 2010). Concomitantly, resilience is positively associated with central areas of well-being such as life satisfaction, self-esteem and morale (Wagnild & Young, 1993). Those who are more resilient are therefore more likely to maintain a certain equilibrium of well-being even during adversity. Of course, resilient responses to life events are also largely mediated by other central personality traits, particularly extraversion and neuroticism (Sarubin et al., 2015). Resilience is not necessarily an isolated construct beyond other personality characteristics, although this has been widely debated (e.g., Luthar, Cicchetti, & Becker, 2000; Wagnild, 2003).

However, there is still empirical support for some inherent capacity that appears to distinguish resilient individuals from others. In longitudinal studies of young children with a developmental background in stressful environments, for
example, some were found to be seemingly immune to risk factors due to a shared makeup of gregarious dispositions and an adept ability to draw on multiple sources of social support (Werner & Smith, 1992). Interestingly, Werner and Smith (1992) found that this capacity was predominantly related to social support from at least one caring adult, emphasizing the importance of a vital network of social contacts among resilient individuals.

In the latter sense, resilience is better described as a continuous building process that encompasses accumulation of protective building blocks and resources across the life span that jointly buffer against stressors (Lundman, Strandberg, Eisemann, Gustafson, & Brulin, 2007; Luthar et al., 2000; Masten & Reed, 2002). Multiple studies do support that age moderates the relationship between resilience and mental health, meaning that perceived levels of resilience tend to increase as a function of age (for a meta-analysis, see Hu, Zhang, & Wang, 2015). Contrary to the view of resilience as some inherent personality trait, resilient capacities are largely mediated by environmental factors and embeddedness in social systems (Rutter, 2012; Shaw, McLean, Taylor, Swartout, & Querna, 2016). Resilience does not emerge in a developmental vacuum. Several models divide the construct of resilience into specific domains (see Masten & Reed, 2002; Werner, 1995), implicitly to de-emphasize the fallacious claim that resilience reduces to a single trait. For example, Werner (1995) distinguishes between three domains of protective factors, namely within the individual (even temperament, high intelligence), the family (warm adults, positive role models) and the community (supportive teachers, church activities). Such interactive conceptualizations of resilience are meant to encompass multiple factors beyond just a single resilient predisposition, including personality traits, family environment and other systems of social support (Rutter, 2012). A wide array of protective mechanisms consolidate the building process that constitutes resilience. Again, these interactive conceptualizations suggest a key influence of the social environment on resilience as a developmental process. The social aspects of resilience should thus be investigated further.

Resilience as a social process
Needless to say, human beings are social animals with an intrinsic need of connecting with others. In conceptualizing well-being as a multidimensional construct, social well-being has been proposed as an operationalization of thriving in people’s social life that transcends the mere subjective or psychological dimensions of well-being (Keyes, 1998, 2005). The conventional wisdom is that well-being also has a public domain that has to be taken into account. In this respect, resilience is not just about withstanding adversity in that it also represents a fundamental construct of human flourishing and complete mental health (Fredrickson & Losada, 2005; Keyes, 2005). Among those who fulfilled the criteria of Keyes’ (2005) model of complete mental
health and thus reported high resilience, 79.2% were purportedly able to change bad situations for better and 69.8% felt they were capable of learning from difficult situations. Without the social components, mental health is incomplete. By the same token, the argument is that resilience does not apply universally without effects that are socially influenced (Rutter, 1999, 2012). Insofar as resilience represents a capacity to bounce back to an equilibrium of well-being in the face of adversity, there has to be something there to bounce back to that needs to be contextualized in sociocultural terms (Lopez, Teramotto Pedrotti, & Snyder, 2015). Regardless of the individual capacity to overcome negative events throughout life, it is important to note that resilience develops within a social context. Resilience is not a unidimensional construct that exclusively inoculates people against hardships. Close relationships with affectionate adults in the family, community and school system consistently stand out as the most salient correlates of resilience (for a review, see Luthar et al., 2000). As a result, the role of social support ought to be understood in depth in the study of resilience.

**The role of social networks**

Social support can be defined as a sense of being loved and valued by others within a network of reciprocal commitment and communication (Taylor, 2012a). People who have solid social support experience less stress during challenges and are more likely to exercise adaptive coping strategies (Taylor, 2010). Notwithstanding this general importance of social support, it can certainly be offered in many forms that can be weighted differently. In particular, research has showed that relationships that are maintained on a daily basis (Stetler & Miller, 2008) and provide a close person to confide in (Umberson, 1987) are some of the most beneficial aspects of social support (for a review, see Taylor, 2010). Beyond the importance of single confidants, a diverse social network with people from multiple social domains has alleviating effects on anxiety and depression (Cohen & Wills, 1985). On the one hand, there is a balancing act between the overall size and the density of the social network on the other.

Although the generic significance of social support generalizes across different age groups, the value of different sources of support varies over time. With respect to resilience, parental support remains a key variable in promoting resilience against depression and violence exposure throughout adolescence (Eisman, Stoddard, Heinze, Caldwell, & Zimmerman, 2015). Nevertheless, the family environment is only for starters. The scope of the social network then continues to expand over the course of life. A vital buffer against stress in adulthood is marriage (Ditzen, Hoppmann, & Klumb, 2008), which is also vindicated by findings that marriage is a superior predictor of loneliness than mere companionship (Stack, 1998). Similar demographic differences distinguish the social networks of men and women. Although men tend to have
wider social networks, women are more intimately engaged in their relationships (Belle, 1991). Women are also more likely to cope with stress by actively seeking support than men (Taylor, 2012b). The dynamics of the social network is important to address in the development of resilience as a social building process. A larger network is not necessarily equivalent of a highly intimate network and vice versa. Accordingly, the relationship between resilience and social networks is likely to be more probabilistic and needs to be contextualized according to varying kinds of support and temporal circumstances. Rather than treating social support as a fixed uniform construct, different forms of support and their respective influence should be distinguished akin to separate building blocks of resilience.

Resilience in a clinical context: Social anxiety disorder (SAD)
As a result of the critical relationship between resilience and social networks, those who suffer from social anxiety disorder (SAD) are likely to be in a significant risk group. Scarcity of social support and poor social quality of life are salient sociodemographic features of SAD (Eng, Coles, Heimberg, & Safren, 2005; Furmark et al., 1999). This clinical group has not been addressed in previous research on the social aspects of resilience. Targeting an extensive empirical understanding of the relationship between socially phobic symptoms and resilience is therefore most warranted.

SAD is one of the most common anxiety disorders with an approximate prevalence between 4% and 8%, although estimations of lifetime prevalence range from 7% and 13% (Kessler, 2003). The epidemiology of SAD also indicate a clear overrepresentation of females (Furmark, 2002; Kessler, 2003). What is more, a Swedish epidemiological study found a point prevalence as high as 15.6% (Furmark et al., 1999), emphasizing the scope of the problem that social anxiety constitutes throughout the population. According to the diagnostic criteria of the American Psychiatric Association (2013), SAD is comprised of a persistent fear of acting in ways that will attract criticism or other negative evaluations from others, which makes the person abnormally fearful of humiliation, embarrassment, rejection or causing offence to others. However, it is important to note that social anxiety is not equivalent of being shy (Burstein, Ameli-Grillon, & Merikangas, 2011). Naturally, it is possible to be a moderately shy or reserved person and still be able to interact with others. A person who is at risk of a clinical diagnosis of SAD experiences distress to the extent that it disrupts and impairs normal behavior in school, the workplace or other everyday settings (American Psychiatric Association, 2013). Some people attribute the onset of their social anxiety to repeated experiences of humiliation (McCabe, Antony, Summerfeldt, Liss, & Swinson, 2003). In turn, this fear of humiliation exacerbates the chronicity of the disorder due to a consequential reluctance to seek treatment (Kessler, 2003). Nonetheless, cognitive behavioral therapy (CBT) has indeed showed successful treatment
results (Heimberg, 2002; Månsson et al., 2016). In a recent randomized
controlled trial targeting SAD, only nine weeks of internet-based CBT sufficed
to ameliorate anticipatory speech anxiety and abnormal responsivity to self-
referential criticism, specifically through reduction of overt activity and volume
of gray matter in amygdala (Månsson et al., 2016). It should therefore be
stressed that effective treatments do exist.

Although symptoms of SAD can be ameliorated therapeutically, it is still
important to understand the kinds of social support that might consolidate the
positive post-treatment outcomes. Successful treatment should not just be about
alleviating the symptoms of SAD, it should also facilitate behavior that
promotes future resilience and prevents fallback to maladaptive social behavior
in the long term. In light of the prior associations between social anxiety and
lack of social support (Furmark et al., 1999), it is plausible that these people
might be at risk of isolation. The problem, then, becomes a diminished network
of social support that aggravates loneliness and makes the person increasingly
vulnerable to adversity. This is where the role of resilience supposedly enters
the equation. Adept resilient capacities are likely to be associated with buffering resources of a supportive social network.

**Statement of purpose**
The purpose of the present study was to investigate how social networks relate
to the interplay between resilience and social anxiety in a clinical group of
SAD-clients compared to a control group of university students. The
methodological aim was to put resilience into a clinical context. In light of the
critical relationship between social support and resilience, multiple sources of
support ought to be distinguished as to how they individually relate to
resilience. The intent was to approach resilience against social anxiety as a
process that is predicated on a supportive social network of frequent contacts
with other people from a variety of different roles.

**Research questions and hypotheses**
The study addressed four specific research questions. Firstly, is there a
difference in resilience between the clinical group and controls? The first
hypothesis was that the control group would be more resilient than the clinical
group as a result of the clinical difference between the groups. Secondly, are
there differences in social networks between the groups? The second hypothesis
was that the control group would have more well-established social networks
than the clinical group. Specifically, controls were expected to have larger,
more diverse and active social networks. Thirdly, is resilience associated with
social anxiety? As a means of countering adversity, the third hypothesis was
that resilience would be negatively associated with social anxiety in both
groups. Fourthly, do social networks mediate the relationship between
resilience and social anxiety? Given the previous theoretical arguments that
individual resilient capacities against risk factors supervene on the qualities of
the larger social environment (e.g., Shaw et al., 2016), the mediating role of
social networks on the association was also tested.

Method

Participants
The study included eighty-one participants divided into two mutually
independent samples, one clinical group and one control group. The clinical
group was made up of forty-one adult SAD-clients between the ages of 19 and
45 years ($M = 29.68$, $SD = 7.37$), 68% of whom were females. The control
group was recruited via convenience sampling from a Swedish university and
consisted of forty undergraduate students between 20 and 50 years of age ($M =
26.65$, $SD = 6.32$), 80% of whom were females. Being a current student at the
university in question was the only inclusion criterion. The students were taking
courses within the area of behavioral sciences at the time.

Measures and materials
The study was designed cross-sectionally and included three separate
operationalizations of the study variables.

Demographics. Apart from the participants' gender and age, demographic
information about marital status and highest level of education was also
submitted. These demographic characteristics are presented in Table 1.

Resilience. Resilience was operationalized by the Resilience Scale (RS;
Wagnild & Young, 1993). The RS taps central resilient features on a 7-point
likert scale from 1 (Disagree) to 7 (Agree). Items include for example “I usually
manage one way or another” and “My belief in myself gets me through hard
times”. In the present study, the shortened 14-item version of the Resilience
Scale was used (RS-14; Wagnild, 2009). The Swedish version of the items was
adopted from a previously validated translation (Nygren, Björkman Randström,
Lejonklou, & Lundman, 2004; see also Lundman et al., 2007). The total score
thus ranges from 14 and 98, with higher scores indicating higher resilience. The
RS-14 showed an alpha of .92 in the control group and .84 in the clinical group.

Social networks. The Social Network Index was used to investigate the
participants' networks of social support (SNI; Cohen, Doyle, Skoner, Rabin, &
Gwaltney, 1997). The scale operationalizes twelve forms of relationships that
represent different social roles in which the person engages in regular contact
with others, including spouse, children, parents, relatives, friends, coworkers,
neighbors, etc. The SNI encompasses subscales for network diversity, the total
number of people in the social network (i.e., social network size) and embedded
networks. Network diversity represents social roles in which the person engages
in regular contact at least once every two weeks with at least one other person,
ranging from 0 to 12. The size of the social network is the total number of
people with whom the person has contact at least once every two weeks. The
number of embedded networks taps the social domains in which the person is
active (e.g., the family), ranging from 0 to 8. Each point in a specific social domain requires at least four people with whom the person has contact at least once every other week within that domain.

**Social anxiety.** Liebowitz Social Anxiety Scale–Self Report was used to operationalize social anxiety (LSAS-SR; Liebowitz, 1987). The scale was intended to operationally define the clinical distinction between the two groups. The LSAS-SR is comprised of twenty-four items divided into two subscales, one for social anxiety and one for social avoidance. The respondent is asked to rate to what extent he or she has experienced anxiety and avoidance in a set of scenarios over the past week on a likert scale from 0 to 3 (e.g., “Working while being observed”, “Eating in public places”, etc.). For the subscale for anxiety, the likert scale ranges from 0 (None), 1 (Mild), 2 (Moderate) and 3 (Severe). For the subscale for avoidance, the likert scale ranges from 0 (Never; 0%), 1 (Occasionally; 1%-33% of the time), 2 (Often; 33%-67% of the time) and 3 (Usually; 67%-100% of the time). The total score for each subscale thus ranges from 0 to 72. The subscales can also be collapsed into an overall total score between 0 and 144. Total scores of 30 and above indicate that a clinical diagnosis might be plausible (Rytwinski et al., 2009). The total score was the primary measure of social anxiety in this study. The LSAS-SR showed an alpha of .90 in the control group and .92 in the clinical group.

**Procedure**
The clinical group was adopted from an ongoing study about SAD at Umeå University, Sweden. The study in question had previously been approved by the local ethics committee. All participants in the clinical group had been diagnosed with SAD by a psychologist prior to the present study according to the DSM-5 (American Psychiatric Association, 2013). All were informed about the purpose of the study, specifically that it was an addendum to the ongoing study which they already had been recruited to. Ethical information about anonymity, voluntariness and confidentiality of participation was stated in a cover letter. Forty-one out of fifty-one participants agreed to partake in the study. All forty-one gave written informed consent. The clinical participants were ascribed personal anonymity codes and filled out the SNI in writing prior to the present study. An online version of the RS-14 was completed a few months afterwards in conjunction with the LSAS-SR. The control group filled out the full version of the survey in writing after lectures on campus. A similar cover letter about the purpose and ethics of the study was given prior to their participation. The participants in the control group also received individual anonymity codes before they answered the questions. All gave their informed consent in writing.

**Statistical analyses**
All data analysis was conducted in IBM SPSS Statistics, version 23. Demographic differences between the groups were initially analyzed through
chi-square tests and independent samples t-tests. Independent samples t-tests were also computed to analyze the hypothesized group differences in resilience and social networks, including Cohen’s d to estimate effect sizes (Cohen, 1988). A complete correlation matrix of all study variables was computed with zero-order Pearson correlations. The hypothesized negative association between resilience and social anxiety was tested with simple regression analyses. Hierarchical adjustments for demographic group differences were made where applicable. Mediation analyses were performed in PROCESS Macro, release 2.15 (see Hayes, 2013). A default number of 1000 bootstrapped samples were created in generating indirect effects (i.e., a \times b\text{-paths from IV to M and M to DV, respectively}). 95% bias-corrected confidence intervals were the primary estimates of indirect effects, which is a preferable method over Sobel test to avoid misleading impositions of normality (Mackinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2008; Shrout & Bolger, 2002). Sobel test was reported for comparative reasons. Kappa-square ($\kappa^2$) were the size of the indirect effects (Preacher & Kelley, 2011).

**Results**

Demographic comparisons between the clinical group and the control group are presented in Table 1. As shown in Table 1, there was a significant difference in education. The control group had attained higher levels of education than the clinical group. Moreover, the age distribution approximated a statistically significant difference between the groups, albeit not below $p < .05$. The trend arguably was that the clinical participants were somewhat older than controls. There were no significant differences with respect to the gender ratio or the frequency distribution of marital status between the two groups.

<table>
<thead>
<tr>
<th>Demographic characteristics and analyses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>Age, mean (SD)</td>
</tr>
<tr>
<td>Gender, female (%)</td>
</tr>
<tr>
<td>Education, n (%)</td>
</tr>
<tr>
<td>Current/completed university</td>
</tr>
<tr>
<td>Lower grade</td>
</tr>
<tr>
<td>Marital status, n (%)</td>
</tr>
<tr>
<td>Single</td>
</tr>
<tr>
<td>Married/cohabitant</td>
</tr>
<tr>
<td>Living apart together</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

*Note. Lower grade = Compulsory school, upper secondary education or vocational education*
Descriptive statistics and independent samples $t$-tests are presented in Table 2. As displayed in Table 2, the clinical group reported significantly higher levels of social anxiety compared to the control group. The control group reported levels of social anxiety below the cut-off value of 30 (Rytwinski et al., 2009), indicating that a SAD-diagnosis is unlikely. That is, there was a significant clinical distinction between the groups.

**Is there a difference in resilience between the clinical group and controls?**
The first hypothesis was that the control group would have higher levels of resilience than the clinical group. As presented in Table 2, the independent samples $t$-test did indeed show a significant mean difference in resilience between the clinical group and the control group. The perceived levels of resilience were significantly higher among controls than the clinical participants, $d = 0.87$, suggesting a large-sized effect (Cohen, 1988). The hypothesized difference in resilience between the groups was consistent with the data. In sum, the control group was significantly more resilient compared to the clinical group.

**Are there differences in social networks between the groups?**
Considering the socially avoidant symptoms of SAD, the second hypothesis was that the control group would have more well-established social networks compared to the clinical group. Specifically, the groups were expected to differ on all three subscales of the SNI. As displayed in Table 2, the results of the independent samples $t$-tests showed that there were significant mean differences between the groups on all three measures of the social network, namely network diversity, $d = 0.56$, the size of the social network, $d = 0.71$, and the number of embedded networks, $d = 0.70$. The effect sizes were all in the medium range (Cohen, 1988). As hypothesized, the control group was more likely to have more diverse, more active social networks and a larger total number of frequent contacts within their respective social networks in comparison with the clinical group.

### Table 2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Clinical group ($n = 41$)</th>
<th>Control group ($n = 40$)</th>
<th>Between group statistics ($n = 81$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
</tr>
<tr>
<td>LSAS-SR Total</td>
<td>66.07</td>
<td>19.81</td>
<td>29.05</td>
</tr>
<tr>
<td>Resilience</td>
<td>63.20</td>
<td>11.42</td>
<td>73.90</td>
</tr>
<tr>
<td>Network diversity</td>
<td>4.88</td>
<td>1.36</td>
<td>5.68</td>
</tr>
<tr>
<td>Network size</td>
<td>14.13</td>
<td>6.73</td>
<td>21.72</td>
</tr>
<tr>
<td>Embedded networks</td>
<td>1.63</td>
<td>1.03</td>
<td>2.44</td>
</tr>
</tbody>
</table>

*Note. Abbreviations: LSAS-SR, Liebowitz Social Anxiety Scale--Self-report version*
Is resilience associated with social anxiety?

A complete correlation matrix of all study variables is presented in Table 3. As displayed, all three measures of the SNI were positively associated with resilience among controls. Only network size was significantly associated with resilience in the clinical group, but all three measures of the SNI were negatively associated with social anxiety. Neither association between the measures of the SNI and social anxiety was significant among controls. As for the association between resilience and social anxiety, resilience was indeed negatively associated with social anxiety in the control group and in the clinical group. Higher levels of resilience were inversely associated with lower levels of social anxiety and vice versa. The association was somewhat stronger in the control group than in the clinical group.

The third hypothesis was that resilience would be negatively associated with social anxiety in the two groups. As shown in Table 4, resilience was negatively associated with social anxiety in both groups and explained a total 25% of the variance in social anxiety among controls and 19% of the variance in the clinical group. After adjusting for age and education (i.e., the demographic differences between the groups), resilience significantly explained 20% of the total variance in social anxiety among controls, $F\Delta(1, 36) = 10.34, p = .003$. Specifically, resilience remained significantly associated with social anxiety ($\beta = -.49, p = .003$). That is, controls who were more resilient were less likely to experience social anxiety. As for the clinical group, resilience significantly explained 9% of the variance in social anxiety after adjusting for age and

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. LSAS-SR Total</td>
<td>–</td>
<td>–.50**</td>
<td>–.04</td>
<td>–.08</td>
<td>–.07</td>
</tr>
<tr>
<td>2. Resilience</td>
<td>–.44**</td>
<td>–</td>
<td>.46**</td>
<td>.40*</td>
<td>.38*</td>
</tr>
<tr>
<td>3. Network diversity</td>
<td>–.38*</td>
<td>.30</td>
<td>–</td>
<td>.62***</td>
<td>.72***</td>
</tr>
<tr>
<td>4. Network size</td>
<td>–.62***</td>
<td>.37*</td>
<td>.65***</td>
<td>–</td>
<td>.87***</td>
</tr>
<tr>
<td>5. Embedded networks</td>
<td>–.64***</td>
<td>.31</td>
<td>.62***</td>
<td>–</td>
<td>.88***</td>
</tr>
</tbody>
</table>

Note. Upper matrix = Control group; Bottom matrix = Clinical group

* $p < .05$; ** $p < .01$; *** $p < .001$

### Table 4

Summary of simple regression analyses of resilience and LSAS-SR Total (Unadjusted for demographics)

<table>
<thead>
<tr>
<th>Independent(s)</th>
<th>Model summary</th>
<th>Unstandardized coefficients</th>
<th>Standardized coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$R^2$</td>
<td>$F$</td>
<td>$b$</td>
</tr>
<tr>
<td>Resilience (Clinical)</td>
<td>.19</td>
<td>9.40**</td>
<td>–.76</td>
</tr>
<tr>
<td>Resilience (Control)</td>
<td>.25</td>
<td>12.52**</td>
<td>–.60</td>
</tr>
</tbody>
</table>

Note. ** $p < .01$
education, $F(\Delta(1, 37) = 13.93, p = .001$. The negative association between resilience and social anxiety remained statistically significant above and beyond age and education ($\beta = -.33, p = .034$), indicating that those who were more resilient were less likely to have severe social anxiety. As hypothesized, resilience was negatively associated with social anxiety in the clinical group and the control group, including after demographic adjustment for age and education. Those who were more resilient were less likely to have severely high levels of social anxiety.

**Do social networks mediate the relationship between resilience and social anxiety?**

The analytic aim was to understand resilience as a process that is mediated by the social environment (Shaw et al., 2016). Hence, the three measures of the SNI were tested as potential mediators of the association between resilience and social anxiety. In the clinical group, a partial mediation was found between resilience and social anxiety through social network size. The results showed that there was a significant $a$-path between resilience and network size, $b = 0.21, t = 2.43, p = .019$. There was a significant $c$-path between resilience and social anxiety, $b = -0.77, t = -3.11, p = .004$. Thirdly, there was a significant $b$-path between network size and social anxiety after controlling for resilience, $b = -1.54, t = -3.98, p < .001$. The $c'$-path between resilience and social anxiety was not significant at this stage when the mediator was included in the model, $b = -0.44, t = -1.94, p = .059$. The confidence interval showed a significant indirect effect of resilience on social anxiety through social network size, $a \times b = -0.33, 95\% CI [-0.718, -0.111]$. Sobel test was also significant, $z = -2.03, p = .041$. The kappa-square effect size, $\kappa^2 = .20, 95\% CI [0.072, 0.391]$, indicated a significant medium-sized indirect effect (Preacher & Kelley, 2011). That is, those in the clinical group who were more resilient were more likely to have larger social networks, which in turn indirectly mitigated social anxiety. A conceptual model of the mediating role of social network size on the association between resilience and social anxiety is depicted in Figure 1.

![Diagram of mediation model](image)
The model was also tested in the control group. Among controls, there was a significant \( a \)-path between resilience and network size, \( b = 0.40, t = 2.53, p = .015 \). The \( c \)-path between resilience and social anxiety was significant, \( b = -0.60, t = -3.24, p = .002 \). However, the \( b \)-path between network size and social anxiety after controlling for resilience was not significant, \( b = 0.16, t = 0.82, p = .417 \). The \( c' \)-path remained significant when the mediator was included, \( b = -0.66, t = -3.28, p = .002 \). Thus, whereas there was a significant direct effect of resilience on social anxiety among controls, the indirect effect through social network size was not significant, \( a \times b = 0.06, 95\% \text{ CI} [-0.087, 0.207] \). Sobel test was also non-significant, \( z = 0.73, p = .464 \).

Disparate results were found when the mediating role of embedded networks was tested. In the clinical group, the confidence interval suggested a significant indirect effect of resilience on social anxiety via embedded networks, \( a \times b = -0.28, 95\% \text{ CI} [-0.747, -0.024] \). Sobel test was non-significant, \( z = -1.77, p = .076 \). Kappa-square indicated a significant indirect effect, \( \kappa^2 = .18, 95\% \text{ CI} [0.023, 0.383] \), yet another medium-sized effect (Preacher & Kelley, 2011). In spite of the indirect effect, there was no significant \( a \)-path between resilience and embedded networks, \( b = 0.02, t = 1.98, p = .054 \) (see Appendix for a detailed outline). As a result, the trend suggested that a mediating influence of embedded networks on the association between resilience and social anxiety was at play, albeit not enough for any statistically significant inferences. Among controls, there was no significant indirect effect of resilience on social anxiety via embedded networks, \( a \times b = 0.06, 95\% \text{ CI} [-0.125, 0.199] \). Sobel test was also non-significant, \( z = 0.71, p = .474 \).

Lastly, there were no significant indirect effects of resilience on social anxiety through network diversity in either group. The confidence interval crossed zero in the clinical group, \( a \times b = -0.13, 95\% \text{ CI} [-0.509, 0.006] \), as well as in the control group, \( a \times b = 0.13, 95\% \text{ CI} [-0.079, 0.440] \). Similarly, Sobel test was non-significant in both instances (see further description in Appendix).

**Discussion**

This study aimed to investigate the role of social networks in the interplay between resilience and social anxiety in a clinical group of SAD-clients compared to a control group of university students. The intent was to put the construct of resilience into a clinical context. As hypothesized, the groups did indeed differ in the perceived levels of resilience and the scope of the social networks. The control group was significantly more resilient than the clinical group. While controls were more likely to have larger, more diverse and more active social networks, the clinical group had significantly smaller, less active and less diverse social networks. Secondly, the negative associations between resilience and social anxiety supported the hypothesis that those who were more
resilient would be less likely to experience severe social anxiety, including after demographic adjustment for age and education. Lastly, the results of the mediation analysis showed a significant partial mediation effect of resilience on social anxiety through social network size in the clinical group. High resilience was indirectly associated with lower social anxiety as a function of the size of the social network. That is to say, while there was a direct effect of resilience on social anxiety among controls, the effect was more indirect via social network size in the clinical group.

**Discussion of results**
The central aim of the study was to approach the construct of resilience as a social process that is predicated on supportive social networks. The difference in resilience was reiterated by concomitant differences in all three dimensions of the social network between the control group and the clinical group (see Table 2), emphasizing the centrality of previous findings of depleted social support among clinical participants with SAD (Furmark et al., 1999). Judging from the description of the SNI by Cohen et al. (1997), the results that the control group had more diverse social networks suggest that they were more likely to interact with people from a wider range of social roles rather than only within the family or their college class. That is to say, close friends, relatives, family members, neighbors and so forth. In contrast, the social networks within the clinical group were more limited to fewer of these dimensions. Indeed, network diversity has previously been found to have mitigating effects on anxiety and depression (Cohen & Wills, 1985). Interestingly, network diversity did in fact show the strongest association with resilience of the three measures of the SNI among controls (see Table 3), whereas the association with social anxiety was not significant. Notwithstanding the latter non-significant association, a potential indirect effect of network diversity on social anxiety through resilience should not be ruled out (see Shrout & Bolger, 2002).

In tandem with a more diverse social network, the control group was more likely to have a larger total number of frequent contacts within these different social roles, which is to say a larger sized social network. Not only were the social networks in the clinical group less multi-faceted, their regular contacts were more restricted to a smaller number of people. This is explicable on the basis that the clinical participants might shy away from strangers and would rather choose to interact with fewer people that they trust, supposedly so as to minimize the fear of humiliation or negative evaluations at the heart of SAD (American Psychiatric Association, 2013; Furmark, 2002). Similarly, the lower number of embedded networks suggested that the clinical participants appeared to be less active within the social networks that they actually had managed to establish compared to controls. Among controls, this could be interpreted as a more pronounced ambition to maintain active relationships with friends and family akin to the beneficial daily contacts with significant others described by
Stetler and Miller (2008). As shown in Table 3, these embedded networks of active contacts were indeed positively associated with resilience among controls but not in the clinical group. Whereas all three associations with resilience were significant in the control group, network size was the only subscale significantly associated with resilience in the clinical group (see Table 3). Therefore, controls might be able to draw on all three dimensions of their social networks and amplify their resilience accordingly, whereas the clinical participants only may be able to benefit from a few or none of them as a result of their SAD-diagnosis, although causal directions are most uncertain.

The comparison between the clinical group and the control group was intended to highlight how socially phobic behavior alter resilience and networks of social support. There were no significant demographic differences between the groups other than education, although the age difference also approximated \( p < .05 \) (see Table 1). The clinical participants had lower levels of education on average and were somewhat older than controls. Despite the age difference, the perceived level of resilience was higher in the control group (see Table 2). Given that resilience has been found to increase with age (Hu et al., 2015), it is still plausible to assume that the disparate levels of resilience can be understood on the basis of the clinical distinction between the groups, even though the difference in education may not be disregarded. Nevertheless, resilience was negatively associated with social anxiety in the clinical group as well as the control group after adjusting for age and education. Notwithstanding these demographic group differences, those who were more likely to be resilient against social anxiety were indeed so even when their age and education were held constant. The perceived levels of resilience were also consistent with previous comparisons of university students and clinical samples (Aiena, Baczwaski, Schulenberg, & Buchanan, 2015). Most importantly, though, the present study extends these prior results with new knowledge about resilient capacities and how these relate to expansion of social networks specifically among clinical participants diagnosed with SAD. By virtue of being more self-reliant, resourceful and the exercise of a more adaptive way of looking at life events (Wagnild & Young, 1993), controls were more likely to be resilient against social anxiety. These resilient capacities were directly associated with lower levels of social anxiety among controls, but indirectly among the clinical participants via social network size.

With respect to resilience in a clinical context, there appeared to be a more dynamic relationship with social networks. Those who were more resilient among the clinical participants were more likely to have a larger number of social contacts, which indirectly appeared to mitigate their levels of social anxiety. The complexity of these dynamics was emphasized by the divergent magnitudes of the total effect and the direct effect of resilience. When the mediating role of social network size was taken into account, the total effect of
resilience, $b = -0.77$, $t = -3.11$, $p = .004$, dropped to a notably smaller direct effect, $b = -0.44$, $t = -1.94$, $p = .059$. The direct effect was not statistically significant when the mediator was included, although this might simply be a matter of statistical power. Nevertheless, the presence of the mediator appeared to cancel out a substantial amount of the initial effect of resilience on social anxiety, indicating partial mediation (see Baron & Kenny, 1986; Shrout & Bolger, 2002). This suggests that resilience does transcend individual properties in that the individual always is embedded in various social networks that can either impair or enhance resilience, highlighting the importance of social network analyses in the study of resilience (Shaw et al., 2016). Resilience against risk factors appears to be mediated by external circumstances. In this case, the more resilient the clinical participants were, the larger number of frequent social contacts they appeared to have and eventually the less social anxiety. Given the self-reliant and resourceful characteristics of resilience (Wagnild & Young, 1993), these individuals might have a more pronounced ambition to cope with their diagnosis through more frequent interactions with growing numbers of people, so as to successively reduce their social anxiety over time.

Interestingly, it was the total number of frequent social contacts the clinical participants had that mediated the association between resilience and social anxiety, not the degree of diversity or embedded activity of the social network. Although diverse forms of social relationships have resulted in buffering effects on generic anxiety symptoms in previous studies (Cohen & Wills, 1985), the overall size of the social network was the key source among the SAD-clients in this study. As opposed to the more qualitative aspects of diverse relationships, a quantitative increase in the number of frequent social contacts with people from the entirety of the social network seems to be a critical element that might mitigate severe social anxiety. Similarly, engaging in fewer but actively embedded networks did not seem equally beneficial, albeit the trend suggested otherwise (see full description in Appendix). Thus, the role of embedded networks deserves further investigation. The clinical implications of these indirect effects of resilience on social anxiety as a function of the properties of the social network are particularly worth emphasizing. Rather than reinforcing avoidant safety behaviors that perpetuate unrealistic concerns of humiliation or embarrassment (see Clark & Wells, 1995), increasing numbers of frequent encounters with other people could facilitate adaptive reappraisals of these cognitive-behavioral entanglements. The more attempts to frequent social contacts, the more the person practices how to confront his or her urge to avoid uncomfortable situations. Heimberg (2002) has detailed such therapeutic exercises to confront phobic situations and thereby enable cognitive restructuring of maladaptive ways of thinking about social events. Judging from the pathways in the mediation model (see Figure 1), resilient capacities might promote social skills that subsequently attract more social support and, in turn,
buffer against social anxiety. Resilience seems to be an important factor to enhance the ambition to expand the social network and thereby a means of ameliorating social anxiety over time. In short, the clinical application of these results should be investigated further.

**Methodological discussion**

There are still central methodological limitations to consider in the evaluation of the results. The cross-sectional design of the study does not justify causal inferences to be made on the basis of the results. The results should be interpreted according to the particular point in time of data collection. Without the necessary long-term temporal perspective, causality cannot be inferred. The causal limitations due to the cross-sectional design are especially important to consider when interpreting mediation analysis (Hayes, 2015). Figure 1 represents a conceptual model of the pathways in the model and should be judged as such, which is to say without premature claims of causality. It should therefore also be stressed that the clinical group completed the SNI prior to data collection of resilience and social anxiety, that is, the mediator was assessed beforehand. This discrepancy is important to remember in the assessment of the mediation analysis. Specific directions in the mediation model of resilience, social networks and social anxiety should be interpreted tentatively and require longitudinal follow-ups in future research.

In spite of the results that education was the only significant demographic group difference and that the clinical participants were slightly older than controls, this does not exclude additional systematic differences. The convenience sampling of the control group means that other conceivable systematic differences between the groups cannot be ruled out. By the same token, the external validity of the results in the control group is limited. Randomized sampling would have been a more appropriate strategy in this respect. Replication of the results in other samples is therefore an important issue for future studies. Similarly, the study did not account for depression symptoms or other comorbid disorders related to SAD (American Psychiatric Association, 2013). SAD is not isolated from other consequential psychological problems. Such underlying differences could act as extraneous influences on the results. The study did also not control for personality characteristics that may be intertwined with resilience, social anxiety and the establishment of social networks. For example, extraversion has previously been linked to resilience (Sarubin et al., 2015), network diversity (Cohen et al., 1997) and social anxiety in combination with neuroticism among other traits (Bienvenu et al., 2004). Such characteristics may therefore be relevant sources of alternative explanations to consider.

Moreover, although the reported level of social anxiety in the control group was below the clinical cut-off value of 30 (Rytwinska et al., 2009), the level of
social anxiety was still notably higher than previous standards of other comparisons between SAD-participants and healthy controls (e.g., Månsson et al., 2016). Even though the mean level on the LSAS-SR in the control group was not abnormally high, the wide spread around the mean should be duly noted in this case (see Table 2). The standard deviation indicates that some controls in fact could meet the criteria of a potential diagnosis of SAD. Notwithstanding that the results are based on self-report data, the clinical risk is no less noteworthy. An initial screening would have been a viable option in selecting the healthiest controls in order to make the distinction between the groups more substantial. Thus, an interpretation of the comparison between the clinical group and the students as a homogenous group of unequivocally healthy controls ought to be made with caution.

**Conclusions**
The purpose of the study was to investigate the role of social networks in the relationship between resilience and social anxiety. Rather than treating social support as a generic construct, the intent was to distinguish different aspects of support and the individual importance of these sources within a network of social contacts. From a clinical point of view, social anxiety is associated with a more scarce, less diverse and more inactive social network. Most importantly, whereas resilience seems to mitigate social anxiety directly among controls, it appears to have an expansive effect on the size of the social network that indirectly downregulates severe social anxiety among clinical participants with SAD. This is important for the understanding of the establishment of a supportive social network in cases where a SAD-diagnosis is present. Resilient characteristics are supposedly key to the social skills that mitigate social anxiety and eventually facilitate future resilience. Thus, resilience might be understood as a protective mechanism against fallback to maladaptive social behavior. Not content with individual resilient characteristics, however, a substantial understanding of the surrounding social network is critical.

**Future directions**
First of all, a longitudinal replication of the results ought to be attempted in future studies, so as to substantiate inferences of causality with regards to the current findings. The results of the mediation analyses can be developed in further research on the dynamics of resilience, social networks and social anxiety. The cross-sectionally based model that has been outlined in the present study suffices for starters, but undoubtedly calls for more intricate analyses with a longitudinal time frame. Additional knowledge about the relationship between resilient properties and adaptive social skills is also warranted in order to investigate how adaptive individual characteristics can be integrated with the development of supportive social networks, particularly among SAD-clients to follow up on the current results. Judging from the results in this study, an increase in the number of people that the clinical participants interact with on a
frequent basis seems to be a viable way forward in mitigating clinical levels of social anxiety. This could be a significant contribution to understand and change socially avoidant behavior for better. The clinical application of these results would be an appropriate issue for future research. Further research should also address this with regards to other comorbid disorders related to SAD, for example major depression disorder or other anxiety disorders (American Psychiatric Association, 2013). In doing so, the clinical understanding of the association between resilience and social networks will become even more comprehensive.
References


Supplementary analyses
The same mediation model was also tested with the other two measures of the SNI beyond the previously reported mediating role of social network size on the association between resilience and social anxiety. Summaries of the pathways in the remaining mediation models of network diversity and embedded networks are outlined below. Key results are also highlighted on page 12.

Starting with network diversity, the mediation analysis showed the following results in the clinical group. There was a non-significant $a$-path between resilience and network diversity, $b = 0.03$, $t = 1.92$, $p = .062$. The $b$-path between network diversity and social anxiety after controlling for resilience was not significant, $b = -3.97$, $t = -1.85$, $p = .070$. There was a significant $c$-path between resilience and social anxiety, $b = -0.77$, $t = -3.11$, $p = .003$. The $c'$-path also remained significant when the mediator was included in the model, $b = -0.63$, $t = -2.51$, $p = .016$. The confidence interval crossed zero, $a \times b = -0.13$, 95% CI $[-0.509, 0.006]$, suggesting a non-significant indirect effect of resilience on social anxiety through network diversity. Sobel test was not significant, $z = -1.25$, $p = .210$. That is, there was a significant direct effect of resilience on social anxiety unrelated to network diversity.

As for the control group, there was a significant $a$-path between resilience and network diversity, $b = 0.05$, $t = 3.05$, $p = .004$. When controlling for resilience, the $b$-path between network diversity and social anxiety was not significant, $b = 2.55$, $t = 1.42$, $p = .162$. The $c$-path between resilience and social anxiety was significant, $b = -0.60$, $t = -3.27$, $p = .002$. Moreover, the $c'$-path was still significant when the mediator was included in the model, $b = -0.73$, $t = -3.60$, $p = .001$. The confidence interval contained zero and thus pointed to a non-significant indirect effect, $a \times b = 0.13$, 95% CI $[-0.079, 0.440]$. Sobel test was also non-significant, $z = 1.24$, $p = .214$. Thus, there was a significant direct effect of resilience on social anxiety unrelated to network diversity.

Lastly, these were the results of the mediation analysis of resilience, embedded networks and social anxiety in the clinical group. There was no significant $a$-path between resilience and embedded networks, $b = 0.02$, $t = 1.98$, $p = .054$. However, there was a significant $b$-path between embedded networks and social anxiety after controlling for resilience, $b = -10.57$, $t = -4.40$, $p < .001$. There was a significant $c$-path between resilience and social anxiety, $b = -0.77$, $t = -3.11$, $p = .003$. The $c'$-path also remained significant when the mediator was included in the model, $b = -0.48$, $t = -2.26$, $p = .029$. The confidence interval suggested a significant indirect effect of resilience on social anxiety via embedded networks, $a \times b = -0.28$, 95% CI $[-0.747, -0.024]$. Sobel test was not significant, $z = -1.77$, $p = .076$. Kappa-square still indicated a significant
indirect effect, $\kappa^2 = .18$, 95% CI [0.023, 0.383], indicating a medium-sized effect (Preacher & Kelley, 2011).

Similar results were found in the control group. Among controls, there was a significant $a$-path between resilience and embedded networks, $b = 0.03$, $t = 2.38$, $p = .022$. After controlling for resilience, the $b$-path between embedded networks and social anxiety was not significant, $b = 1.73$, $t = 0.81$, $p = .422$. There was a significant $c$-path between resilience and social anxiety, $b = -0.60$, $t = -3.24$, $p = .002$. The $c'$-path did also remain significant when the mediator was included in the model, $b = -0.66$, $t = -3.29$, $p = .002$. The confidence interval crossed zero, $a \times b = 0.06$, 95% CI [–0.125, 0.199], indicating a non-significant indirect effect. Sobel test showed that there was no significant indirect effect of resilience and social anxiety, $z = 0.71$, $p = .474$. In sum, the direct effect of resilience on social anxiety was significant, although there was no significant indirect effect.