SOCIAL PHOBIA: AETIOLOGY, COURSE AND TREATMENT WITH ENDOSCOPIC SYMPATHETIC BLOCK (ESB)

A qualitative study of the development of social phobia and its meaning in people's lives and a quantitative study of ESB as its treatment

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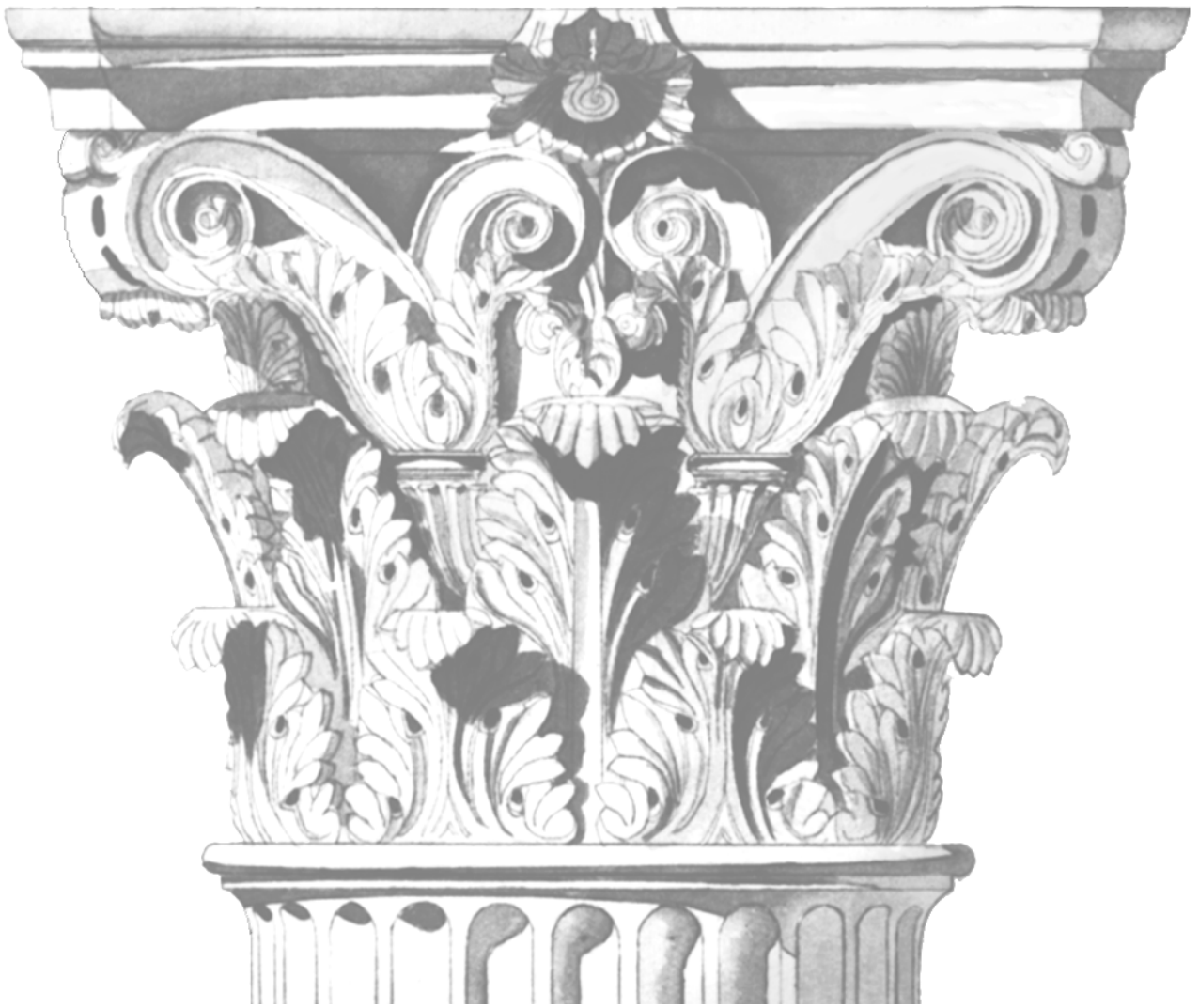
OULU 2004



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Academic Dissertation to be presented with the assent of the Faculty of Medicine, University of Oulu, for public discussion in the Väinö Pääkkönen Hall of the Department of Psychiatry, on December 3rd, 2004, at 12 noon.

OULUN YLIOPISTO, OULU 2004

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ISBN 951-42-7456-3 (nid.)
ISBN 951-42-7457-1 (PDF) http://herkules.oulu.fi/isbn9514274571/

ISSN 0355-3221 http://herkules.oulu.fi/issn03553221/

OULU UNIVERSITY PRESS
OULU 2004

Pohjavaara, Päivi, Social phobia: aetiology, course and treatment with endoscopic sympathetic block (ESB) A qualitative study of the development of social phobia and its meaning in people's lives and a quantitative study of ESB as its treatment

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2004

Oulu, Finland

Abstract

The purpose of this study was to explore the development and course of social phobia by analysing qualitatively all the textual material obtained about the persons with treatment-resistant social phobia who, during the years 1995-2000, underwent a surgical procedure called endoscopic sympathetic block (ESB) to alleviate their phobic symptoms. In the other part of this study, the effect of this surgical procedure on social phobia was assessed quantitatively. The qualitative part of the study was based on the phenomenologic-existential philosophy and the principles of grounded theory.

The qualitative analysis revealed four kinds of parenthood in the families of socially phobic persons: a violent, alcoholic type, a dominant type with high demands, a negligent type and a good enough type. A "vicious circle of social phobia" was formulated as a substantial category.

The quantitative part of the study was an open, prospective follow-up study, where 169 patients operated on for social phobia during the years 1995–2000 were followed up for 5 years, and the changes in their symptoms were estimated using a modified version of Davidson's brief social phobia scale and the Liebowitz quality of life scale. The quantitative and qualitative parts of the study were linked together by investigating each person's family background with a semi-structured interview. According to variation analysis of the results, all symptoms of social phobia seemed to be alleviated highly significantly by ESB, and the results remained similar throughout the follow-up. Reflex sweating of the trunk was the only significant side effect. Overall satisfaction with the operation was estimated to be 3.5 on a five-point scale, representing the description "some help of the operation". Thus, ESB can be regarded as an additional treatment method for social phobia if traditional treatment with medication and psychotherapy has not provided any help for the patient.

Keywords: aetiology, endoscopic sympathetic block (ESB), grounded theory, phenomenology, social phobia, sympathetic surgery, treatment

SOCIAL PHOBIA IS A LIZARD BIRD

Life with social fears is not life, it is pure hell. It was like a lizard inside me, and it was never part of me, although my psychologist and psychiatrist said so. Now I am cured, and my life is perfect. I am still sick but in another way. I can take care of myself, and I am able to seek help when I need it. I am not an invalid any more, and I don't have to be afraid every minute. A lizard bird - a sort of beast with long nails – that's what the social phobia was like. And now it is gone.

Translated from an autobiographical essay by P,
a 24-year-old female

Acknowledgements

First of all, I wish to thank my supervisors Erkki Väisänen and Timo Telaranta for giving me the opportunity to study this topic and for serving as important examples of not giving up despite all the difficulties and collegial resistance aroused by this topic. There were many times when I would have given up without the support from my supervisors. I also thank Professor Matti Isohanni for allowing this work to be carried out in the University of Oulu Clinic of Psychiatry and also for his support. I am grateful for all the friendly e-mails and phone calls I have had from Oulu, while doing this study at home in Tampere far from personal support and the inspiring atmosphere of a research group.

The Finnish Psychiatric Association and the University of Oulu Clinic of Psychiatry have supported me financially, thus helping this work to be completed. It was a long time since I had been studying statistics, and I would not have been able to update my skills and accomplish the statistical analysis without help from Pekka Kaatiala, M.Sc. I would therefore like to present special thanks to him.

I also thank the staff of Privatix Clinic, where I had to spend a lot of time while gathering the material. All the staff members were eager to help and support me in all ways they could. I especially thank registered nurse Anne Ylihärsilä for advice and information about the research process before I started in it.

At the early stages of this work, I was specialising in psychiatry in Tampere City Mental Health Care Centre, and I thank senior physician Eila Heikkinen, M.D., for letting me work part-time whenever I needed more time for writing. My warmest thanks belong to Inkeri Nieminen, M.D., who was my senior supervising psychiatrist in Tampere. She was always warm and friendly in spite her stressful and demanding work at the Centre, and thus taught me a lot about the psychiatrist-patient relationship. She also belonged to the rare group of colleagues who did not condemn this work and had no negative prejudgements about it. Also, the staff of my present workplace at Helaakallio Clinic in Pirkkala have been very understanding and supportive at the last metres of my journey towards the Ph.D. degree.

I also thank Leena Väisänen, Ph.D., for reading my manuscript and for her valuable advice and thoughts about the practical aspects of qualitative research and my preliminary reviewers Jukka Aaltonen, Ph.D., and Georg Bischof, Ph.D., for their comments and advice.

And last, but not least, come my wonderful daughters Saana and Salla-Mari, and my husband Simo, who all kept my feet on the ground during this long process of research. With their cheerfulness and liveliness my daughters helped to cheer me up when I was frustrated and ready to give up. My husband also kept supporting me even at the times when it seemed impossible to continue this work. My mother and my six siblings with their families were also interested in the progress of my work, thus contributing to its accomplishment, all in their own ways.

Tampere 2004 Päivi Pohjavaara

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II Pohjavaara P, Telaranta T & Väisänen E(2001) ESB in the treatment of addiction: a case report. Annales Chirurgiae et Gynaecologiae 90.

III Väisänen E, Pohjavaara P & Telaranta T 2001) Sympathetic surgery for psychiatry. Annales Chirurgiae et Gynaecologiae 90.

IV Pohjavaara P, Telaranta T & Väisänen E (2003) The role of sympathetic nervous system in anxiety: is it possible to relieve anxiety with endoscopic sympathetic block? Nordic Journal of Psychiatry 2003; 57:55-60.

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Contents

1 Introduction

When I begun this study in 2000, I was doing my last year of specialist training to become a psychiatrist. My knowledge of social phobia by then had been obtained through education and from my patients at psychiatric clinics. I naturally also knew from personal experience what it meant to be afraid of speaking in public, because I had to give several presentations during the medical school and later in the specialist training. Therefore, I was familiar with the sensations of a racing heart and trembling hands. But I had not really understood what it could be like if the social fears were so huge that you would have to skip school or isolate in your home completely.

By the year 2000, docent Timo Telaranta had been performing sympathetic blockades for years, and at work I had met a couple of patients who had gone through this operation. Nobody really knew what this "blockage of the stress nerve" was, or how and why it was accomplished, and especially doctors, both psychiatrists and, as far as I knew, surgeons, were somehow against it. At the same time, I was hoping to be able to take up research, and I happened to hear that the team of Timo Telaranta and Professor Erkki Väisänen were seeking a researcher to analyse the huge amount of material about the operated persons they had gathered. I hesitated for a long time before joining that team, because of the negative comments I had heard earlier. My biggest concerns were the need to combine surgery and psychiatry, to study a surgical treatment method of a psychiatrically classified disorder, the ways the data had been gathered without any control group or randomisation and the use of qualitative research methods, of which I knew nothing. But now, despite all the difficulties I encountered, I am happy for having had the courage to go on. I was inspired by qualitative research. I hope that this report will help to pave the way for qualitative research in medical science, and that more medical doctors and especially psychiatrists will become interested in qualitative research. A good psychiatrist is able to empathise, and this skill is not possible unless we understand our patients. In my opinion, qualitative research helps us to understand the patients better than do the often numerical results of quantitative studies.

2 Review of the literature

2.1 Social phobia

Diagnosis. Social phobia is an anxiety disorder, which can be described as a strong, persisting fear of situations where humiliation or embarrassment may occur (Kaplan & Sadock 1998). The patients are usually afraid of performance or interaction situations, such as public speaking, eating and drinking, using a public bathroom, entering a crowded room and speaking on the phone (performance). Dating and finding a sex partner or spouse are almost impossible, as is even eye contact with others (interaction) (Hazen & Stein 1995).

Social phobia can be differentiated from other anxiety disorders based on the different symptom profile and the different situations where the symptoms occur (Hazen & Stein 1995). Social phobics are less likely to experience chest pain, tinnitus, blurred vision, headache and fear of dying, but have greater problems with dry mouth than panic disorder patients. Headache, sweating, and loss of voice are common in social phobia and differentiate it from generalised anxiety disorder. Blushing and muscle twitching are also more common in social phobia than in agoraphobia. Panic disorder attacks may occur anywhere, even when the patient is alone and under no observation. The diagnostic criteria of social phobia according to the official diagnostic classification of DSM IV are presented in table 1. The DSM IV classification is in scientific use, whereas the ICD-10 classification is in clinical use in Finland. There are no major differences between these to two classifications.

Table 1. DSM IV criteria for social phobia.

A.	A marked and persistent fear of one or more social or performance situations in which the person is exposed to unfamiliar people or to possible scrutiny by others.
B.	Exposure to the feared social situation almost invariably provokes anxiety, which may take the form of a situationally bound or situationally predisposed panic attack.
C.	The person recognizes that this fear is excessive or unreasonable.
D.	The feared social or performance situations are avoided or else endured with intense anxiety or distress.
E.	The avoidance, anxious anticipation or distress in the feared social or performance situation interferes significantly with the person's normal routine, occupational functioning or social activities or relationships with others, or there is marked distress about having the phobia.
F.	In individuals under age 18 years, the duration is at least 6 months
G.	The fear or avoidance is not due to the direct physiological effects of a substance (e.g. drug abuse, medication) or a general medical condition, and it is not better accounted for by another mental disorder (e.g., panic disorder, separation anxiety disorder, body dysmorphic disorder, pervasive developmental disorder or schizoid personality disorder).
H.	If a general medical condition or other mental disorder is present, the fear referred to in item A is unrelated, e.g., the fear is not of stuttering, trembling in Parkinson's disease or exhibiting abnormal eating behaviour, as in anorexia nervosa or bulimia nervosa.
Specify if	Generalized: if the fears include most social situations (also consider the additional diagnosis of avoidant personality disorder).

In epidemiological studies, the lifetime prevalence of social phobia varies within 0–20 %, probably because of the differences in the classification criteria, and because of the cultural differences in the prevalence of this disorder (Walker & Stein 1995, Wittchen & Fehm 2003). The lifetime prevalence rates can, however, be as high as about 50 % in rural and isolated areas (Pakriev *et al.* 2000). It has been estimated that 50–80 % of clinical patients with social phobia have at least one other mental disorder (Wittchen & Fehm 2003). The most common comorbidities are simple phobia (ca. 60 %), agoraphobia (ca. 45%), alcohol and drug abuse (ca. 19 % and 13%) and major depression (ca. 17 %) (Hazen& Stein 1995). The generalized subtype of social phobia is usually associated with considerably higher comorbidity rates than the non-generalized type (Wittchen & Fehm 2003). There is also evidence that social fears predispose to other, secondary mental disorders. It seems that social phobia is not only a risk factor for the first onset of depressive episodes, but is also associated with a more malignant course and character of subsequent depressive illness. Persons with social phobia concurrent with another disorder represent a particularly high-risk group for suicidal ideation and attempted suicide. Due to comorbidity problems, social phobia is also an important cause for disability pension.

Etiological theories. Family studies suggest that social phobia aggregates within families more often than chance would predict, and that social phobia may breed true; and twin studies suggest that shared environmental and genetic factors contribute, at least in part, to this familial tendency (Walker & Stein 1995, Wittchen & Fehm 2003). Many studies have yielded more powerful evidence for an inherited propensity towards anxiety than for specific heritability of social phobia. In a pilot study concerning children of adults with social phobia, almost half of the children had at least one lifetime anxiety disorder diagnosis, and sixty percent had more than one anxiety disorder diagnosis (Mancini *et al.* 1996). In another study, Stein MB *et al.* concluded that the relative risks for generalized

social phobia and avoidant personality disorder were markedly higher (approximately 10-fold) among the first-degree relatives of probands with generalized social phobia than among the first-degree relatives of reference probands (Stein *et al.* 1998).

Another source of the familial aggregation of social phobia could be factors in the family environment, such as the style of child rearing, restricted exposure to social situations within the family and parental modelling (Wittchen & Fehm 2003). Anxiety is said to be a response to a disruption in the mother-child relationship (Merikangas *et al.* 2003). Studies of the possible contribution made by genetic and environmental factors have revealed a higher specificity for the transmission of social phobia (Wittchen & Fehm 2003). It may be that these factors contribute to converting a general predisposition for anxiety towards a more specific manifestation of social phobia. Some studies show that an impairment in either parenting or family function seems to be associated with behavioural disorders and depression, but these are not associated with anxiety (Merikangas *et al.* 2003). Evidence from studies assessing childhood social risk factors for the development of social anxiety is thus inconsistent, and there is a lack of prospective studies designed to examine vulnerability factors leading to social anxiety specifically rather than to anxiety disorders in general.

According to psychodynamic theories, social phobia might develop if the inborn defence system is constitutionally too strong, the inborn safety system is constitutionally too weak, the parental role functioning oriented towards discipline and power is too strong, or the parental role functioning oriented towards cooperative partnership is too weak, or several of these factors are present at the same time (Cloiter & Shear 1995). The parents of people with social phobia may be less caring, more rejecting or more overprotective than other parents. Inappropriate parental attitudes towards child rearing, negative peer relations and disturbance in the social facets of self-esteem may also lead to social phobia (Bruch & Cheek 1995). There are studies reporting an association between anxiety disorders and childhood physical or sexual abuse, and the association is strongest between sexual abuse and panic disorder in women (Stein *et al.* 1996). Adverse childhood events (i.e. death of a parent, childhood abuse) have no impact on the type of social phobia that develops (generalized or non-generalized) (Weinshenker *et al.* 1996–97). Social phobic persons are characterized by high levels of harm avoidance and low levels of novelty seeking, cooperativeness and directedness (Chatterjee *et al.* 1997).

The psychodynamic theories also say that some children with social phobia may have a biologically based personal trait called behavioural inhibition, which may lead to severe shyness when the child grows older (Kaplan & Sadock 1998, Wittchen & Fehm 2003). Measurements of this temperamental state in children show that those with high behavioural inhibition values are significantly more likely to develop social phobia. High behavioural inhibition values in children are associated with high values in parents, and it can thus be assumed that temperament is a risk factor for the development of social phobia. Whether this temperamental disposition is a necessary or sufficient aetiological factor remains to be determined, because the studies concerning the relationship between social phobia and behavioural inhibition in adolescence rely on cross-sectional data, and hardly any longitudinal studies are available.

Ethological theories explain the difference between phobic and non-phobic persons with the findings on submission and dominance in the animal kingdom. According to them, dominant humans tend to walk with their chins in the air and make eye contact,

whereas submissive humans may tend to walk with their chins down and avoid eye contact (Kaplan & Sadock 1998). The chronic stress associated with subordination is postulated (Marcin & Nemeroff 2003) to cause increased synaptic dopamine concentrations and subsequent down-regulation of D 2 receptors in the basal ganglia.

The cognitive theory says that the core of social phobia is a strong desire to convey a particular favourable impression of oneself to others and marked insecurity about one's ability to do so (Clark & Wells 1995). This is especially seen in the self-conscious type of shyness, where the motivation to approach people exists, but entering the group is impossible (Crozier 2001). The problem persists because the patients are not really able to process what is happening in social situation, are engaging in safety behaviours that prevent disconfirmation, are negatively influencing other people's behaviour, and are using their own impression of themselves as the main evidence for the idea that other people are negatively them evaluating (Clark & Wells 1995).

The biological background of anxiety seems to lie in supersensitivity of the central serotonin system (Tancer *et al.* 1995). The hippocampus may predominantly control the avoidance components of anxiety via the serotonin system, while the dorsomedial hypothalamus controls the escape components via the cholinergic system (File *et al.* 2000). The autonomic dysfunction and the overactivity of the sympathetic nervous system appear to induce many of the physical symptoms of anxiety, such as sweating, trembling and heart racing (Nickell & Uhde 1995). Blushing seems to be a mixture of parasympathetic and sympathetic activities, and only the kind of blushing that occurs in embarrassing situations is mediated through the sympathetic nervous system (Crozier 2001).

There are also theory-based aetiological factors that are used to describe the specific events that actually provoke the onset of social phobia (Wittchen & Fehm 2003). The three potential mechanisms are: direct conditioning, in which fear develops from exposure to a critical or traumatic event; vicarious learning, i.e. observation of signals in a traumatic situation, and verbal or non-verbal transmission of information about social situations. The studies about these factors are, however, retrospective, and there are really no studies available on this particular issue.

Treatment of social phobia. The efficacy of medication with a variety of mechanisms of action at the level of neurotransmitters suggests the relevance of multiple neurotransmitter systems for social phobia. Especially in performance phobia, the patients may get help from a combination of beta-blockers or benzodiazepines and a supportive educational approach that emphasises the important role of self-directed *in vivo* exposure (Sutherland & Davidson 1995). When embarrassing and frightening situations occur daily (generalized social phobia), regular drug treatment with standard MAO inhibitors or serotonergic drugs is recommended (Schneier 1995, Davidson JRT 2003). About 60 % of patients seem to benefit from MAO inhibitors, and about 50 % may benefit from serotonergic drugs, e.g. fluvoxamine, paroxetine and sertraline. The standard MAO inhibitor drugs are the best pharmaceutical alternative, but they are nowadays considered second-line drugs because of the inconvenience of maintaining a low-tyramine diet to prevent the serious hypertensive reaction. Newer reversible MAO inhibitors, such as moclobemide, do not seem equally effective as the older standard drugs (Schneier *et al.* 1998). Moclobemide might be beneficial for some patients after about 4 months' use at doses of 600 mg or more, but further studies are needed. Relapse rates following the withdrawal of medi-

cation are, unfortunately, quite high, as the relapse may occur up to 4 weeks after the discontinuation of MAO inhibitors (Schneier 1995).

Controlled studies are available on some serotonergic drugs, including at least paroxetine, fluvoxamine and sertraline (Baldwin *et al.* 1999, Stein *et al.* 1999, Katzelnik *et al.* 1995). Paroxetine seems to be most beneficial, because it helps 55–70 % of patients, but fluvoxamine and sertraline also seem to help about 50 % of patients. Patients may also benefit from benzodiazepines, but the possibility of dependence and tolerance restricts their use (Sutherland & Davidson 1995). Beta adreno-receptor-blocking agents help only in performance phobia, but are not helpful in a more generalised social phobia. Thus, SSRI drugs are the drugs of choice in generalised social phobia, but the disorder requires long-term medication, and relapses are common after withdrawal of the drug.

Several controlled studies indicate the profitability of cognitive-behavioural therapy, social skills training, relaxation techniques and exposure therapy in the treatment of social phobia (Heimberg & Juster 1995, Zaider & Heimberg 2003). When the patient also has deeper psychopathology, such as personality disorders, psychoanalysis or psychodynamically oriented psychotherapy is primarily needed (Alnaes 2001). The profoundly disturbed patient cannot profit from cognitive-behavioural or exposure therapy before she has gained more insight into her problems and is able to liberate enough resources to expose herself to anxiety-provoking situations. Psychotherapeutic interventions alone can be more effective than drug therapy, but combined drug and psychotherapy treatment seems to prolong the remission time that may have been achieved with the medication (Stravynski & Greenberg 1998).

In conclusion, according to both controlled and uncontrolled studies, different treatment techniques help 50–70 % of social phobia patient when they are properly used, but there are many restrictions (Sutherland & Davidson 1995, Schneier 1995 and 1998, Baldwin *et al.* 1999, Stein *et al.* 1999, Katzelnik *et al.* 1995, Heimberg & Juster 1995, Alnaes 2001). Epidemiological studies from around the world have suggested that social phobia is rarely treated (Wittchen & Fehm 2003). Approximately 13–28 % of individuals with social phobia reported ever having seen a health care professional because of this disorder, and this value is irrespective of the degree of social impairment due to social phobia. The proportion of those who had received treatment ranged from 1 % to 11 %. Pure social phobia does not result in high utilization rates of psychiatric or primary care treatment, unless it is complicated by another disorder. The patients tend not to present their disorder directly or to seek help, and their disorder is often poorly recognized, which results in low treatment rates.

Sociodemographic features and effects of social phobia on quality of life. The ECA findings in 1992 were the first results to show social phobia to be a common disorder associated with significant disability and impairment (Schneier *et al.* 1992). They also confirmed that the onset of social phobia prior to age 11 predicts non-recovery in adulthood (Wittchen & Fehm 2003). In clinical samples, individuals have reported signs and symptoms of social fears for an average of 10–21 years, and although most specific and isolated childhood phobias are transitory phenomena lasting for a few months or up to 2 years, children with clinically significant social fears seem to retain their symptoms at least throughout adolescence. Women seem to be more likely than men to have social phobia (gender ratio 3:2), but some studies have failed to reveal a gender difference (Wittchen & Fehm 2003). It has been speculated that men with social phobia might experience

greater impairment than women with the disorder. However, it is not yet known to what degree the sociodemographic factors that influence the onset of social phobia are consequences or correlates of the disorder.

The National Comorbidity Survey (Kessler *et al.* 1994) showed social phobia to be negatively related to education and income and significantly more common among never-married individuals, students, persons who are neither working nor studying and those who live with their parents. Approximately half of the persons with social phobia reported at least one outcome indicative of severity at some time in their lives (either significant role impairment, professional help seeking, or use of medication more than once). Another study by Schneier and colleagues (Schneier *et al.* 1994) showed that more than half of the patients with social phobia had at least moderate impairment at some stage in their lives due to social anxiety and avoidance in areas of education, employment, family relationships, marriage and romantic relationships, friendships or social network and other interests. A substantial minority reported at least moderate impairment in the activities of daily living and suicidal behaviour or no desire to live. More than half of all patients reported at least moderate impairment in self-regulation of alcohol use at some stage in their lives due to social phobia.

Non-generalized and generalized social phobias affect the quality of life differently. Kessler and colleagues found that social phobia characterized merely by fear of speaking is less persistent, less impairing and less comorbid than social phobia characterized by more generalized social fears (Kessler *et al.* 1998, Kessler 2003). The most direct impairments involve social interactions and information processing errors in these interactions. The indirect effects on secondary mental disorders, substance abuse and physical, e.g. cardiovascular, disorders, normative role transitions and effects on help seeking are important determinants of quality of life. Avoidance of social interaction, which is characteristic of social phobia, often prevents consultation of a physician, and only approximately 5 % of individuals with social phobia seek help (Keller 2003). It is not until comorbid disorders develop that persons recognize they are ill, and the proportion of those seeking medical help consequently rises with comorbidity. There is also evidence to suggest that those who seek help face underrecognition and undertreatment of their disorder.

2.2 Autonomic nervous system and anxiety

Thanks to modern research techniques, we know a lot of the location of attention, emotion and arousal modulation in the brain. Arousal requires involvement of the brain stem, the thalamus and the cortex, while attention is maintained by the function of the right frontal lobe (Kaplan & Sadock 1998, Nagahama *et al.* 2001). The amygdala rates the emotional importance of an experience, and the limbic system is the centre of human drives, whose regulation appears to require an intact frontal cortex. Crude emotions are produced and handled in the midbrain structures and the olfactory cortex, while distinctly human emotions are generated in the cortex (Kaplan & Sadock 1998).

The studies indicate that, in anxiety disorders, the sympathetic nervous system's drive is thought to be the main reason for the physical symptoms (Kaplan & Sadock 1998).

Stimulation of the autonomic nervous system causes tachycardia, headache, diarrhoea and tachypnea, which are also peripheral manifestations of anxiety. These symptoms do not necessarily correlate with the subjective experience of anxiety. The autonomic nervous system of patients with anxiety disorders exhibits increased sympathetic tone, adapts slowly to repeated stimuli and responds excessively to moderated stimuli; these changes are more prominent in social phobia patients than in panic disorder patients (Tancer *et al.* 1995).

The autonomic nervous system is thought to be one of the most important mediators between the mind and the viscera, and its activity reflects both the central excitatory state and the local visceral input (Malliani 1982). The reflex arc seems to be the functional unit of the system. Local reflexes, modulated by the higher nervous structures, constitute the basis of the system. The functions can be divided into two categories: 1) a role in basic metabolic functions, such as energy storage and release, in the control of exocrine secretion and intake and in the conservation and loss and transformation of energy and 2) a role in behaviour, where the hypothalamus is involved in alertness and defence reactions (Brooks 1983).

Central autonomic regulation is achieved through interrelated neuronal cell groups located in the brainstem, diencephalon and telencephalon (Mosqueda-Garcia 1996). The autonomic nervous system is divided into the sympathetic, parasympathetic and enteric systems. The sympathetic and parasympathetic nervous systems do not have opposite effects, as it has traditionally been thought. Nor is the autonomic nervous system simply a "non-cognitive" and automatic part of brain function, but rather intimately related with the central nervous system (Hugdal 1996). The afferent fibres of the autonomic nervous system have their origin in the visceral receptors and travel through connector neurons and efferent pathways to the visceral effector organs (Hamill 1996). The cell bodies of the preganglionic neurons of the efferent pathways are situated in the lateral grey column of the spinal cord and in the motor nuclei of the seventh, ninth and tenth cranial nerves. Preganglionic neurons synapse on postganglionic neurons in paravertebral, prevertebral and previsceral or terminal ganglions. Homeostatic responses mediated by the autonomic nervous system are achieved by altering the balance between the sympathetic, parasympathetic and different hormonal systems (Mosqueda-Garcia 1996). The most apparent link between the autonomic and endocrine systems is manifested by the interactions between the adrenal cortex and the adrenal medulla.

2.3 Neurobiology of anxiety

The neuroanatomical circuits, which support fear and anxiety behaviour, are modulated by a variety of chemical neurotransmitter systems (Charney 2003). These include the peptidergic neurotransmitters, corticotrophin-releasing hormone (CRH), neuropeptide Yand substance P, the monoaminergic transmitters, norepinephrine, serotonin and dopamine, and the amino acid transmitters, gamma-aminobutyric acid and glutamate.

The connection between the sympathetic nervous system and the psyche is best seen in anxiety and especially in social phobia. The observed usefulness of beta-adrenergic antagonists in performance phobia supports this hypothesis (Sutherland & Davidson 1995).

There are studies indicating possible supersensitivity of the central serotonin systems in social phobia and schizophrenia patients (Tancer *et al.* 1995, Malhotra *et al.* 1998). It has been shown using SPECT (Pirker *et al.* 2000) that, in a solitary case study, the decreased 5-HTT activity of a social phobic patient was normalized by a sympathetic block (Kuikka *et al.* 2000). Among the many neurotransmitters implicated in social anxiety disorder, the complex interactions between the noradrenergic and serotonergic systems and the HPA axis overlap those found seen in fear and anxiety (Marcin & Nemeroff 2003). Recent research has focused on the paralimbic, striatal and neocortical regions, which areas seem to be the key neuroanatomical players in fear, anxiety and social phobia.

Neuroanatomical studies show that hemodynamic activity decreases in the amygdala and the hippocampus upon provocation with aversive odours (unconditioned stimulus) and pictures of human face (conditioned stimulus) in healthy controls, but increases in patients with social anxiety disorder (Charney 2003). These data appear to show the role of amygdalar-hippocampal projections in mediating contextual fear, and it is possible that deficits in the transmission of information regarding context may be involved in the pathogenesis of phobias.

As previously mentioned, autonomic dysfunction and overactivity of the sympathetic nervous system appear to induce many of the symptoms of anxiety (Nickell & Uhde 1995). Blushing, which is also a very common physical symptom of social phobia, seems to have more complex causes, and only the kind of blushing that occurs in an embarrassing situation, is mediated through the sympathetic system, while the other forms of blushing, such as the slowly "creeping" and blotchy blush developing in performance situations after about twenty minutes, is probably caused by parasympathetic activation (Crozier 2001). Thus, blushing may be a mixture of parasympathetic and sympathetic activities, and an embarrassing situation against expectations may be crucial for the sympathetic kind of blushing. This can explain why social phobics (when thought to be under constant sympathetic hyperactivation) do not become pale but blush in triggering situations.

The symptoms of autonomic nervous system arousal are hallmarks of social phobia and have led to the use of beta adreno-receptor-blocking agents for distinct social phobias, although the studies on autonomic nervous system function in social phobia have yielded inconsistent results (Schneier 1999). Several studies indicate that non-generalised social phobic subjects have greater heart rate increases during behavioural challenges than generalised social phobic subjects or healthy controls (Davidson *et al.* 2000), but some studies showed no differences, and the heart rate variability in social phobia has not been shown to consistently differ from that of healthy controls (Schneier 1999). Also, when the activity of the sympathetic nervous system was measured by plasma norepinephrine and epinephrine levels during public speaking or during autonomic function tests, the activity did not seem to differ between social phobics and controls (Naftolowitz *et al.* 1994). On the other hand, quite opposite findings have also been published (Gerritsen *et al.* 1996). In behaviourally inhibited children, however, heart rate and sympathetic activation are stable and high, and this may indicate that autonomic hyperreactivity in early childhood might be a precursor of social phobia that may become attenuated over time through normal maturation or end organ down-regulation in response to chronic hyperreactivity, with the cognitive features of anxiety and self-consciousness becoming more prominent (Schneier 1999). Also, the diagnostic criteria of social phobia, which do

not require autonomic nervous system symptoms, may define a more heterogeneous group in respect of autonomic nervous system activity than a sample of behaviourally inhibited children, in whom the findings of autonomic hyperreactivity are more consistent.

2.4 Sympathetic surgery

The physical symptoms of social phobia might be treated by blocking the sympathetic system at the upper thoracic level with a surgical procedure (Crozier 2001, Telaranta 1998). Sympathectomy was first used to treat the exophthalmos of Basedow disease (Jonnesco 1896) and angina pectoris (Le Riche 1913, Jonnesco 1921) in the late 19th and early 20th centuries. Its beneficial effect on the treatment of facial sweating was noticed as early as the 1930s, and its impact on palmar sweating was reported in the 1950s, when the procedure was already carried out endoscopically (Kux 1954). Today, botulinum injections are considered superior to sympathicotomy in the treatment of hyperhidrosis of the plantar and/or underarm areas, but sympathicotomy is recommended in the treatment of either palmar or axillary hyperhidrosis, . (Colling & Whatling 2000). For the treatment of blushing, this treatment method was first proposed in 1985 (Wittmoser 1985). Instead of eliminating the upper thoracic sympathetic ganglions by sympathectomy (cauterisation), the procedure is nowadays mainly carried out by blocking the ganglions by clamping (sympathicotomy), which is a reversible procedure and causes notably fewer side effects (Lin CC 1998). The only significant side effect of the operation seems to be reflex sweating of the trunk.

2.5 Theoretical background of the study

Existential phenomenology. Phenomenology is one of the 21st century's most influential philosophical trends, and this philosophy also initiated the qualitative research tradition (Hall 2000). Phenomenological research aims to understand experiences as they are lived and the meaning of life for human beings. The goal is to describe subjective experiences without preconceived apprehension. The phenomenon under study is approached through intuitions, insights and reflections at different levels and by temporarily bracketing earlier theories, abstractions and prejudices. The basis for phenomenological thinking was derived from the Husserlian motto "to the things themselves" (Zu den Sachen), where an open-minded reflective approach to the phenomenon under study is used to enlarge and deepen the range of immediate experiences. The interpretation of the results of phenomenological research is done by reflecting and by following the hermeneutical cycle, which can be described as a wave-like movement from details to the whole and back.

Lauri Rauhala (1981) applies the term "existential phenomenology" to the philosophical trends that, after Heidegger (1962), proposed a holistic view of the problems of human existence. In his Finnish formulation of existential phenomenology (Rauhala1981), Rauhala applies Heidegger's term ‘situationality’ to phenomenology. Rauhala presents a

holistic human paradigm, which divides the existence of a human being into three basic modes: consciousness, physicality and situationality. Consciousness means the totality of human experiences, physicality means organic existence, and situationality means basically the life situation to which consciousness and physicality are related. Rauhala also claims, referring to Husserl, that the view of the world consists of meaning systems, which are divided into three components: objects or matters, mind (in Greek language noema) and consciousness. The mind exists for consciousness, which allows the following conclusion: When there is a mind in consciousness, which interacts with a certain object in the way that this object is understood with the help of that mind, then there is a meaning system (Rauhala 1993). Thus, consciousness or the view of the world exists as meanings.

According to Rauhala, psychic disorders should be described as distorted views of the world rather than diseases (Rauhala 2002). Rauhala also says that empirical science cannot answer all questions of human existence because the empirical research method is ontologically committed to hypothesis and method. Research on aspects of human existence requires ontological analysis, which results in a human paradigm. Consciousness makes up the person's subjective view of the world, which differs from the scientific view of the world. The scientific view consists exclusively of meanings based on facts, but the subjective view also includes other meanings, such as feelings, beliefs and intuitions. Symptoms, such as anxiety, obsessions and delusions, are meanings and belong to the person's subjective view of the world.

In philosophical analysis, consciousness can be divided into noesis and noema (Rauhala 1993, Rauhala 2002). Noesis is the potential of experiences, which is based on processes of the nervous system and can be studied with quantitative methods of empirical sciences. Noema is the content or frame of mind, which helps the person to understand a phenomenon or an object.

Biopsychosocial model of disease. Rauhala's division into physicality, consciousness and situationality can be referred to as the biopsychosocial model of disease (Engel 1977, Kaplan & Sadock 1998) and thus regarded as one explanatory model of the etiology of disorders or diseases. The biopsychosocial model is derived from the general systems theory. The biological system deals with the anatomical, structural and molecular substrates of disease, and the correspondence with Rauhala's physicality as an organic background of disease is obvious. The psychological system deals with the effects of psychodynamic factors, motivation and personality on experience and reactions to illness, resembling consciousness in Rauhala's theory. Finally, the social system examines the cultural, environmental and familial influences on the expression and experience of illness, and the description of this part of the model could also be applied to the description of situationality. Engel postulates that each system affects and is affected by all the others, and the resemblance to Rauhala's ideas of interaction between the three aspects of human existence can be seen. Engel's model does not treat medical illnesses as a direct result of people's psychological and sociocultural makeup but promotes a comprehensive understanding of disease and treatment.

2.6 Methodological background

Qualitative research methods in health research. Qualitative research methods are necessary in efforts to understand the experience of health, because none of the ways of directly measuring health are sufficient (Fridlund & Hildingh 2000:15). In the humanistic paradigm, the health of a human being cannot be measured but can be described, understood and interpreted. The methods of qualitative analysis emphasize the individual's own perspective and views of the specific "truth and reality" of their health. This means that every single individual is of equal importance for the ultimate results, irrespective of how many or how few people have reported the same quality or aspect of well-being. Health is regarded as a personal experience, a process and a way of being.

Qualitative research methods have rarely been used in psychiatric studies, but there are a few good examples, such as Leena Väisänen's study about the grief of the parents on the death of a child (Väisänen L 1996). Väisänen used a phenomenological family therapy approach and found out that the grief after the death of a person's own child involves deep attachment rather than detachment, and that professional helpers have inadequate knowledge of crisis intervention in such situations of exceptional grieving.

The grounded theory. The grounded theory is a method of qualitative research that can be used to inductively derive a theory from the study of a phenomenon (Strauss & Corbin 1990, Vehviläinen-Julkunen 2000a). The roots of the grounded theory lie in the tradition of symbolic interactionism, which is a theoretical perspective on human action and behaviour developed in the 1920s by what is now known as the Chicago School (Vehviläinen-Julkunen 2000a). George Herbert Mead, who was a major intellectual influence within the Chicago School, argued that the human self emerges through the process of social interaction with others, in which social roles and expectations are crucial.

The aim of the grounded theory is to uncover the social processes that lie behind the phenomenon under study and to thereby explain the phenomenon. Strauss and Corbin (Strauss & Corbin 1990, Vehviläinen-Julkunen 2000a) have provided four criteria for a well-developed grounded theory. First, the theory should fit the phenomenon, meaning that different types of data have been used in the theory development. Second, the theory should be comprehensible to the informants and other people involved in the phenomenon. Third, the theory should provide generality, meaning that the data are comprehensive and the theory abstract enough to be applicable to different situations. Fourth, the theory should provide control, which means it describes the conditions under which it can be used a basis for actions in the studied area.

At first, the grounded theory meant a data-based theory that was a result of comparative analysis (Glaser & Strauss 1967). Glaser and Strauss regarded their data-based theory as an inductive search. The categories and their interrelationships arise and are elicited from the data by a process of analysis. The researcher tries to find out the basic plot of the data, and she is supposed to be free of any presuppositions and any theoretical frames of mind. However, professional presuppositions are allowed, if they are reflected on and thus taken into consideration. The researcher herself is an integral part of the social reality that creates social processes (Vehviläinen-Julkunen 2000a). The researcher's earlier experiences are also part of the research material, contributing to a deeper understanding of the phenomenon.

Later, Glaser criticized the formerly described "Straussian" method (Vehviläinen-Julkunen 2000a). He was critical about Strauss' strategy of picking out of the research data individual observations, sentences and paragraphs and labelling them as something that is assumed to describe the phenomenon under study. Glaser argued that the researcher should adopt a more distant and passive role in order to avoid overconceptualization of individual events and overestimation of a detailed, multiphased technique of analysis.

Data collection and analysis in the grounded theory method take place simultaneously (Vehviläinen-Julkunen 2000b), and data collection is continued until saturation is reached. The data analysis is a continuous process: the coding of the material begins immediately, as does the process of comparison, which allows different categories to be formed out of the material. The method also argues for data collection and analysis to take place in advance of the literature review.

The grounded theory analysis progresses towards the theory through different levels of coding (Vehviläinen-Julkunen 2000b). At the level of *open coding*, the researcher analyses the data line by line, asking questions and thereby trying to find answers to the questions "what is happening and what it describes". The answers to these questions are *substantive codes*. These substantive codes are further analysed by comparing them to each other, and the codes that describe a certain phenomenon make up *a category.* In the *axial coding* phase, the categories are analysed in terms of the 1. *context* in which each category appears, the 2. *conditions* which make it possible, its 3. *causes* and 4. *consequences*, its 5. *covariance* as well as 6. *contingent phenomena* (the 6 C rule). At the *selective coding* phase, the categories are critically reviewed and revised to improve the reliability of the analysis.

The theory obtained with grounded theory analysis can be either substantive or formal (Vehviläinen-Julkunen 2000b). A substantive theory is concerned with a certain domain of activity, while a formal theory has wider applicability and needs to be empirically tested.

Reliability and validity in qualitative research. Reliability is traditionally understood as an ability of the method or study to give non-coincidencial results (Pyörälä 1994). In quantitative research, it is usually described as similarity vs. differences between the results of repeated tests. In qualitative research, reliability means reliability in the process of handling and analysing the data. Reliability in qualitative research can be tested either by parallel reading of the data by another investigator or by analysing the data in two parts and then comparing the results of the two analyses. The process of analysis and the results of the study must be presented in such a way that the reader is able to follow and assess the process. The presentation must also be reliable in the way that the reader can be confident that it is possible to end up with the presented conclusions by analysing the data as presented.

Validity is traditionally understood as an ability of the study to investigate the topic it was supposed to be investigating. In qualitative research, the investigator must be able to prove that the best way to find answers to the questions of the study is to use this particular set of data and this particular method. Another aspect of validity is that the results are valid in the whole research material and in the environment that was supposed to be investigated.

The reliability and validity of the study are confirmed by strictly following the rules of the method of analysis and by triangulation (Fridlund & Hildingh 2000). Triangulation refers to the combination of methodologies in the study of a given phenomenon (Fridlund & Hildingh 2000). Four types of triangulation exist and are useful in both qualitative and quantitative analysis for confirmation and completeness: 1. data from several data sources that differ in view of person, time and place, 2. involvement of several investigators with interdisciplinary or multi-disciplinary views, 3. theory comprising multiple perspectives of interpretation, such as nursing, public health, social science, etc. and 4. application of different data collection methods. If these criteria are met, the scientific method inductively progresses from the data to the theory, and the sample size is determined by the point at which information is saturated (Fridlund & Hildingh 2000). The saturation point is the point at which data collection can be discontinued because no new information would be gained from additional cases (Pyörälä 1994). The presentation of the analysis and the results differs from the presentation of quantitative results. The results of a qualitative study cannot usually be reduced to numerical values, but are rather "a dense description" of the topic that has been studied (Honkasalo & Pyörälä 1994).

3 Aims of the study

Social phobia is often referred to as a "forgotten anxiety disorder" (Heimberg et al 1995), and it has been studied less than the other anxiety disorders. Its aetiology, course and meaning in peoples' lives have remained obscure in the results of quantitative studies. The aim of this study was to deepen our understanding of social phobia. By combining different scientific philosophies (existential philosophy and natural sciences), methodologies (qualitative and quantitative) and medical subspecialties (psychiatry and surgery), a more thorough and broader view of the phenomenon of "social phobia" was attainable.

4 Original material

When I started my study, docent Timo Telaranta and professor Erkki Väisänen had already been gathering data for years from persons who had decided to seek help for their phobic symptoms in social situations by resorting to endoscopic sympathetic block. The informants in this study were individuals who had suffered from a number of symptoms, such as blushing, palpitations, sweating and trembling, in social situations and had sought help from a private clinic where surgical blockades of the sympathetic nervous system (endoscopic sympathetic blockade, ESB) were performed in order to relieve such symptoms. This group was considered to be the best source of information about social fears because they had suffered from their symptoms so much that they had been ready to try even this new method of treatment method that had not been generally acknowledged. The informants had not received help from conventional psychiatric treatment with medication and psychotherapy and had been suffering from their symptoms for at least five years.

The data consisted of patient files, psychiatric interviews and questionnaires (modified version of Davidson's brief social phobia scale and the Liebowitz quality of life scale) (Davidson *et al.* 1997, Taiminen 1998) used during the examinations preceding the decision as to whether or not to operate the patient. Similar questionnaires were also sent to the patients after the operation.

Because the material was huge and because many different kinds of data were available, it was decided to divide this study into two parts. In PART I, the development, course and implications of social phobia were studied with qualitative methods, and the goal was to understand social phobia better and to find new means to help these people. The ultimate aim was to encourage phobic persons to seek and also to get help from the health care service. In the second part of the study, PART II, the effects of ESB on the symptoms of social phobia were studied with quantitative methods. Endoscopic sympathetic block has been regarded as the treatment of choice for the physical symptoms that occur in social phobia, and because many biological studies (e.g. Stein 1995, Heimberg *et al.* 1995) indicate the high probability of sympathetic overactivity in patients with social phobia, it was considered ethically sound to use ESB on carefully selected patients with severe treatment-resistant social phobia.

Hence, the purpose of this study was to find answers to the following questions:

1. Why does social phobia develop (PART I: qualitative part of the study) (Joint publication number V)?
2. What is the meaning of social phobia in a person's life (PART I: qualitative part of the study) (Joint publication numbers II, III and V)?
3. Can treatment-resistant patients get help from endoscopic sympathetic block (ESB) (PART II: quantitative part of the study) (Joint publication numbers I and IV)?

5 Part I. Aetiology and course of social phobia (a qualitative study using a phenomenological approach and the grounded theory method)

5.1 Methods and data

5.1.1 Theoretical and methodological frames of reference

The background philosophy of our study is based on Lauri Rauhala's (Rauhala1981) Finnish formulation of existential phenomenology described earlier. In this study, the amount of data was vast, and the process of analysis was therefore most easily accomplished and described by using Lauri Rauhala's ideas about the modes of human existence and, further, the grounded theory method. Also, the topic of research is extremely delicate and emotional, and this was another reason to use the grounded theory method.

5.1.2 Ethical considerations

The topic of this study is highly delicate, emotional and personal. In order to understand social phobia better, it was essential to try to understand the informants' deepest emotions and thoughts. This was the only way to reach the deeper meanings that this symptomatology has for people. The informants of this study were extremely alert in all social relationships and therefore exceptionally intent on remaining anonymous. But there were also some informants whose life seemed to have changed so dramatically after the ESB treatment that they were even ready to tell about their experiences on Finnish television, where this topic was presented a couple of times. However, following the ethically approved practice, while publishing the results of the quantitative part of the study, all personal sociodemographical information about the informants was removed and only general information about their educational background, gender and age was given. In the

qualitative part I, too, all details by which the persons could be identified have been omitted. I also had a dual role as a researcher and, sometimes, as the psychiatrist responsible of treatment, and I thus observed the normal rules of professional secrecy. The Board of Ethics of the Medical Faculty at the University of Oulu also approved the research plan of this study.

5.1.3 Qualitative data

The basic question for the researcher was to find out why social phobia develops, and explanations were sought from different aspects of the study patients' lives. As mentioned above, the informants in this study were individuals who suffered from blushing, palpitations, sweating and trembling in social situations and sought help from a private clinic where surgical blockades of the sympathetic nervous system were performed. This group was considered to be the best source of information concerning social fears because they suffered from their symptoms so much that they were ready to try even this novel treatment method that had not been publicly acknowledged yet.

From the spring 2000 to the spring 2002, I continued the data collection initiated by Timo Telaranta and Erkki Väisänen by conducting basic psychiatric interviews. As mentioned in the chapter titled *Original material*, I used patient files, psychiatric interviews and questionnaires (modified version of Davidson's brief social phobia scale and the Liebowitz quality of life scale) (Davidson *et al.* 1997, Taiminen 1998) as qualitative data. The questionnaires were also sent to patients after the operation, and they often commented on their current status and feelings freely on the reverse side of those questionnaire sheets. In order to get more information and data from a different perspective, I sent a request to some patients to write autobiographical essays (Appendix 1). This request was sent to 20 randomly selected patients (list of the patients in Appendix 2), and four of them responded.

The collection and analysis of data were going on simultaneously, and I was therefore able to discontinue data collection when saturation was reached at some point during the spring 2002. According to the phenomenological approach, a strict preliminary plan for data collection would have imposed restricting presuppositions and narrowed down my view.

5.2 Progression of analysis

The first phase of qualitative analysis consisted of “deep reading” of the textual material about the patients who had previously been studied quantitatively (PART II of this study, joint publication number I). At the first time of reading the texts, my goal was to estimate whether the textual material was "deep" enough to allow qualitative analysis. Of the original series of 169 patients (described in more detail in PART II of the study and in joint publication number I), the texts of 6 persons were very uninformative because they had not contacted the clinic after the operation and had not returned the feedback letters. They

were therefore excluded from the data. The rest of the material consisted of patient files, psychiatric interviews, feedback letters and autobiographical essays, and I assumed the data to be versatile enough to shed light on social phobia from different perspectives.

At the beginning of the analysis, I thus had textual material of 163 patients. Based on this research material, there seemed to be clearly different groups with different severity levels of symptomatology. The symptoms that were recorded were blushing, heart racing, sweating of the hands or head and trembling of the hands or head. The informants occasionally also had difficulties with symptoms other than the main symptom based on which they were categorised, but the category was chosen based on the symptom they subjectively felt to be most debilitating. There were only 5 persons who did not blush or have heart racing, and group I consists of the persons who did not have any other symptom apart from these two.

The subjects were then divided into groups according to their main physical symptoms as follows. The number of persons in each group is presented after the group name. This division was done in the whole series of 163 persons:

I Blushing persons	n = 14
II Sweating persons (sweating of the head and/or hands)	n = 45
III Trembling persons (trembling of the head and/or hands)	n = 47
IV A wide range of symptoms (4–6 different physical symptoms)	n = 57
Total	N = 163

The qualitative analysis proceeded in steps, which I will describe next (STEP 1–4).

STEP 1: Open coding

At the open coding step of the analysis, I used the whole textual material available of the 163 patients. Saturation of the textual material was achieved when the data of 49 patients had been read, but the data of altogether 81 patients were read in order to increase reliability.

The purpose of this study was to investigate the generalised form of the social phobia. Therefore, only the group where the patients' symptom profiles were broad (4–6 symptoms) and consisted of all the above-mentioned symptoms were included in the final analysis. The total group of 163 patients included only 57 with a broad range of symptoms, and the group of 81 patients whose textual material was read came from 31 patients with a broad range of symptoms. The final qualitative analysis was done on the texts of 31 patients, who are described in Table 2.

Table 2. Patients whose texts were included in the final analysis. Their gender (F = female, M= male), age at the time of the operation, and the text material used are indicated.

	Sex	Age	Text material used
1.	F	24 years	autobiography, patient file
2.	M	65 years	autobiography, patient file
3.	F	36 years	autobiography, patient file, feedback letters
4.	M	65 years	autobiography, patient file
5.	M	54 years	patient file, feedback letters
6.	M	40 years	psychiatric interview, patient file
7.	F	27 years	psychiatric interview, patient file
8.	F	47 years	psychiatric interview, patient file
9.	M	41 years	psychiatric interview, patient file
10.	M	42 years	psychiatric interview, patient file
11.	M	30 years	psychiatric interview, patient file
12.	M	40 years	psychiatric interview, patient file
13.	M	34 years	psychiatric interview, patient file
14.	M	28 years	patient file, feedback letters
15.	M	34 years	psychiatric interview, patient file
16.	M	43 years	patient file, feedback letters
17.	F	37 years	patient file
18.	M	39 years	patient file
19.	M	26 years	patient file
20.	M	22 years	psychiatric interview, patient file
21.	M	48 years	psychiatric interview, patient file
22.	F	41 years	psychiatric interview, patient file
23.	F	45 years	psychiatric interview, patient file
24.	F	58 years	psychiatric interview, patient file
25.	M	45 years	psychiatric interview, patient file
26.	M	48 years	psychiatric interview, patient file
27.	M	39 years	psychiatric interview, patient file
28.	F	35 years	patient file, feedback letters
29.	F	37 years	psychiatric interview, patient file
30.	F	46 years	psychiatric interview, patient file
31.	F	50 years	psychiatric interview, patient file

The open coding step of the analysis produced 48 themes that represented aspects of the persons' lives, and they are presented as a list:

1. Personal alcohol problem
2. Alcohol problem of a family member
3. Feelings of guilt, shame and embarrassment; poor self-confidence
4. Dominant mother
5. Poor relationship with father
6. School bullying or dropping out of education
7. Phobic symptoms since childhood

8. Phobic symptoms in a family member
9. Lost chances in school, work or social life
10. Good outcome of sympathetic blockade
11. Sympathetic blockade did not help
12. Previous treatment
13. Experience of separateness of the phobia; "the phobia doesn't belong to me, and underneath that I'm a very social person"
14. Tricks and rituals used to cope with the phobia
15. Phobia is a "chain", "prisoner of the phobia", "narrowed life"
16. Embarrassing situation as a triggering point of phobic symptoms
17. Urge to achieve "a social profession" (teacher, health care, management)
18. Therapeutic interventions after surgery
19. Symptoms of phobia start without traumatic childhood or any particular triggering life situation
20. Better coping at work after the blockade (when you don't have to avoid people any more)
21. Marriage with an "equal" (i.e. phobic) or "lower" partner; repetition of the relationships experienced in childhood
22. New developmental phase where biological vulnerability can trigger fears (e.g. starting of school or going to the army)
23. No symptoms if, for instance, one’s professional position is superior to those of the other people in social interaction
24. Physical activity relieves symptoms
25. Real abnormality in appearance triggers symptoms
26. Growth in an isolated environment
27. Too much responsibility during childhood
28. Readiness to spend all one's savings or to take a bank loan in order to pay for the sympathetic blockade
29. Comorbidity
30. Symptoms in interaction with the opposite sex
31. Symptoms are not objectively seen at a medical appointment
32. Symptoms are relieved upon ageing
33. Negative attitude of therapists towards sympathetic blockade
34. Sympathetic blockade in the hope of getting rid of medication
35. Demanding personality
36. High level of parental demands or expectations
37. Religious family
38. Preliminary fear and shame of the symptoms
39. Agoraphobia
40. Physical violence in the family
41. Good school performance
42. Use of hormones (not estrogen replacement therapy)
43. Disturbance of body image (dysmorphophobia or anorexia nervosa)
44. Loss of the father (concrete or psychic experience)
45. Personal religious awakening
46. Psychotic episodes

47. Sympathetic blockade improves the quality of sleeping and memory
48. Symptoms relapse some time after the sympathetic blockade

STEP 2. Substantive coding

The themes mentioned in Table 3 were then divided into categories using Lauri Rauhala's division of existence as a background philosophy. This categorisation represents the phase of substantive coding in the analysis, where the similarities and differences of the categories are compared with one another. The following categories were obtained:

- P. Physicality category (the person's main physical symptom, sub-categories I–IV on page 34)
- C. Consciousness category: 1, 3, 13, 35, 38, 39, 43, 46
- S. Situationality category: 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16,17,18,19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48

Out of the total of 48 themes, the themes number 42, 43, 45 and 47 did not occur in the group of patients whose symptom profile was broad, and those themes were not included in the final analysis.

STEP 3. Axial coding

The purpose of the axial coding phase in the grounded theory is to see how the different categories are related to one another. In this study, the categories P., C. and S. are related in the same way as in the biopsychosocial model of disease: The physicality categories represent the biological aspect of the model and, in this study, the biological aspect of social phobia; the consciousness categories represent the psychological aspect of the model and the psychological aspect of social phobia; and the situational categories represent the social aspect of the model and the social aspect of social phobia.

The main question to be answered in this study was, why does social phobia develop and what kind of course and meanings does it have in people's lives. Of the above-mentioned categories, only the situational categories were able to provide answers, because the physicality and consciousness categories represented only the physical and psychic symptoms of social phobia.

STEP 4. Selective Coding

The next step of the analysis was the selective coding of situational categories. Because of the large number of these categories, they were divided into sub-categories:

- A. Family background 2, 4, 5, 26, 27, 36, 37, 40, 41, 44
- B. Predisposing and triggering factors 8,16,19,22, 25
- C. Other factors concerning symptomatology 7, 23, 29, 31, 35, 39, 43, and 46
- D. Social difficulties 6, 9, 15, 21, 30
- E. Dreams about the future 17, 34
- F. Coping mechanisms 12, 14, 18, 24, 28, 32, 42, 45
- G. Outcome of the blockade 10, 11, 20, 47, and 48
- H. Other factors 33

I re-read all the texts of the 31 patients in the qualitative analysis. In order to understand the development and course of social phobia, I reviewed the categories in the context of time and life course. At the next step of the analysis, these sub-categories were placed on a time line to create a chronologically logical life history of a person with social phobia (Fig. 1).

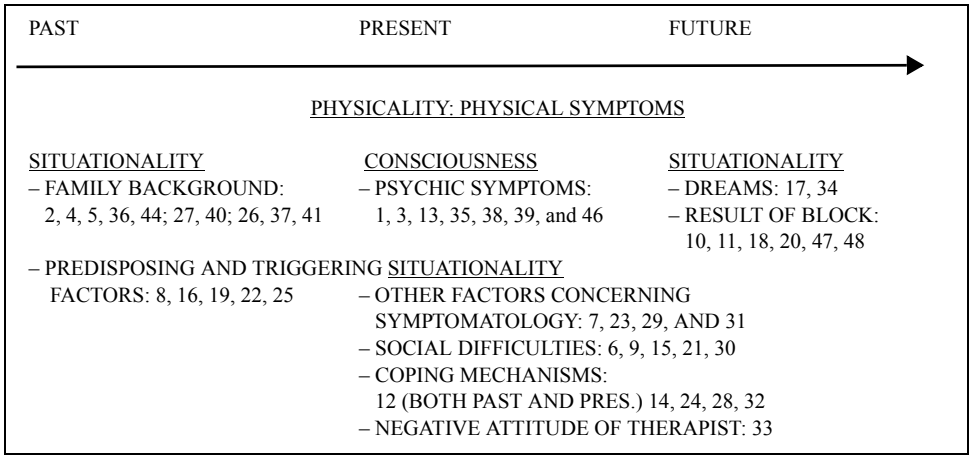

Fig. 1. Life history of a person with social phobia placed on a time line.

5.3 Results

The results of this part of the study are presented in joint publication number V. The 31 persons with a broad range of symptoms included 19 men and 12 women, both highly educated persons and one with no education, persons on pension, at work, unemployed and students. They came from either the country or towns. This heterogeneity of socio-demographic background made the data versatile and helped to increase the depth of analysis.

The list of categories on page 38 and Fig. *1* show the prominence of situationality themes. In all time segments in Fig. *1*, situationality themes were more numerous than physicality or consciousness themes, and this supports the theory of social phobia being a phenomenon that manifests in the context of situation. At the same time, it appears that the consciousness themes are not really related to the past or the future, and an example of this phenomenon was seen in the assessment interviews preceding the possible sympathetic block, where some patients described suffering from blushing, sweating or trembling, but had no idea whatsoever that they could have a disorder called social phobia.

By returning to the textual material again, I finally formulated a conclusion of the background of social phobia and found four substantial/essential categories "*The four categories of the parents of a socially phobic persons*":

I Violent parents with an alcohol problem
II Dominant parents with high demands
III Negligent parents

IV Good enough parents

The four categories refer to four different background histories of people who, later in their life, suffer from social phobia. These "parenthood types" are next presented as text examples from the original study data. The text examples are formulated by combining texts of different study patients. The numbers after the text examples refer to the patients whose texts the example is from. More text examples are presented in joint publication number V.

I Violent parents with alcohol problems

> In her childhood, the father was drunk all the time. When he drunk heavily, he went totally mad and had rows with the mother. The children had to resolve these fights. The father was violent and demanding. He was often so drunk that he couldn't stand and was brought home in a car and carried into the house (3, 10, 11, 13, 21, 29).

It usually is the father who drinks, and the violent type of alcoholism is the most common manifestation of this background. The children of the family have no opportunities to learn that any close relationship can be safe. This feeling of insecurity of social relationships is then generalised to concern all social interactions. The children are often in the middle of fights and have to resolve them or to take the parent's role when the parent himself is unable to do that.

II Dominant parents with high demands

> My mother is a "career woman". When I was raped, she said it was my own fault. My mother was a teacher and she forced me back to school, when I tried to drop out. She was "the dominant person" in our family; she was busy and angry and demanded me to be diligent and obedient. I was so ashamed when she made me do something that I was embarrassed to do in front of people. My father was so demanding that nothing I did was good enough for him, no matter how well I managed at school (1, 29).

In these families, the parents are so engaged in their own career prospects and so demanding that the child cannot get any positive feedback on her achievements. The demands cause the children to be always alert in social interaction. They mustn't make fools of themselves because otherwise the parents would be ashamed of them. In the literature, parental overprotectivenss is given as one reason for social phobia (Wittchen & Fehm 2003), but this did not come up in the textual material studied here.

III Negligent parents

> She knows nothing else about her father except his name. Her mother has told not to contact her father at all. She becomes anxious and begins to cry when talking about her father and says that it is hard to talk about him because her mother has told her not to do so (24).

> My younger brother became the apple of my eye, and I was left to take care of him when I was three years old. When I was six years old, I went to day-care and came home all by myself (1).

The parents can be absent in many ways, both psychologically and physically. Psychologically, the parents can be involved in other things, such as work, and the children must manage on their own; or the use of alcohol takes all their attention, so that they do not

even notice that their children are present. Either one or sometimes both parents are "lost", and someone else brings up the child. The disturbances in parent-child interaction take place in early childhood or in the latency age, when the child's basic safety has already developed, and that probably explains why these children do not become psychotic but rather have problems with self-esteem, which cause feelings of inadequacy in social relations.

IV Good enough parents

> My home was situated in the remote countryside, where you could see no other houses, people, cars, horses or other traffic. I spent all my summers playing by myself in the sandpit deep in my own thoughts. I have been shy all my life, but it didn't become a problem until we moved (2, 4).
>
> My childhood was normal. We had three children and good parents. My parents did not use alcohol, nor were they violent. My mother told me she was also "a blusher", and I think my symptoms are therefore of biological origin. When I started school and went to the army, my anxiety began (5, 14, 18).

It is typical of these families that the parents did their best, but because of the external circumstances (living in an isolated area) and probably because of the parents' own problems and symptoms, the child learns to be afraid of other people. It is impossible to make any conclusions about the contribution of biological or environmental aetiological factors to social phobia, if both isolation and parental symptoms occur simultaneously.

Another aim of this study was to describe the course of social phobia and to assess the meaning of social phobia in people's lives, and I therefore returned to the texts again. At this phase, I could not concentrate on one particular time dimension but rather concentrated on the categories that described the course of the person's life. It turned out that there was a certain kind of "snowball effect" in their lives, and that they ended up with increasingly severe difficulties in life. I finally named my other substantial category as "*The vicious circle of social phobia*".

The vicious circle in these persons' lives begins with the poor self-confidence and the feelings of shame they have. They have not received any positive feedback in the past and have learned to be very demanding about themselves. They never were praised in childhood, and this feeling of inadequacy followed them into adulthood. They began to be afraid of situations where they might be under scrutiny or become criticized, became addicted to alcohol while trying to relieve their symptoms and finally ended up in total isolation. Isolation then made them feel more ashamed, and the circle therefore continued.

I thought that the best way to describe this vicious circle would be to present one life history, which was again formulated by combining texts from different study patients. Regardless of the differences in these persons' childhood experiences, the influences of social phobia on their adult lives were very similar. One story is therefore enough to describe the meaning of social phobia. By combining texts that describe the life histories of different phobic persons, one dense description or a story about the life of a person of this kind is formed and presented next. The text is not a direct citation from the textual material that was analysed, but there are certain phrases and words that the patients used themselves. I have not mentioned the texts of which the story has been formulated, because there are quotations from all the texts of the 31 study patients. In order to make

the text more readable, I replaced the word "patient" with the name Marie, which does not refer to any real patient.

Story about Marie, a lady with severe social phobia

Marie's parents were alcoholics or career-oriented, possibly lived in the remote countryside where you really had no chance to learn anything about the rules of social life or were phobic themselves.

As a child, Marie played alone in the sandpit and had to take care of herself because her parents were either too drunk to be able to take care of anything or so engaged in their work that they didn't have much time for the family. Marie also took responsibility for her younger siblings. Her younger brother was the apple of her eye, and when she was three years old, she was sometimes left alone to take care of him. When she was six years old, she went alone to day care centre and came back home. But sometimes she also had to take responsibility for the whole family, when she had to intervene in the fights between her father and his drunken friends. During the father's fights, all the siblings and their mother sometimes ran away, but Marie didn't leave because she was sure that she could get her father to calm down.

Marie didn't really have any symptoms of phobia before she was seven years old. In social situations, her hands started to tremble, she couldn't even write her name while someone was watching, her voice was stuck in her throat when she had to make a phone call, she felt short of breath, and she thought she was dying or losing control of herself. She had to make strict plans for how she would be able to do her shopping and banking, and the timing was extremely important: she could go there only when she thought there weren't too many other people around, and she preferred small shops.

At school she was a talented student, but her parents didn't encourage her to study further. When her teacher wrote a letter to her parents and praised her, suggesting that she should continue her studies at high school, her mother ripped the letter in front of her. On the other hand, Marie never had the feeling that she was "good enough" in spite of her good grades.

At school, students must give presentations, and so did Marie. She was on the first grade of high school when she had to go in front of the others in the classroom and read a text from a book. She had a huge panic attack, she didn't see the letters on the page, didn't see other students, she almost fainted, felt she was dying. The teacher made the situation even worse by mocking Marie because of her behaviour.

The symptoms got worse when she moved from primary school to secondary school and she had to drop out of college because of them. Sometimes the presentations or the singing tests in music classes were so impossible to face that she had to skip school. She was mocked because of her shyness and her appearance, and she even wished that the school building would burn down so that she wouldn't have to go there any more. She was so ashamed of her symptoms and already afraid of difficult situations in advance that she lost her self-esteem completely. After that, she felt guilty, blushed and trembled even when the teacher accused the students about something she was totally innocent of.

In spite of her difficulties, Marie wanted a job where she could be near people, but thought she would never be able to do that. However, she went to study to be a nurse. She would have wanted to study further, e.g. to become a doctor, but because of her fears, she settled for the nursing programme. She was very lonely during her studies and never attended any social events of the other students. After graduation, she worked in a local health care centre. She didn't have any symptoms when she was taking care of patients, because she knew that, if she did her job well, the patients would be pleased with her. In the company of her colleagues, she was afraid of being under scrutiny and her trembling and sweating prevented her even to have lunch with them.

Marie started dating when she was 17 years old. Her boyfriend was older than she was, and after they got married, Marie found out she was married to a violent alcoholic, who closely resembled her father. She divorced and later found another partner, who was a kind, gentle man. She called her other husband "her own nurse", with whom she was able to go outside her home, and he thus prevented her from being totally isolated.

Her second husband finally made her seek help. She went through different individual therapies (e.g. psychodynamic, cognitive and cognitive-behavioural) and medications (e.g. alprazolam, diazepam, beta-blockers, citalopram, fluoxetin) and ended up being addicted to benzodiazepines and alcohol. Then she heard that one private clinic was offering help to people suffering from exactly the kind of symptoms that she had, and because she felt that was the only possibility left, she went through the examinations in the clinic and finally decided to have sympathetic blockade. After the blockade, she didn't dare to break her isolation without help. She was therefore guided to attend cognitive-behavioural therapy again, to become able to expose herself to formerly impossible social situations.

Marie's story had a happy end. After the blockade she felt she was "normal", she wasn't afraid any more, she enjoyed her life, feeling that she has been given a new life. She didn't need any medication any more. She said that the blockade must have cut some unwanted connection between her psyche and soma, and this helped her to get out of the imprisonment of social phobia.

In Marie's story, all aspects of the vicious circle are intertwined and interacting in a way that leads to increasingly difficult hardships in life. Poor self-confidence and shame developed in her early childhood because of the lack of positive feedback no matter what she did. She gave up her dreams about education, was insecure in her close relationships and avoided social interaction, had comorbid disorders and lived a very restricted life. But there was an idea of a more "social Marie", who wanted to be with people. At this point, it must be remembered that, according to some studies, not all of the shy or phobic persons are eager to have social life (we could call them ‘fearfully shy persons’) (Schmidt & Schulkin 1999). There are phobic persons who consider themselves solitary souls, but are happy with their life as it is, and the people in that group naturally do not seek help in order to become more social. More examples of life-stories found in this patient group are presented in the joint publications II and III.

5.4 Discussion

The purpose of this study was to increase our understanding about social phobia, its background and its meaning in people's lives. The aetiology of social phobia has formerly been studied with quantitative methods, and both heritable components and childhood traumas have been recognised as etiological factors (Knowles & Mannuzza 1995; Stein *et al.* 1998; Cloiter & Shear 1995; Clark & Wells 1995; Tancer *et al.* 1995, Telaranta 1998, Wittchen & Fehm 2003). Theories say that some children with social phobia may have biologically based personal trait called behavioural inhibition, which may lead to severe shyness when the child grows older (Kaplan & Sadock 1998, Wittchen & Fehm 2003). As formerly described, the parents of people with social phobia may be, as a group, less caring, more rejecting or more overprotective than other parents. Inappropriate parental child-rearing attitudes, negative peer relations and disturbance in the social facets of self-esteem may also lead to social phobia (Bruch & Cheek 1995). Merikangas *et al.* suggest (2003) that psychosocial stressors in childhood could be precursors of behavioural disorders and depression, but not anxiety. *However, our qualitative, phenomenological and grounded theory methods showed that insecurity in childhood or isolation are very usual amongst people with social phobia, and parental overprotectiveness as the sole predisposing factor did not come up in this material.*

In epidemiological studies, social phobia has been estimated to be more common amongst women, but it has been suggested that men as a group have greater psychosocial impairment because of it, and the generalised form of social phobia could hence be more common among men (Wittchen & Fehm 2003). In the PART I of our study, this difference was also seen, because only the group of people who had a broad range of symptoms and were thus considered to suffer from generalised social phobia was studied, and there was a larger proportion of men amongst them (19 male vs. 12 female).

In our series, social phobia was often found in most members of the family, the utmost example being one family where all the six sons suffered from social phobia. Of the biological and psychosocial aetiological factors, the psychological and environmental factors seem to be more significant in the development of phobia: when the parents are also shy, the child may still develop into a normal social person if the environment is safe, while a phobia develops if the person is exposed to such experiences as bullying at school, life in isolation or embarrassing situations that trigger phobic symptoms. The onset of phobic symptoms often coincided with the starting of school. The reason for this may be that entry into school life is usually the first time when a child has to face strange people and her "life circle" expands (Roos 1988). The combination of this and life with violent or alcohol-addicted parents was a direct route to social phobia, which started in childhood and generalised early. The above-mentioned six siblings were children of an alcoholic father, and at least four of them ended up to seek help from sympathetic blockade.

The findings of the part of the study that addressed the course and meaning of social phobia in people's lives were basically similar compared to the earlier findings (Schneier 1992, Kessler 1994, Kessler 2003). *Difficulties in the areas of role impairment, professional help seeking, use of medication, education, employment, family relationships, marriage and romantic relationships, friendships or social network, comorbid disorders, suicidal behaviour and impairment in the self-regulation of alcohol use were all seen in this*

material. Any kind of social relationship is a threat against which a person with social phobia must develop coping and defence mechanisms. But her means of coping or defending herself only make the situation worse: she drops out of school and probably does not get any professional education, isolates from people, cannot start a family and treats her symptoms with excessive amounts of medication and alcohol. Even though these facts have been known for years, persons with social phobia are still not taken seriously today. Their tendency to fall into a deepening and worsening "vicious circle" of symptoms, feelings of shame and preliminary fears may not be recognised by health care professionals because these people lack the courage to seek help, and while seeing a doctor, do not talk about their problems, which are often underestimated, and the people are merely categorised as "normally shy persons". *The most obvious result of this part of the study was that people with social phobia feel that they have lost one essential aspect of life while being incapable of social interaction and while knowing that their life could have gone in another, more "social" way.*

Rauhala's phenomenological background theory was applied here, because it was easy to analyse the large textual material based on this theory. For the researcher, being a psychiatrist, the resemblance between Rauhala's theory and the biopsychosocial model of disease made the theory easier to comprehend; the medical knowledge from psychiatric education and the everyday work at psychiatric clinics was consistent with Rauhala's ideas. In the analysis, the situationality themes of the research patients' texts emerged as the primary data. Situationality consisted of the person’s past, present and future and was the best source of information about the background history, course and meanings of social phobia. The prominence of situationality themes in the data supports the theory of social phobia being a disorder strongly bound to situation.

The reliability and validity of qualitative research can be estimated from the methodological, data and researcher’s points of view. The methodological point of view about reliability and validity is concerned with the suitability of the method to study to the kind of subjects that are supposed to be studied. The main methodology used in this study was grounded theory, which was chosen because of the abundant textual material to be studied and because the documentation of the analysis and, hence, the interpretation of the process of analysis by the reader, were easy. Being based on the data, the grounded theory is also said to be a suitable method for studying any processes in human action. The grounded theory is a suitable method in the research of delicate and less widely investigated topics. I found only one qualitative study about the course of social phobia (Chartier *et al.*1998) in my literature search, which means that qualitative methods have been rarely used to study this disorder. Amongst anxiety disorders, it is by far the least widely studied disorder, although there has been an increasing interest in it since the 1980s, as shown by the increasing number of quantitative studies.

Glaser and Strauss consider (Glaser & Strauss 1967) a study valid if the rules of the method are strictly followed. The data-related criterion of reliability and validity is met by using different kinds of data and by saturation and triangulation. In this study, triangulation was performed at three different levels: data triangulation was achieved by collecting data from different sources (interviews, patient files and patients’ essays), methodological triangulation was done by combining the phenomenological and grounded theory methods, and researcher triangulation was performed by parallel reading of the data by two different investigators. In this study, Leena Väisänen, Ph.D. did the parallel reading of the

material and came basically to same conclusions as the researcher. The findings about patients' family backgrounds also corresponded to the findings of an earlier study (Telaranta 1998).

Different investigators do not necessarily end up with similar conclusions. In qualitative research, however, the results are "only" one part of the reality and always filtered through the investigator. In hermeneutical science, the manifestation of reality *is* reality, and the researcher participates in the production of reality. Therefore, the idea of the researcher's total objectivity in qualitative studies is impossible. The researcher's personality, attitudes and expectations inevitably influence the results of the study.

When analysing reliability and validity from the data point of view, it should be borne in mind that biographical essays also differ: some are autobiographies that describe a person's life in detail, while some are life-stories told to another person in social interaction (Roos 1988). Life-stories, or life narratives, differ from life histories in that a history can be verified, but a story is produced (Bertraux 1981). A life story is produced within the constraints of the rules of social interaction, and it hence differs from an autobiography, which is written by the person herself without immediate contact with the reader (Vilkko 1988). However, both forms of stories follow the same principles: their structure is simple and chronological. The present research data were versatile and thus informative, since they consisted of both materials generated in social interaction (interviews and patient files) and written materials produced by the patients. One category of texts analysed consisted of the autobiographical writings I had requested. While writing their feedback letters, the patients did not know who would read them (the researcher, the surgeon or the reception nurse), while the autobiographies were sent to me personally. By combining data from different sources, it is possible to minimise the influence that the researcher's personality, profession and motives might have on results of the study.

As any other treatment method, the blockade does not help everyone, and the end of the Marie's story could also have been different. Marie had the support of her second husband, and in spite of her difficulties in childhood, her personality had developed nearly normally. If she had had a personality disorder which would have gone unnoticed and undiagnosed during her many health care visits, and the sympathetic blockade had been done, the result could have been worse. When the patient also has deeper psychopathology, such as personality disorders, psychoanalysis or psychodynamically oriented psychotherapy is primarily needed (Alnaes 2001). A seriously disordered patient cannot profit from cognitive-behavioural or exposure therapy before she has gained more insight into her problems and is then able to liberate resources for exposing herself to anxiety-provoking situations. Psychotherapeutic interventions alone can be more effective than drug therapy, but the combination of medication and therapy seems to lengthen the remission time that might be attainable with medication (Stravynski & Greenberg 1998). Also, serious drug and alcohol addiction may impair the results, if psychic and physical dependence has developed, and the goal of the drug use is not to relieve the phobic symptoms any more (Pohjavaara *et al.* 2001). A good example of this is again seen in the family of six sons mentioned earlier. Of the four sons, the one who did not get any help from sympathetic blockade was severely addicted to alcohol.

Social phobia seems to be very heterogeneous both in its aetiology and in its symptomatology. It impairs the quality of life and causes costs both to the individual and society in the form of medication, hospitalisation and pensions, not to mention the loss of talents of

the persons who cannot educate themselves because of their symptoms. In this study, I concentrated on the generalised form of social phobia, in which the persons experienced many physical symptoms and feared all kinds of social situations. However, it would be interesting to find out if there are differences in the backgrounds of the persons who "only" blush, tremble or sweat. This thought came to my mind when I noticed, in one setting, three firemen who all suffered from blushing. Whether or not this was merely a curious coincidence, the patients' life histories could answer the question of why not all phobics have similar symptom profiles.

6 Part II. Endoscopic sympathetic block in the treatment of social phobia (a quantitative, open, prospective, non-controlled, non-randomised follow-up study)

6.1 Background and aims of the part II of the study: Problems in the treatment of social phobia

About 50–70 % of persons with social phobia get help from conventional methods of treatment, such as medication and psychotherapy. Beta-blockers, benzodiazepines, MAO inhibitors or SSRI drugs may be effective (e.g. Schneier 1995, Davidson JRT 2003), but they require long-term use and may also cause side effects and addiction problems. The idea of long-term medication is not tempting, and since these people often have already developed addiction to alcohol, no further addiction-provoking agents are needed.

Because endoscopic sympathetic block has widely been regarded as the treatment of choice for basically the same physical symptoms that occur in social phobia (Wittmoser 1985, Drott *et al.* 1993, Kao *et al.* 1996, Yilmaz *et al.* 1996), and because many biological studies indicate the obvious probability of sympathetic overactivity in patients with social phobia, it was considered ethically sound to use surgical sympathetic block for carefully selected patients with severe and chronic social phobia resistant to psycho- and pharmacotherapy. In the Part II of this study, the effect of endoscopic sympathetic block was studied in a group of patients with social phobia who had not obtained any help from medication and/or psychotherapy.

6.2 Material and methods

Study design. This was an open, uncontrolled, unrandomised, prospective follow-up study of 169 patients who had undergone one- or two-sided endoscopic sympathicotomy (cauterisation of the sympathetic nerve) or sympathetic block (clamping of the sympathetic nerve with metallic clips) during 1995–2000. The method was quantitative, but the results

were also evaluated from a qualitative point of view. The purpose of the qualitative assessment was to find out what kind of psychosocial stressors, which were called "insecurity factors" and will be described later in the chapter titled "*Data gathering and analysing process*" (Telaranta 1998), the patients had in their life history, and whether the results were consistent with the results of the Part I of the study.

Statistical analysis. The statistical analysis was done using primarily one-dimensional and, when comparing the different surgical methods, two-dimensional variance analysis (ANOVA) (Uhari & Nieminen 2001). Variance analysis includes a large number of tests to show the variance between the sub-groups of data. One-dimensional analysis is usually chosen if changes are possible in only one dimension, but two-dimensional analysis is more commonly used in medical research (Uhari 1998). Variance analysis was chosen because of its usefulness in comparing more than two subgroups of data and in the case of repeated tests.

In our series, the changes in patients' symptoms were estimated repeatedly during the follow-up (one month after the operation, six months after the operation, one year after the operation and after that annually), which is why variance analysis of repeated tests, which compares the means of the values of repeated tests, was chosen. It was possible to include grouping factors, which divided the data into to subgroups independent of each other, by using this statistical method. The series was divided into subgroups of different genders, educational and professional levels and different "insecurity factors". Then, the effect of ESB on both psychic and physical symptoms of social phobia and the patients' satisfaction with the result were analysed with reference to the method of operation and the follow-up time. The complete mathematical formulas used in the variance analysis have been described by Matti Uhari and Pentti Nieminen (Uhari & Nieminen 2001).

6.3 Data collection

The study subjects had been suffering from social phobia for over five years, and they had not got any help from medication and/or psychotherapy. If their previous treatment had been inadequate, they were offered medication and/or psychotherapy, and if the outcome was still unsatisfactory, and if there were no contraindications for the surgical procedure, the operation was done. Patients with panic disorder, borderline personality disorder and untreated depression at the time of the decision on the operation were excluded. Somatic contraindications included hyperthyroidism, pheochromocytoma and any state of hormonal imbalance. The 169 patients in the final analysis were chosen based on these inclusion and exclusion criteria. The formulation of the data is presented in Fig. 2 and Table 3, and more information about the study subjects is presented in Table 4.

The patients were interviewed by a doctor (operating surgeon and psychiatric trainee), a psychologist or a professor of psychiatry, and the diagnoses of social phobia were made according to DSM IV. A typical unstructured psychiatric diagnostic interview was performed, and a questionnaire on the patients' experiences and possible feelings of insecurity in childhood and adolescence was filled in at the appointment (Appendix 3). In the questionnaire insecurity was categorised as being related to psychological and physical violence, alcoholism in a family member, being a victim of school bullying and strict reli-

gious demands in the primary family. These categories were selected because their strict prevalence in the patient group had been previously noticed (Telaranta 1998). The modified versions of Davidson's brief social phobia scale and the Liebowitz quality of life scale (Davidson *et al.* 1997, Taiminen 1998) were also included in the same questionnaire. The scales were modified into a simpler form in order to emphasize the aspects and symptoms under study.

If there were no contraindications for the blockade, and if the patients gave a written consent for the operation after having had complete information about the procedure and its possible side effects, the operation was performed.

The severity of the patients' psychic and physical symptoms was scored from 1 to 5 using a modified version of Davidson's brief social phobia scale before the operation, at the control visit one month after the operation, 6 months after the operation and thereafter once a year. The symptoms and the meanings of the different scores are presented in Table 5 in the *Results*.

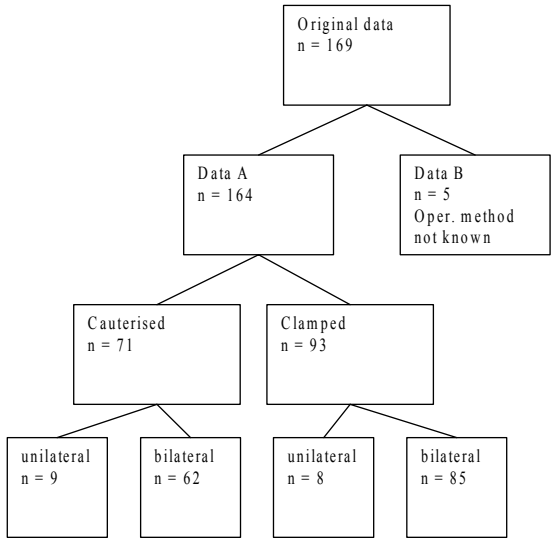

Fig. 2. Subgroups of operated patients.

6.4 Endoscopic sympathetic block

The surgical procedure was made endoscopically under general anaesthesia. The procedure was performed mainly bilaterally (152 bilateral operations and 17 unilateral operations). The procedure was carried out endoscopically by clamping the thoracic 2–3 ganglions with metallic clips (Lin *et al.* 1998). The level of clamping was determined based on the main physical symptom: clamping of the second thoracic ganglion was done on blushing persons, and clamping of the third thoracic ganglion was done on persons with blushing and hand sweating. This classification has been described in detail elsewhere (Lin & Telaranta 2001). The operation was performed under general anaesthesia in rou-

tine operating room conditions, and it has the same risk level as any other thoracoscopic operation. The clamping is reversible and causes fewer side effects than the use of the more invasive techniques. Because of adhesions, the procedure occasionally had to be performed using cauterisation.

Table 3. Variables analyzed in the different data sets.

Data A	Data A + B
Sociodemographic data	Sociodemographic data
Insecurity factors	Insecurity factors
Changes in symptoms of social phobia during follow-up	Changes in symptoms of social phobia during follow-up
Comparison of the clamping and cauterizing methods	

6.5 Results

The results of this part of the study are presented in the joint publication I, and they are also briefly mentioned in the joint publication IV. The findings on sociodemographic background and "insecurity factors" are presented in Table 4. The patients were aged between 18 and 60 years at the time of the operation, and there were 111 female and 58 male patients. 68% of them had college level education, 14 % had university level education, and 17 % were students, unemployed, on disability pension or had no education (group labelled as "Other"). There were 71 cauterised patients (62 of them had had a bilateral operation and 9 a unilateral operation) and 93 clamped patients (85 bilateral operations and 8 unilateral operations). There were 5 patients for whom the bilateral operation was planned, but their operation files were not available for the researcher. These patients were therefore excluded from the comparison of the clamping and cauterisation methods, but included in all the other statistical calculations. The longest follow-up time was over 48 months (7 patients), and the other follow-up groups included the following numbers of patients: 17 in the group of 0–6 months, 30 in the group of 7–12 months, 53 in the group of 13–24 months and 62 in the group of 25–48 months. The patients' mean age at the time of surgery was 37 years.

Table 4. Number (N) of patients by gender, education/professional background (Other = no education, student, unemployed or retired) and insecurity factors.

Gender	N
Female	111
Male	58
Total	169
Education	N
Not known	2
University level	24
College level	115
Other (unemployed, no education or in pension)	28
Total	169
Insecurity	
Physical	40
Psychic	80
Alcoholism	41
School bullying	56
Religious strictness	36
No insecurity	37
Yes insecurity	127
Not known	5
Total	169

About half of the patients had experienced some kind of psychological insecurity in their childhood, and one third had had one or more other insecurity factors (alcoholism of a family member, physical violence, religious strictness or school bullying), and this difference was statistically highly significant (Table 4, Figs 3 and 4, Appendix 5a)

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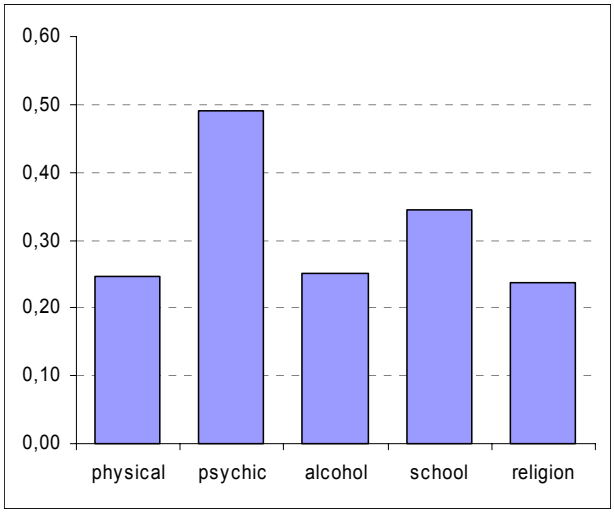

Fig. 3. Prevalence of "insecurity factors" in the study patients presented as percentages.

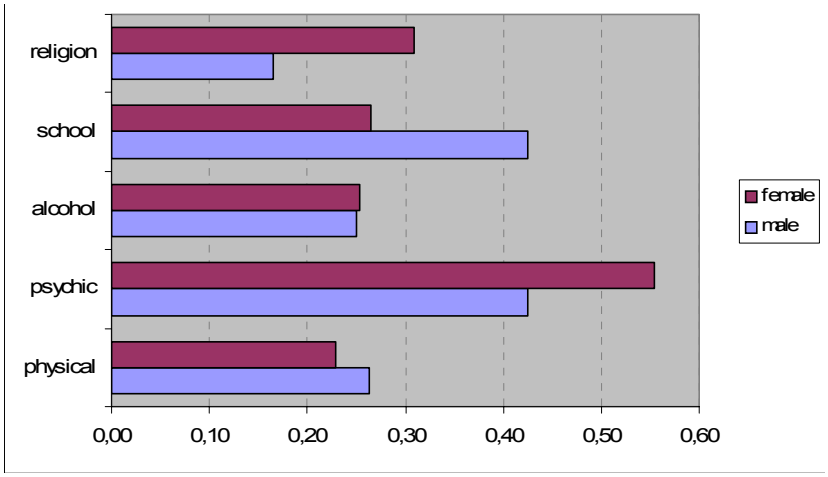

Fig. 4. "Insecurity factors" of males and females presented as percentages.

About one fourth of the patients had experienced no insecurity at all, and about one half of them reported one or two insecurity factors. Men had suffered from school bullying more often than women (43 % vs. 27 %, p-value 0.03), while women had suffered slightly more psychological insecurity (55% vs. 43%, p-value 0.10) and had faced more strict

religious demands than men (31% vs. 16%, p-value 0.04). Physical abuse had been more common in the older age group (age groups 20–39 and 40–59 years, 18% vs. 35%, p-value 0.08) (Fig. 5). The patients with professional education (not university level) had had more alcoholism in their families than the others (31% vs.13%, p-value 0.07) (Fig. 6).

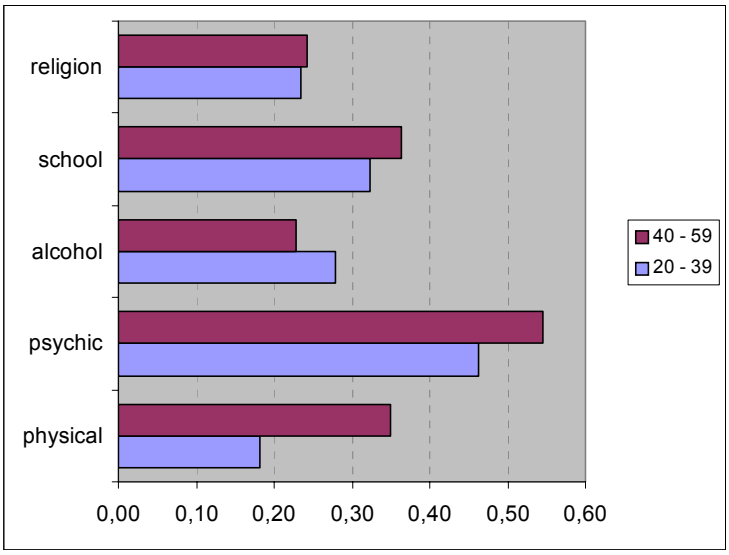

Fig. 5. "Insecurity factors" in different age groups (20–39 years and 40–59 years) as percentages.

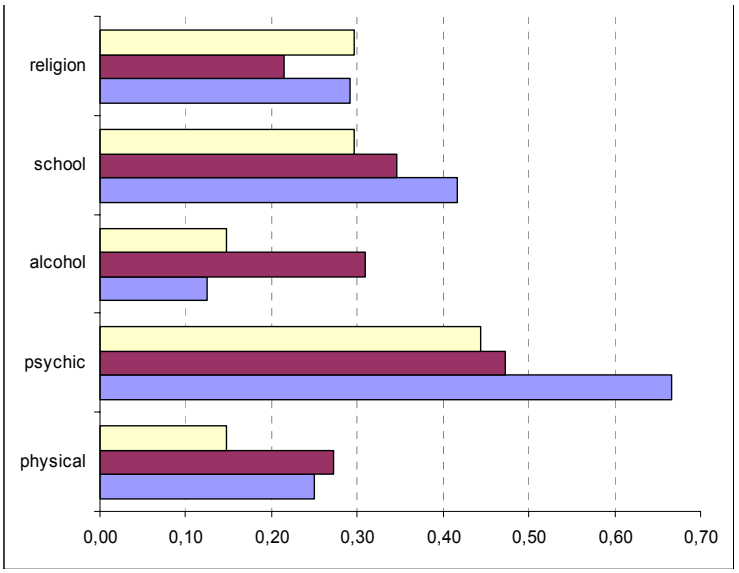

Fig. 6. "Insecurity factors" in the educational groups as percentages. Groups: white= other, lighter grey= university level, darker grey= college level.

The number of insecurity factors in childhood did not seem to have any significance for the outcome of the operation. The changes in symptom severity and stability of the outcome after different follow-up times are presented in Table 5 and Figs 7–9. The changes in symptom severity were calculated by subtracting the postoperative symptom severity value from the preoperative severity value, and the remainders were used in the statistical analysis. The severity of reflex sweating of the trunk was also included in the symptom questionnaire because it is known to be the most common side effect of the operation. The unilateral clamping procedure seemed to be equally effective as bilateral clamping or bilateral cauterisation. The target effect seemed to increase over time when sweating of the hands was treated (p-value 0.05), while the effect on the other symptoms remained the same during follow-up.

Table 5. Changes in the psychic and physical symptoms of social phobia.

Variable	N	MEAN	SD	Dev. from 0
Performance anxiety	148	1.,58	1.12	+++
Fear of observation	149	1.,49	1.36	+++
Embarrassment	148	1.61	1.24	+++
Coffee cup neurosis	148	1.34	1.35	+++
Alertness	138	1.36	1.28	+++
Sweating of hands	151	1.61	1.46	+++
Sweating of head	147	1.21	1.42	+++
Blushing	150	1.87	1.36	+++
Palpitation	151	1.94	1.29	+++
Trembling of hands	150	1.04	1.47	+++
Trembling of head	98	0.78	1.14	+++
Sweating of trunk	138	–0.77	1.20	+++

Symptom severity scale: a modified version of Davidson's brief social phobia scale
Symptom severity: 1= no harm, 2= little harm, 3= some harm, 4= much harm and 5= very much harm of this symptom
Changes in symptoms= Preoperative symptom severity minus postoperative severity
Statistic calculations with one-dimensional variance analysis; H0: no change, H1: operation had an effect.
+= almost significant, ++= significant, +++= highly significant

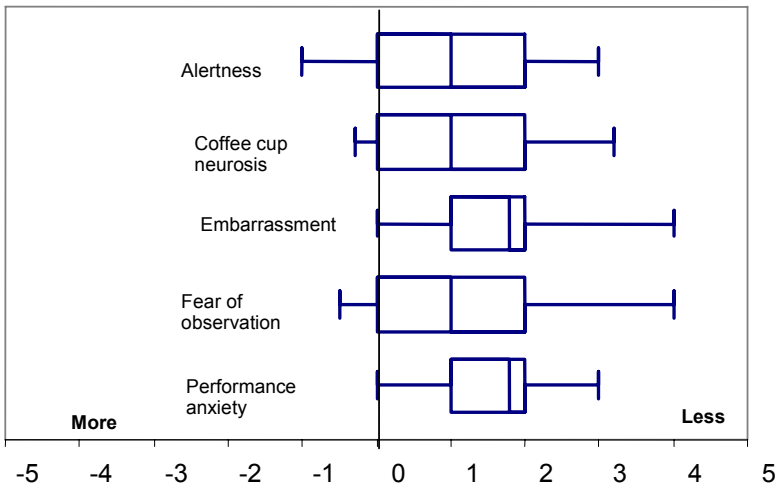

Fig. 7. Changes in the psychic symptoms of social phobia presented as remainders of equation: preoperative symptom severity – postoperative symptom severity. Symptom severity scale presented in Table 6.

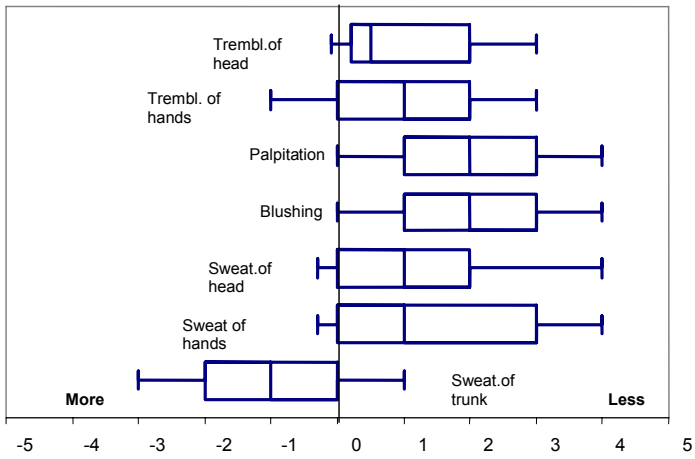

Fig. 8. Changes in the physical symptoms of social phobia presented as remainders of equation: preoperative symptom severity - postoperative symptom severity. Symptom severity scale presented in Table 6.

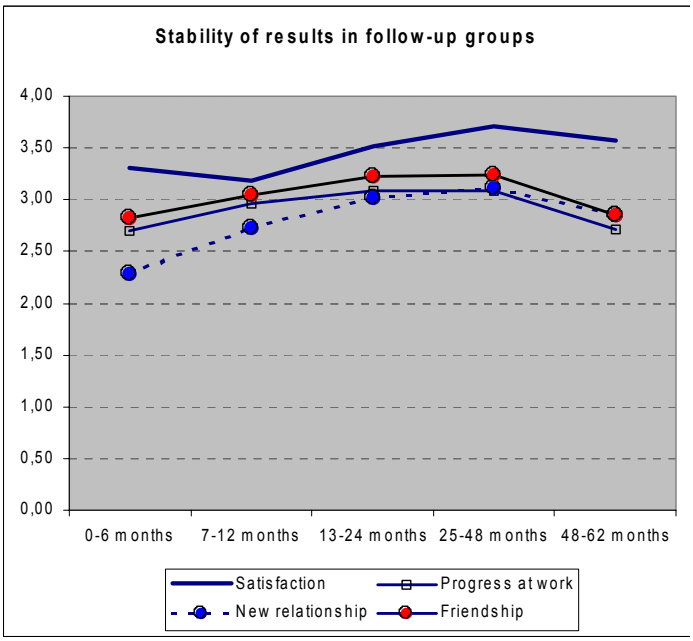

Fig. 9. Stability of the outcome during the follow-up. Satisfaction with the operation presented as numerical values. Values 1 to 5 (1= regrets the operation, 2= no help of the operation, 3= some help of the operation, 4= satisfied with the operation and 5= very satisfied with the operation)

Overall satisfaction with the operation was also asked in the follow-up questionnaires, and it was estimated by the patients themselves on a five-point scale as follows: 1= regrets the operation, 2= no help of the operation, 3= some help of the operation, 4= satisfied with the operation and 5= very satisfied with the operation (Table 6). The mean of overall satisfaction with the operation was rated around 3.5, and it remained unchanged over time, and even seemed to even increase over time in the cauterised patients. There were no differences in the satisfaction rates between the age or educational groups and genders.

The patients were also asked about the different aspects of their quality of life, and they evaluated the effect of the operation on them. The scale was the same as in the overall satisfaction item. The patients had had some benefit of the operation for their performance at work, in dating and in social relationships (Table 7 and Fig. 9). More information about the statistical analysis, tables and pictures is presented in the Appendixes 4 and 5.

Table 6. Patient satisfaction inquiries.

Aspects of satisfaction asked	Scores 1 to 5 to each aspect
Overall satisfaction	1= regret the operation
Impact on work performance	2= no help at all
Impact on dating	3= some help
Impact on other social relationships (mainly friends	4= much help/ satisfied
	5= very much help/ very satisfied

Table 7. Satisfaction with the outcome of the operation.

	Follow-up in months after operation					
	0–6	7–12	13–24	25–48	49–62 sum	
Overall satisfaction						
Mean	3.31	3.18	3.51	3.71	3.57	3.52
SD	1.25	1.16	1.08	0.95	1.27	1.07
Count	13	28	51	62	7	161
F= 1.34; degrees of freedom: 4 and 156; p-value 0.259						
Progress at work						
Mean	2.70	2.96	3.09	3.08	2.71	3.02
SD	0.95	1.02	0.77	0.90	0.95	0.89
Count	10	25	44	59	7	145
F=0.71; degrees of freedom: 4 and 140; p-value 0.588						
New relationship						
Mean	2–29	2–72	3–02	3–11	2–86	2–96
SD	0–49	0–98	0–77	0–94	1–07	0–90
Count	7	25	43	55	7	137
F= 1.94; degrees of freedom: 4 and 132; p-value 0.108						
Friendship						
Mean	2.82	3.04	3.23	3.24	2.86	3.15
SD	0.98	1.18	0.83	0.84	0.69	0.91
Count	11	26	48	59	7	151
F= 0.87; degrees of freedom: 4 and 146; p-value 0.482						

Numerical codes: 1= regrets the operation, 2= no help of the operation, 3= some help of the operation, 4= satisfied with the operation and 5= very satisfied with the operation
Statistical calculations carried out with one-dimensional variance analysis; grouping variable: follow-up groups

6.6 Discussion

Based on the literature, social phobia seems to be more common in females than males (Heimberg *et al.* 1995, Wittchen & Fehm 2003), and this finding was confirmed in our study. Social phobia is also described to be more common among individuals who are young, poorly educated, of low socioeconomical status and unmarried. These factors are, however, also common among other psychiatric patients. In our study, only one sixth of the patients were not employed, and only a small part of them had no professional education, and the finding of low educational level among social phobia patients is thus not supported. Most of our patients had been suffering from their symptoms since childhood or adolescence, which supported the earlier findings on the early onset of symptoms. Unfortunately, marital status was not included in our analysis. On the whole, however, our study seems to support most of the earlier findings on "a typical social phobia patient": the social phobia patient is more often female, her disease has begun at an early age, she has some kind of professional education, often chosen within the constrains posed by the social fears. The patient may not have educated herself for the profession she would have wanted but has preferred an occupation where she does not have to face people.

According to the psychodynamic etiological theories about anxiety, there may be a threat of disintegration of the ego or feelings of shame underlying the symptoms, and developmental and environmental factors in a child's life may lead to behavioural inhibition and social phobia (Cloiter & Shear 1995, Wittchen & Fehm 2003). Of our patients with severe social phobia, only one fourth had experienced no insecurity in their childhood, about half of them had experienced some psychological violence in the form of being mocked, called names or subordinated. This background factor, which was called "psychological insecurity", was the most common of the "insecurity factors" studied. School bullying, religional narrow-mindedness and alcoholism in the family can also be considered psychological stressors. One third of the patients had had alcoholism in their primary families, had experienced physical violence, had been bullied at school or had been under strict religious rules in their childhood. Physical violence was more common in the older age group, which is probably an indication of the changed attitude towards physical punishment in child rearing. Men had experienced more school bullying than women, and this could be due to the stricter social demands applied to men in society: it is more acceptable to be a shy woman than a shy man.

These "insecurity factors" are somewhat overlapping entities and open to various interpretations, and this may partly explain the high prevalence of insecurity in the childhood of the patients with social phobia. However, all these forms of insecurity in childhood may cause severe disturbances in the development of healthy self-esteem, leading probably to various psychiatric disorders, including severe mistrust towards and fear of other people – and ultimately to social phobia. *The subjective experience of insecurity may lead to biological changes and disturbances in the regulation of the autonomic nervous system, causing typical symptoms of social phobia. The findings increase our knowledge of both the psychodynamic and the biological background of social phobia and are consistent with the results of the PART I of this study.*

As mentioned earlier, a study design involving an open, uncontrolled, prospective method is problematic because it is hard to discriminate all the confounding factors and to define the extent of placebo effect on the results. However, this study design is possible when a totally new kind of treatment method is studied. When there is enough information of this phase of the study, and if the new method seems promising, it is time to define its position in the group of other, previously approved treatment methods by studying it in a controlled, randomised, possibly double-blinded study design. In surgical studies, double-blinded designs are impossible and unethical, especially when the operating surgeon is one of the researchers. There are also many others difficulties, including financial ones, when arranging blinded randomisation of the patients operated on in private clinics. Persistence of the treatment effects is said to question the hypothesis of placebo effect (Stravynski & Greenberg 1998). In our study, the longest follow-up times were over 4 years, and the results remained unchanged over time, which disproves the placebo effect.

The diagnoses were made exclusively according to the DSM IV criteria, and the lack of structural diagnostic interviews can be said to be one weakness of the study. There were many interviewers present in the patients' first interviews, the symptoms were recorded precisely, and the diagnoses were checked afterwards from the case reports by a researcher who was a psychiatrist. Structural diagnostic interviews were not used because of the partly qualitative nature of the study, where disorders were understood rather as phenomena of human life than diseases with exact definitions. Another reason was that

some of the interviewers were not familiar with the use of structured interviews. However, it is essential to make the diagnosis with care and to exclude especially borderline personalities and persons with serious alcohol addiction, because their results are poor. Whenever the patient has deeper psychopathology, such as personality disorders, psychoanalysis or psychodynamically oriented psychotherapy are primarily needed in the treatment (Alnaes 2001).

Social phobia has long been a neglected disorder (Heimberg *et al.* 1995), but it is currently acknowledged as a serious, disabling anxiety disorder associated with a marked reduction in the quality of life, and it needs to be studied further (Stein & Kean 2000). The conventional treatment methods (medication and psychotherapy) help only 50–70 % of the patients (Crozier 2001), and when the lifetime prevalence rate is approximately 10 % of the population, there still remains a large group of people who do not get any help. They may have never even had the courage to seek help, or the traditional methods had not been useful. Therefore, new treatment options for social phobia are needed.

In this study, endoscopic sympathetic block was useful in reducing the symptoms of severe social phobia. Although the method is surgical and the effect hence mainly biological, the psychological symptoms of social phobia were also significantly reduced. The results are best if the main symptoms are blushing or palpitation, but even a smaller reduction in the other symptoms is important if it helps the patient to break his isolation. Knowledge of the elimination of embarrassing physical symptoms in social situations helps the patient to expose himself to formerly impossible situations, and success in them also causes psychological symptoms to subside. But the relief of psychological symptoms may also be due to direct a biological effect of the operation on the anxiety-mediating areas in the nervous system. The only meaningful side effect is compensatory sweating of the trunk, but not even that is significant when modern surgical method are used. Clamping is as good as bilateral cauterisation, and the results may be equally good with unilateral and bilateral clamping, but because there were only eight patients who had undergone a unilateral clamping procedure, the material is not sufficient to allow definite conclusions concerning that. The results remain unchanged over time, which shows that they were not due to a placebo effect. In the future, it is important to compare this treatment to traditional treatment in order to find out its place among the other, officially approved methods of treating social phobia.

7 Epilogue

Only one generation ago, very confident investigators tested invasive somatic therapies, such as lobotomy in the treatment of psychiatric illnesses with sad results, as we all know (Fins 2003). Even today, psychosurgery or electrical stimulation of the brain is used to treat treatment-resistant obsessive-compulsive disorder, for instance (e.g. Cosgrove & Rauch 2003; Nuttin *et al.* 2003). The problems in using and studying these treatment methods are the same as in the case of endoscopic sympathetic block. Comorbidity is high among these patients, and comorbid depression and personality disorders, for example, usually have an effect on the surgical outcome. It is therefore important to make the diagnosis carefully (Greenberg *et al.* 2003). In the previous studies concerning the surgical treatment of OCD, the number of patients has been relatively small, and there is hence a lack of long-term prospective follow-up findings. Post-operative psychiatric treatment has also been regarded as important in the case of persons with OCD.

In the present study, too, the weakest link was the diagnosis, and the exclusion of persons with severe personality disorders was considered important. Also, the persons who sought psychiatric help after the operation benefited best. The good aspects of our study were the long follow-up time and the large size of the patient series. The combination of qualitative and quantitative research methods also added to our understanding of social phobia, how it develops, what kind of impairment it causes, and underlined the fact that when a person seeks for help for it, she should be taken seriously.

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Appendixes

Appendix 1 Request letter for autobiographical writings

Tampere

Hyvä

Olen psykiatrian erikoislääkäriksi pian valmistumassa oleva lääkäri, ja teen tohtorin väitöskirjaan tähtäävää tutkimustyötä sosiaalisten tilanteiden pelosta ja sen hoidosta sympaattisen hermon salpauksella, jollainen Sinullekin on tehty. Tarkoituksenani on selvittää sosiaalisten pelkojen vaikutusta ihmisten elämänlaatuun ja sitä, muuttuuko tilanne elämänlaadun osalta sen jälkeen, kun tämä salpausleikkaus on tehty. Tutkimuspotilainani on n. 200 leikattua potilasta, joista n. 10–20:lle erikseen valitulle lähetän tämän kirjeen. Tutkimusraporttieni missään vaiheessa potilaiden henkilöllisyys ei tule käymään ilmi kenellekään muulle kuin minulle, joten näihin kyselyihini vastaaminen on täysin intimiteettisuojasi mukaista.

Elämänlaatututkimukseen liittyen pyytäisin Sinua kirjoittamaan oheiselle paperiarkille omaelämäkertasi, eli elämäntarinasi siten, kuin itse olet sen nähnyt. Toivoisin Sinun käsittelevän siinä lapsuus- ja nuoruusaikaasi, perheolosuhteitasi ja muita ihmissuhteita, koulunkäyntiä ja opiskelua, työelämää ja vapaa-ajan viettoasi, sairauksia ja vaivojasi, joista olet kärsinyt, sekä millaista apua olet niihin saanut ja hakenut. Jos mahdollista, voisit pohdiskella tätä elämänlaatuasiaa myös itse eli millainen on mielestäsi laadukas elämä, ja miten hyvin tai huonosti se on Sinun kohdallasi toteutunut.

Lähetän ohessa valmiin vastauskuoren, jossa voit palauttaa kirjoituksesi Privatix-klinikkaan.

Kiitos jo etukäteen vaivannäöstäsi,

Terveisin Päivi Pohjavaara, psykiatriaan erikoistuva lääkäri

Appendix 2 List of the patients invited to write an autobiographical essay. In the list, gender, year of birth and socioeconomical status are mentioned. F represents female patients and M male patients

I F, 1975, college level education, at work (responded to the autobiographical request, text number 1. in qualitative analysis)

II M, 1930, on pension (responded to the autobiographical request, text number 2. in qualitative analysis)

III F, 1960, university student, (responded to the autobiographical request, text number 3. in qualitative analysis)

IV M, 1931, on pension (responded to the autobiographical request, text number 4. in qualitative analysis)

V M, 1953, university level education, at work

VI F, 1971, university level education

VII F, 1955, college level education, at work

VIII M, 1932, on pension

IX F, 1955, college level education, at work

X F, 1951, university level education, at work

XI M, 1963, college level education, at work

XII F, 1961, college level education, at work

XIII M, 1972, college level education, at work

XIV F, 1953, on pension

XV M, 1970, university education, at work

XVI F, 1975, university student

XVII M, 1949, college level education, at work

XVIII F, 1940, college level education, at work

XIX M, 1956, university level education, at work

XX M, 1978, university student

Appendix 3 Questionnaire and follow-up form of Privatix clinic, which was used during the years 1995-2000

	SEURANTALOMAKE		**PVM**	
Nimi			SOTU	
Asuinpaikka	Syntymäseutu			
Koulutus	Ammatti			Siviilisääty
Puudutuspvm.		Lääkitys		Huumeet
Leikkauspvm				
Tupakointi Rohkaisuryyppy	1 kyllä	2 ei 1 auttaa	Alkoholi 2 käyttää	_____ annosta/viikko 3 ei auta, ei käytä
Oire 1)	2)		3)	
LAPSUUDEN TURVATTOMUUS (1-5)				(1-5)
1. Henkinen julmuus, nöyryytys, ivallisuus				
2. Fyysinen väkivalta, ruumiilliset kuritukset, selkäsaunat				
3. Runsas alkoholin käyttö, alkoholismi				
4. Tiukka uskonnollisuus, kova kuri, vaativuus, korkeat odotukset				
5. Koulukiusaaminen (opettajan tai oppilaiden toimesta)				
6. Iäkkäät vanhemmat, ylihuolehtivuus				
Yht. (maksimi 30 pistettä)				
PELKO JA VALTTELY (1-5)		PRE	POST	POST
1. Esiintymiskammo				
2. Tarkkailun pelko, häpeily yleisessä wc:ssä				
3. Kahvikuppineuroosi				
4. Nolous, häpeily, nöyryytyspelko				
5. Ihmisten välttely, eristäytyminen				
YHT. DAVIDSONIN ASTEIKOLLA (5-25)				
MUU MIELENTERVEYS				
1. Pelko t. ahdistus (yksinkert. pelko)				
2. Masennus (1-5)				
3. Aikaisempi terapia tai Dg				
KEHON OIREET (1-5)		PRE	POST	POST
1. Käsien hikoilu				
2. Pään hikoilu				
3. Punastuminen				
4. Sydämen tykytys				
5. Käsien tärinä				
6. Alavartalon hikoilu				
ELAMANLAATU				
RAJOITTAVUUS/HAITTAAVUUS 1-5		PRE	POST	POST
1. Koulu/koulutus (keskeyttäminen jne.)				
2. Edistyminen työelämässä				
3. Suhteet vanhempiin ja sisaruksiin				
4. Avioliitto/seurustelu/romanttiset suhteet				
5. Ystävyys/sosiaalinen verkosto				
6. Arkipäivän aktiviteetit (kauppa, posti)				
7. Suisidaalinen käytös/elämänhalu				
8. Muut harrastukset/kiinnostukset				
YHT. LIEBOWITZIN ASTEIKOLLA (8-40)				
TYYTYVAISYYS LOPPUTULOKSEEN (1-5)				

Appendix 4 Tables of statistical analysis

Table 8. Mean values of insecurity factors.

Insecurity								
Variable	Count	Mean	Median	Std. deviation	Min	Lower quartile	Upper quartile	Max
physical	163	0,25	0,00	0,43	0,00	0,00	0,00	1,00
psychic	163	0,49	0,00	0,50	0,00	0,00	1,00	1,00
alcohol	163	0,25	0,00	0,44	0,00	0,00	0,50	1,00
school	163	0,34	0,00	0,48	0,00	0,00	1,00	1,00
religion	160	0,24	0,00	0,44	0,00	0,00	0,00	2,00

Group	Count	Mean	Std. deviation
physical	163	0,25	0,43
psychic	163	0,49	0,50
alcohol	163	0,25	0,44
school	163	0,34	0,48
religion	160	0,24	0,44

F = 9,03 degrees of freedom: 4 and 807
p = 0

Table 9. Effects of education, age and gender on insecurity factors.

Effect of education
Physical
Grouping variable: education

	academic	professional	other	sum
mean	0,25	0,27	0,15	0,25
SD	0,44	0,45	0,36	0,43
count	24	110	27	161

F = 0,89 degrees of freedom: 2 and 158
p = 0,411

Condition: 19 < age<= 59
Effect of age
Physical
Grouping variable: age

	20–39	40–59	sum
mean	0,18	0,35	0,25
SD	0,39	0,48	0,44
Count	93	66	159

F = 2,33 degrees of freedom: 3 and 155
p = 0,077

Effect of gender
Physical
Grouping variable: gender

	male	female	sum
mean	0,26	0,23	0,25
SD	0,44	0,42	0,43
count	80	83	163

F = 0,25 degrees of freedom: 1 and 161
p = 0,621

Psychic
Grouping variable: education

	academic	professional	other	sum
mean	0,67	0,47	0,44	0,50
SD	0,48	0,50	0,51	0,50
count	24	110	27	161

F = 1,66 degrees of freedom: 2 and 158
p = 0,193

Psychic
Grouping variable: age

	20–39	40–59	sum
mean	0,46	0,55	0,50
SD	0,50	0,50	0,50
count	93	66	159

F = 0,94 degrees of freedom: 3 and 155
p = 0,425

Psychic
Grouping variable: gender

	male	female	sum
mean	0,43	0,55	0,49
SD	0,50	0,50	0,50
count	80	83	163

F = 2,73 degrees of freedom: 1 and 161
p = 0,100

Alcohol
Grouping variable. Education

	academic	professional	other	sum
mean	0,13	0,31	0,15	0,25
SD	0,34	0,46	0,36	0,44
count	24	110	27	161

F = 2,77 degrees of freedom: 2 and 158
p = 0,066

Alcohol
Grouping variable: age

	20–39	40–59	sum
mean	0,28	0,23	0,26
SD	0,45	0,42	0,44
count	93	66	159

F = 0,93 degrees of freedom: 3 and 155
p = 0,43

Alcohol
Grouping variable: gender

	male	female	sum
mean	0,25	0,25	0,25
SD	0,44	0,44	0,44
count	80	83	163

F = 0 degrees of freedom: 1 and 161
p = 0,965

School
Grouping variable: education

	academic	professional	other	sum
mean	0,42	0,35	0,30	0,35
SD	0,50	0,48	0,47	0,48
count	24	110	27	161

F = 0,4 degrees of freedom: 2 and 158
p = 0,668

School
Grouping variable: age

	20–39	40–59	sum
mean	0,32	0,36	0,34
SD	0,47	0,48	0,48
count	93	66	159

F = 0,72 degrees of freedom 3 and 155
p = 0,539

School
Grouping variable: gender

	male	female	sum
mean	0,43	0,27	0,34
SD	0,50	0,44	0,48
count	80	83	163

F = 4,7 degrees of freedom: 1 and 161
p = 0,032

Religion
Grouping variable: education

	academic	professional	other	sum
mean	0,29	0,21	0,30	0,24
SD	0,55	0,41	0,47	0,44
count	24	107	27	158

F = 0,55 degrees of freedom: 2 and 155
p = 0,579

Religion
Grouping variable: age

	20–39	40–59	sum
mean	0,23	0,24	0,24
SD	0,45	0,43	0,44
count	90	66	156

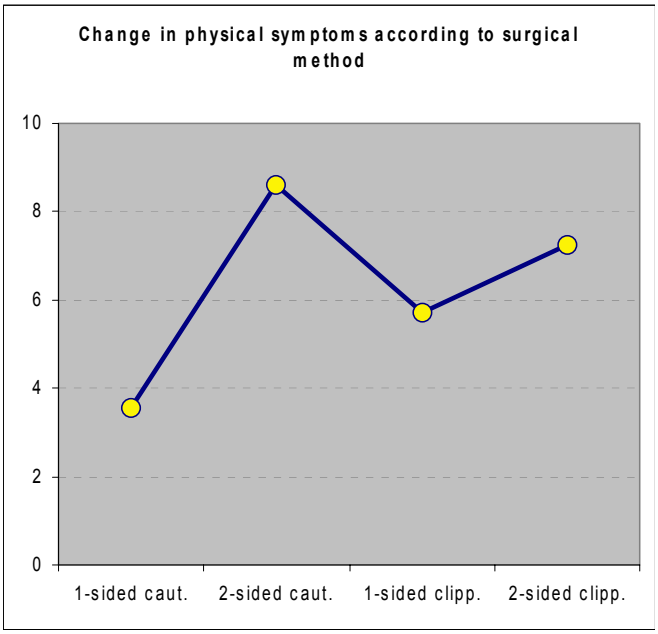
F = 0,71 degrees of freedom: 3 and 152
p = 0,550

Religion
Grouping variable: gender

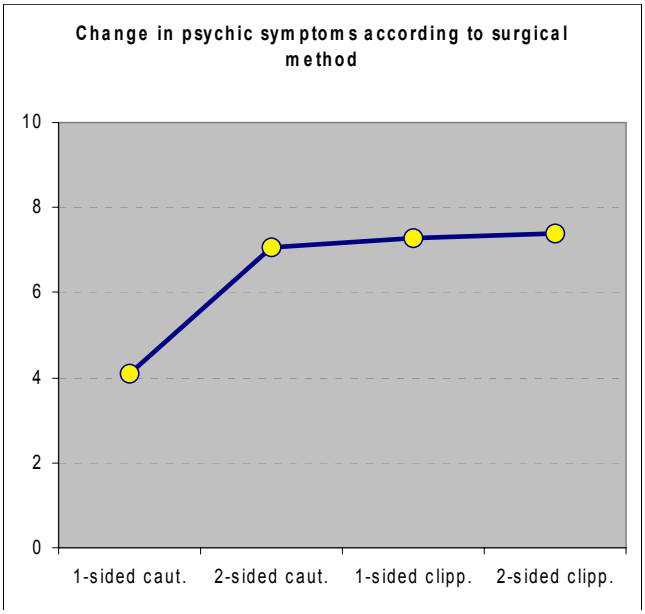
	male	female	sum
mean	0,16	0,31	0,24
SD	0,37	0,49	0,44
count	79	81	160

F = 4,35 degrees of freedom: 1 and 158
p = 0,0386 statistically almost significant

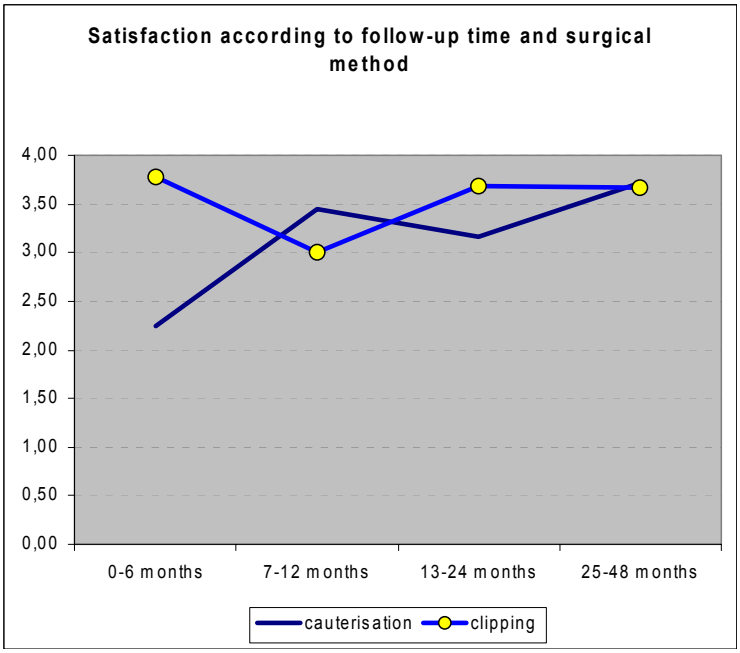
Appendix 5. Figures not included among the text



Appendix 5a Change in physical symptoms according to surgical method 1-sided and 2-sided = unilateral and bilateral



Appendix 5b Change in psychic symptoms according to surgical method 1-sided and 2-sided = unilateral and bilateral



Appendix 5c Satisfaction according to follow-up time and surgical method. Explanations of the numerical values of satisfaction are presented in Results