The Impact of Acupuncture on self-perceived Stress and ADHD Core Symptomatology in an adult, Atomoxetine-taking ADHD Participant. An in-depth Single Case Study.

Nils May

MSc Advanced Oriental Medicine (Research and Practice)

August 2019

Northern College of Acupuncture

Declaration and statements for an MSc dissertation

DECLARATION

This work has not previously been accepted in substance for any degree, and is not being concurrently submitted in candidature for any degree.

SIGNED by the candidate: DATED: 26/08/2019

STATEMENT 1

This dissertation is submitted in partial fulfilment of the requirements for the degree of:

- [ ] MSc Acupuncture
- [ ] MSc Nutritional Therapy
- [ ] MSc Nutrition Science & Practice
- [ ] MSc Chinese Herbal Medicine
- [x] MSc Advanced Oriental Medicine
- [ ] MSc Advanced Complementary Medicine
- [ ] MSc Advanced Nutrition

SIGNED by the candidate: DATED: 26/08/2019

STATEMENT 2

This dissertation is the result of my own independent work and investigation, except where otherwise stated. All other sources are acknowledged by notes giving explicit references. Any proof-reading has been done in compliance with NCA's stated policy.

SIGNED by the candidate: DATED: 26/08/2019

STATEMENT3

I hereby give consent for my dissertation, if accepted, to be available for photocopying within the limits of copyright law, for distribution by electronic copy to NCA students and for inter-library loan, as well as for the title and abstract to be made available to outside organisations.

SIGNED by the candidate: DATED: 26/07/2019

continued on next page...

Northern College of Acupuncture

Declaration and statements for an MSc dissertation

STATEMENT 4

I have uploaded the following items to my data repository:

- [x] Initial Research Proposal, as submitted to the research director in July of my start year;
- [x] Detailed Research Proposal, as presented at DRP Presentation Day;
- [x] My Ethics application form;
- [x] The revised DRP that supported my Ethics application;
- [x] Any subsequent Ethics application forms (from Ethics re-application) and any revised DRPs that supported my re-application;
- [ ] Details of any variations of ethical approval;
- [x] My study's pseudonymised raw data, without modification or analysis;
- [x] My Student Supervision Record Sheets;
- [x] My dissertation and any appendices, as submitted in hard copy form on my submission date;
- [x] My poster, as submitted electronically on my submission date.

SIGNED by the candidate: DATED: 26/09/2019

STATEMENT 5

I acknowledge that I have received extra-curricular help with:

- [ ] Academic writing
- [x] Quantitative data analysis
- [x] General proofreading, including proof-reading of a translation
- [x] Use of English language (grammar, spelling, sentence structure)
- [ ] My supervisor has carried out my quantitative data analysis on my behalf, under my instruction, as described in the Dissertation Handbook

Other than the areas above where I have received help, I confirm that this assignment submission is my own work.

SIGNED by the candidate: DATED: 26/09/2019

Acknowledgements

I wish to sincerely thank the following persons for their indispensable help, contributions, and support throughout the process of conducting and completing this dissertation:

First of all, my grandmother who passed away a few weeks before I completed this piece of work. Without her monetary support, I could not have had attended the course. I hope that whatever might be next for her, may be peaceful, auspicious, and joyful.

My beloved Dog Levi, who was always with me (and, in my heart, still is) and endured my states of tension with patience and kindness during the first half of the course, until she sadly passed away after a prolonged illness, in the beginning of February 2017.

My father Peter, and his partner Bruni, for mental and financial support.

My ex-partner Alexandra, for her love and support at least over a part of the way.

My supervisor Dr Ashley Bennett for his essential and invaluable content-related guidance and support.

A very special note of thanks is addressed to Dr D.I. Yvonne Z., my Academic English coach. Without her support, I would not have come this far.

Very special thanks to Helge Nordmann as well, for his mathematical/statistical support and for his patience.

My brother Jens for inspiring my interest in science and evidence-based medicine which resulted in, besides being a Chinese medicine practitioner, my desire to build a bridge between both worlds.

Peggy Welch, Jane Nodder, Paula Seith, Karen Charlesworth, Cath Mortimar, and Denise Magson from the Northern College of Acupuncture NCA for their patience and guidance throughout the course over the past four years.

My friend Sabine Nowak who, as a skilled social-psychologist researcher, shared her knowledge about qualitative research methods with me and helped me to improve my interviewing skills.

My fellow students Maya Harish and Nils von Below, for their friendship and mutual support.

My study participant, who needs to remain anonymous here, for his trustful decision to participate in the study.

Last, but not least, my close friends who are like family to me, Raoul Festante, Oli Paul, and Tanja Villar, and many more, for always being on my side with their friendship and support.

In addition, an extraordinary thank you goes out to Dr H. Plagge from the Hamburg Health Authority, for his unbureaucratic help in overcoming bureaucratic barriers.

I hope that the profession of (T)CM-practitioners and acupuncturists, as well as ADHD-diagnosed individuals suffering from complaints associated with ADHD, will benefit from the present work, respectively future projects may build on it.

Abstract

Introduction/Background: Attention Deficit Hyperactivity Disorder (ADHD) affects both children/adolescents and adults; its core symptoms are inattention, hyperactivity and impulsivity, impairing the social and professional life of those affected. It is associated with an increased level of self-perceived stress.
Aims/objectives: To evaluate the impact acupuncture has on self-perceived stress and ADHD core symptomatology in one adult, atomoxetine-taking ADHD participant, compared to atomoxetine (ATX) alone.
Methodology: The research question was investigated through an in-depth single case study, applying a mixed methods approach. The participant completed two rating scales: the Current Symptom Scale CSS, and the Perceived Stress Scale PSS, once during their usual ATX-intake, thrice during an acupuncture-based intervention phase (8 weeks), and twice after completion.
Semi-structured interviews were held twice.
Questionnaires/rating-scales data were statistically analysed. Interview data underwent a content analysis.
A triangulation was implemented as well.
Findings: The total score of the PSS decreased by 31%. The total score of the CSS decreased by 47%. The attention deficit-related subgroup score decreased by 39 %. The functionality impairment score decreased by 55%. The hyperactivity-/impulsivity-related subgroup score decreased by 53 %; the impulsivity score decreased by 30 %.
Content analysis of the post-interventional interview showed perceived increased controllability, (self-) awareness and centeredness, enhanced ability to focus, and increased self-efficiency through improved coping with stressful experiences. Acupuncture-treatments, accompanying the participant's regular ATX intake, positively affected the participant's hyperactivity/restlessness and his attention deficit. Combined treatment was perceived as more beneficial than pharmaceutical treatment alone. Triangulation detected a high level of content-related convergence.
Conclusion: Acupuncture treatment appears to have positively impacted both self-perception of stress and ADHD core symptomatology. Due to limitations and risks of bias (ROBs) associated with the design, no concrete conclusions regarding a potential method-related specificity can be drawn. Findings appear promising. Further research with larger samples and more robust design is recommended.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

ADHD	Attention Deficit Hyperactivity Disorder
AE	Adverse effect
AP	Acupuncture point
ATX	Atomoxetine hydrochloride
CAM	Complementary and Alternative Medicine
CM	Chinese medicine
CSS	Current Symptom Scale Self-Report Form
DPA	Data Protection Act
DSM-IV	Diagnostical and Statistical Manual of Mental Disorders (fourth version)
EEG	Electroencephalogram
EMS	Early Maladaptive Schemata
GDPR	General Data Protection Regulations
HI	Hyperactive/impulsive subtype (ADHD)
IA	Inattentive subtype (ADHD)
ICD 10 (11)	International Classification of Diseases (10th/11th version)
ITT	Intention to treat
LEED	Local Ethics Enquiry Document
MCD	Minimal Cerebral Dysfunction
MD	Doctor of Medicine
MMR	Mixed Methods Research
MPH	Methylamphetamine
MSc	Master of Science
NARI	Noradrenaline Reuptake Inhibitor
NCA	Northern College of Acupuncture
PCB	Placebo
PIS	Participant Information Sheet
PICO	Population; Intervention; Comparison; Outcome
PROMs	Patient-Related Outcome Measures
PSS	Self-Perceived Stress Rating Scale
RCT(s)	Randomised Controlled Trial(s)
ROB(s)	Risk(s) of Bias
RQ	Research Question
SCT	Sluggish Cognitive Tempo
TEAE	Treatment-emergent Adverse Effect
TCM	Traditional Chinese Medicine
TSST	Trier Social Stress Test
WHO	World Health Organization

1. Introduction

1.1. Keywords

ADHD, in-depth single case study, self-perceived stress, acupuncture, core symptomatology, Atomoxetine, hyperactivity, impulsivity, attention deficit, comparison, combined therapy.

1.2. Background

1.2.1. Attention Deficit Hyperactivity Disorder (ADHD) – a brief introduction

Attention Deficit Hyperactivity Disorder (ADHD) is defined by inattention, hyperactivity and impulsivity (American Psychiatric Association, 1994). 8-12 % percent of children worldwide are affected (Polanczyk, 2007; Faraone *et al*., 2003), and about 65 % of those show symptoms into adulthood (Wilens *et al.*, 2004), where the prevalence is 2.5-4.9 % (Simon *et al.*, 2009).

Three subtypes with different specifications of core symptoms are described: The inattentive (IA), the hyperactive/impulsive (HI), and the combined (comb.) subtype (Chhabildas *et al*., 2001). The disorder impacts the patient's cognitive and behavioural state as well as their social and professional lives severely (Barkley, 2006; Spencer *et al.*, 2007). Common occurrences are sleep deficit (Cortese *et al.*, 2009; Philipsen *et al*., 2006) decreased impulse inhibition (Barkley, 1997), higher rates of delinquent behaviour and substance addiction (Roesler *et al*., 2004) as well as higher levels of

self-perceived stress (e.g. Combs *et al*., 2012) and an increased risk of chronic stress (Hirvikoski *et al.*, 2009).

1.2.2. History and Hypotheses regarding the Aetiology of ADHD

The characteristic triad of symptoms was first described in 1920 in the context of rheumatic disease in children (Still, 1920) as Still syndrome, assuming an organic causality. Subsequent terminology included Minimal Brain Damage, Minimal Cerebral Dysfunction (MCD) and Psycho-Organic Syndrome which hypothesized a cerebral, organic cause, due to similar symptoms in patients suffering from frontal brain lesions. Later research found that MCD was not a disorder of its own. Symptoms also appear in patients without any cerebral damage, hence it is not included in the DSM-IV (Huether, 2002).

Much neurochemical and molecular-biological research has been conducted since then, aided by new enhanced imaging methods. Several studies show potentially specific neurobiological perspicuities, e.g. an increased density of dopamine-transporters in the striatum, or morphological anomalies in terms of a decreased volume of the frontal lobe, the corpus callosum, or the cerebellum in people assumed to have ADHD personalities (Arnsten 2009; Huether, 2002). Hence its aetiology still is not completely understood (Fuhrman, 2005).

Some of the hypotheses on potential causalities relate to anomalies regarding the dopaminergic and serotonergic systems. Increased, as well as decreased activities in different regions of the cerebellum, morphological specificities and neurosensoric anomalies (e.g. a deficiency of motor inhibition) have been demonstrated (Huether,

2002). The influence of genetic impact has been explored, and is still controversially discussed (Faraone and Larsson, 2019). Moreover, diverse psychological, e.g. psychoanalytical, approaches have been developed (Brasset-Harknett and Butler, 2007).

ADHD-individuals are still commonly perceived as 'mentally disordered' (Mueller *et al.*, 2012), which has been questioned. Instead, ADHD-associated characteristics may be considered in the context of neurogenetic diversity (e.g. Eapen, 2012) that is not pathological or disadvantageous per se (e.g. White *et al.*, 2011). In order to define clinically appropriate thresholds for treatment, the implementation of dimensional constructs linking psychopathological and neurobiological aspects has been suggested (Faraone and Larsson, 2019).

Future research will have to consider genetic, neurobiological, and environmental aspects for a better understanding of the complex aetiology of ADHD (Faraone and Larsson, 2019).

1.2.3. Treatment Approaches

ADHD is commonly treated with pharmacological stimulants such as methylphenidate (MPH), dexamphetamine sulfates, or atomoxetine hydrochloride (ATX). Atomoxetine as a noradrenaline re-uptake inhibitor (NARI) is a widely used pharmaceutical. Its efficiency in the treatment of both childhood/adolescence and adult ADHD is well-documented (e.g. Childress 2016).

Besides the pharmacotherapeutic approach, diverse psychotherapeutic and psychosocial methods also are widely established (e.g. Gentile and Atiq, 2006; Chronis *et al.*, 2006).

Certain risks and adverse effects of pharmacological treatments have been documented (Camporeale, Upadhaya *et al.,* 2013,) and there is little research on potential long-term risks (Fredriksen and Peleikis, 2015).

Patients therefore often seek additional or alternative therapeutic treatment within the wide spectrum of complementary and alternative medicine (CAM) which includes, besides nutritional therapy, homoeopathy, bioenergetic systems such as kinesiology, hypnotherapy, Chinese Medicine/Traditional Chinese Medicine (CM/TCM) or Ayurveda. Up to 64 % of child and adolescent ADHD patients received at least adjuvant or temporary CAM treatments (Stubberfield *et al.,* 1999).

This raises the question whether ADHD patients may benefit from diagnostic and therapeutic treatment methods of Chinese medicine, including Chinese herbal medicine (CHM) and acupuncture.

1.3. Brief introduction into Acupuncture, including a brief Overview on Research into its underlying Mechanisms

Acupuncture involves the insertion of sterile needles in specific so-called acupuncture points (370+) at various locations on the body. In Chinese medicine (CM)/Traditional Chinese Medicine (TCM), acupuncture is applied according to a particular CM/TCM-diagnosis, aiming to tonify, disperse, modify, or harmonise a particular imbalance, pattern, or disease.

Between four and 20 needles are usually applied within a treatment session, and remain in the body for a predefined time. Bio-medical research has revealed some mechanisms of action, such as the activation of the endorphinergic system (e.g. Ulett *et al.*, 1998; Han and Terenius, 1982). Activation of descending inhibition due to the needle-related stimulus was found to induce an inhibitive effect on afferent pain signals (e.g. Cao, 2002).

An anti-inflammatory effect due to the activation of vaso-active neuropeptides was also detected (e.g. Lundberg *et al.*, 1992). Stimulation of motor end plates appears to release muscular trigger points (e.g. Chu and Schwartz, 2002). Moreover, systematic effects on the endocrine system and immune-modulative effects (e.g. *Kou et al.*, 2005), as well as stimulation of neuropeptide-related gene expression were postulated (e.g. Sung *et al.*, 2004). Recent research has demonstrated the role of purinergic signalling in acupuncture-mediated nociception (e.g. Takano *et al.*, 2012).

CM and TCM, according to its unique diagnostic approach, categorises both assumed causalities and symptomatic complaints associated with ADHD into patterns which are individually differential-diagnosed in each patient, and lead to a pattern-associated, individualised treatment. Recent findings (e.g. Li, 2009; Liu, 2007; Katz, 2010) can be described as promising.

1.4. Stress and Self-Perception of Stress

Stress is an important warning to the body when facing potential dangers or challenges (Goble and La Grande, 2008). Generally, it can be regarded as a cognitive-emotional

condition resulting from an individual's perceived difficulties in adjusting to life events (Taylor, 2008).

When environmental demands exceed an individual's resources, this results in stress (Lazarus, 1993). When exposed to stressors, individuals experience behavioural, cognitive, and physiological reactions that induce coping activities. Constructs of stress are subjective (Taylor, 2008). Its appraisal may be positively or negatively associated and vary widely in its physiological manifestation (Taylor, 2008). Elevated levels of chronic stress have been associated with an increased risk for cardiovascular diseases (Goble and La Grande, 2008), increased infection-susceptibility (Cohen, 2005), accelerated aging (Simon *et al.,* 2006), overeating and obesity (Dallmann et al., 2003), and a decreased efficiency of overall immune functionality (e.g. Kemeny and Schelowski, 2007).

Since ADHD-diagnosed people were found to experience higher levels of stress, this particular aspect of the syndrome appears highly relevant (e.g. Lange et al., 2005). The evaluation of self-perceived stress may reveal information not detectable by investigator-based observation (Lee, 2012). An established questionnaire for the evaluation of self-perceived stress is the Self-perceived Stress Scale PSS, a ten (Cohen *et al*., 1983) respectively 14 item rating scale (Cohen, 1985) that was chosen as a main measurement in the present research project.

1.5. Rationale for the Research

Research has been undertaken on the associations between ADHD and self-perceived stress (e.g. Combs *et al*., 2012; Hirvikoski *et al.*, 2009). The impact of Atomoxetine on

ADHD both in children/adolescents and adults is well investigated (Childress, 2016). There is some research on the impact of TCM and acupuncture on ADHD-related complaints (e.g. Katz, 2010; Li, 2009).

No research was found on either the impact of acupuncture on self-perceived stress levels in ADHD patients, or the comparison of the impact of acupuncture (or acupuncture and Atomoxetine combined) and Atomoxetine. The current study thus fills a significant research gap. If the anticipated results are confirmed, both ADHD-diagnosed individuals and TCM practitioners/acupuncturists, as well as providers of multi-professional therapies may benefit from the present research.

1.6. Researcher's Background and Practice Discipline

The author-researcher has many years of experience in both TCM/acupuncture and social education. He has worked at a public shelter for homeless adolescents, as well as with adolescent substance addicts and adult psychiatric patients. He is the co-founder and long-term board member of a free acupuncture clinic project. Currently he is completing an MSc course that brings together TCM/acupuncture and evidence-based practice/medicine. As both TCM practitioner and social educator, he has repeatedly encountered phenomena in which psychological complaints correlate with somatic symptoms, including the various symptoms of ADHD.

1.7. Aims

- investigate the impact of acupuncture on self-perceived stress associated with ADHD
- investigate the impact of acupuncture on ADHD core symptomatology
- improve knowledge regarding the combination of ADHD-related pharmaceuticals and acupuncture. Specifically the author's knowledge, as well as that of the TCM/CM/acupuncture profession, other health professionals, and affected individuals

1.8. Objectives

To attain the aims outlined above, it was indicated to recruit a participant (see section 3.4 Recruitment/Methodology) and to quantifiably measure their condition indicators when regularly take in their ADHD-related medication. A treatment plan/flexible point protocol following a customised TCM-diagnosis was to be implemented (see Appendix IV). Condition indicators were to be measured during and after acupuncture intervention phases at different time points. Semi-structured interviews were to be implemented before and after the intervention phase. Quantitative and qualitative data were to be analysed, findings were to be interpreted and reported. After dissertation submission, the participant would be informed about the findings, and results were to be published to a wider audience (TCM/CM-practitioners/acupuncturists, MDs, psychologists, self-help groups etc.).

1.9. Research Question

To what extent does acupuncture impact the self-perception of stress and the severity of ADHD core symptomatology in one adult, Atomoxetine-taking ADHD participant, compared to the intake of Atomoxetine alone?

2. Literature Review

2.1. Search terms and data bases

In order to evaluate the state of research regarding this project's Research Question, a comprehensive literature review was conducted. To ensure an appropriately comprehensive and topic-focused search covering all relevant papers, the themes of the research question were turned into single search terms, respectively search term combinations (Green *et al.*, 2001).

The databases cited below were first searched for sextuple, fivefold, quadruple, or triple combinations of search term categories, which yielded no results. Therefore searches for the combinations "ADHD and self-perceived stress"; "ADHD and acupuncture"; "ADHD and atomoxetine"; "acupuncture and self-perceived stress"; "acupuncture and atomoxetine"; as well as "atomoxetine and self-perceived stress" were conducted. On PubMed, regular search terms were combined, if available, with MeSH tags (Medical Subheadings). See a detailed description of the search terms combinations, respectively independently selected synonyms (Aromataris and Riitani, 2014) or synonym equivalents, as well as the respectively applied Boolean terms, in Appendix I.

Besides PubMed, the data bases PsychInfo, AMED, Alt Health Watch, Science Direct, Clinical Trials.gov., Hindawi, the data base of the University of York, PLOS ONE, and Springer Open were searched as well. The search term combinations above were modified according to the input modalities of the respective data base. This variety of data bases was searched to provide an appropriate breadth and depth of potentially traceable results (Green *et al.*, 2001).

In- and exclusion criteria were implemented in order to keep the present paper focused, and to warrant papers were included because of their thematic relevance rather than how strongly the author agreed or disagreed with a particular paper (Green *et al.*, 2001).

Therefore, PICO schemes for in- and exclusion criteria were used (Constantino *et al*., 2015), see Table 1. Papers published between … and …, except a five year frame regarding the theme 'ADHD and Atomoxetin', were considered to warrant an up-to-date state of the research. Searches were conducted between Sept 5th and Oct 3rd 2017.

2.2. Selection of Critical Appraisal tools

For the critical appraisal of cross-sectional studies and RCTs, the respective Joanna Briggs Institute Critical Appraisal tools (Joanna Briggs Institute, 2017) were applied.

AMSTAR was used for the critical appraisal of systematic reviews (e.g. Faggion, 2015). For a detailed description of the critical appraisal results, see tables six - eight in

Appendix II. Both tools are established and validated (Shea *et al*., 2007; Mann *et al*., 2014) and were selected in accordance with the author's supervisor.

2.3. Search Results

'ADHD and self-perceived stress' yielded 614 results, of which 4 papers remained after applying above-mentioned selection criteria.

'ADHD and acupuncture' yielded 407 results, of which 3 papers remained.

'ADHD and atomoxetine' yielded 2566 results, of which 11 papers remained.

'Acupuncture and self-perceived stress' yielded 380 results, 0 papers remained after applying selection criteria.

'Acupuncture and atomoxetine' yielded 0 results.

Atomoxetine and self-perceived stress' yielded 24 results, of which 0 papers remained.

Table 1: In- and Exclusion Criteria

Search Item	Inclusion	Exclusion
• ADHD and self-perceived stress	**P**: adults; ADHD-diagnosis according DSM-IV or ICD-10 **I**: no intervention needed but self-perceived stress needs to be investigated **C**: none **O**: self-perceived stress • search terms incl. in title or abstract • clinical trials	• non-human subjects • unfinished trial/study • studies >10 years
• ADHD and Acupuncture	**P**: same as above **I**: (body-) acupuncture **C**: sham, placebo, or pharma **O**: diverse (e.g. CSSR), examining ADHD core symptoms • search terms incl. in title or abstract • systematic reviews/reviews	• non-human subjects • unfinished trial/study • studies ≥10 years
• ADHD and Atomoxetine	**P**: same as above **I**: ATX **C**: diverse **O**: ADHD core symptoms or safety issues • search terms incl. in title or abstract • RCTs/systematic reviews/reviews	• non-human subjects • unfinished trial/study • studies > 5 years
• Acupuncture and Self-Perceived Stress	**P**: as above **I**: (body) acupuncture **C**: none **O**: self-perceived stress • search terms incl. in title or abstract • clinical trials	• non-human subjects • unfinished trial/study • studies >10 years
• Acupuncture and Atomoxetine	**P**: as above **I**: ATX **C**: diverse **O**: ADHD core symptoms • search terms incl. in title or abstract • clinical trials	• non-human subjects • unfinished trial/study • studies > 10 years
• Atomoxetine and Self-Perceived Stress	**P**: as above **I**: ATX **C**: none **O**: self-perceived stress • search terms incl. in title or abstract • clinical trials	• non-human subjects • unfinished trial/study • studies ≥10 years

2.4. Results

a. ADHD and self-perceived stress

Hirvikoski *et al.* (2009) cross-sectional study evaluated the association between adult ADHD and perception of everyday stress. ADHD-diagnosed individuals reported higher levels of stress. Besides other instruments, the CSS (Barkley and Murphy, 1998) was utilised to collect demographic/background information. The PSS was applied to assess levels or self-perceived stress. However, the 14 item Swedish version (Eskin and Patt, 1996) was applied here.

Combs *et al*. (2012) cross-sectional study evaluated the relationship between ADHD, psychiatric symptoms and perceived stress. A correlation between ADHD symptoms and self-perceived stress was found. The CSS (Barkley and Murphy, 1998) was applied to measure the severity of both inattention and hyperactivity-impulsivity-associated symptoms. One item assessing the participant's overall impairment, and three items assessing the extent to which Sluggish Cognitive Tempo (SCT) may play a role in their participants' symptomatology, were added as well. To assess levels of self-perceived stress, the authors applied the PSS ten item version (Cohen *et al.*, 1983).

The intersection between adult ADHD and early maladaptive schemata (EMS) as well as the perception of stress and well-being were investigated by Miklósi *et al.*'s (2016) cross-sectional study. ADHD symptoms were accompanied by higher levels of self-perceived stress and lower levels of emotional wellbeing. To assess levels of self-perceived stress, the PSS, four-item version (Cohen *et al.*, 1993), was applied.

Corominas-Roso *et al.* (2015) cross-sectional study examined differences between the inattentive and the hyperactive/impulsive subtype regarding their cortisol response to stress, compared to non-affected controls. Levels of self-perceived stress were evaluated. Besides cortisol-related findings (normal reaction before stress exposure in both subtypes but higher cortisol after the exposure in the IA subtype), all ADHD participants were found to experience higher levels of self-perceived stress.

Here, the fourteen-item Spanish version of the PSS (Remor, 2006) was applied after participants were exposed to the Trier Social Stress Test (TSST) which is a common protocol inducing psychosocial stress under standardised conditions (Kirschbaum *et al.*, 1993). All four papers were assessed as being of adequate scientific quality (see table six in Appendix II 'Critical Appraisal').

b. ADHD and acupuncture

Ni *et al.*'s (2014) editorial gave a detailed overview over Traditional Chinese Medicine (TCM) applications on both the pattern diagnosis system for ADHD, as well as TCM treatment methods. The authors addressed difficulties in applying scientific methods of (Western) biomedicine to an individualised treatment based system. They addressed the opportunity of combined biomedical and Chinese therapies, e.g. the combination of methylphenidate and CHM. This paper`s overall quality appeared acceptable (table seven, Appendix II).

Lee *et al.*'s (2011) systematic review located 114 papers regarding acupuncture in the treatment of ADHD. After excluding papers not related to clinical trials, ADHD, or acupuncture, non-randomised controlled trials, observational studies or studies

examining acupuncture in combination with other therapies, three papers remained.

A meta-analysis showed a significant impact of acupuncture compared to the sole administration of conventional pharmaceutics. However, two out of the three included RCTs did not meet high research standards. The authors concluded that future trials should include extended treatments, larger samples and better scientific standards. They admitted to challenges in the use of placebo or blinding in acupuncture studies. Although the outcome of their meta-analysis showed improvement for ADHD patients treated with acupuncture, the fact that it only derived data from two randomised controlled trials makes the conclusions tentative. This systematic review's quality was acceptable, with some minor flaws (Appendix II).

Li *et al.* (2011) systematically reviewed the literature for RCTs and quasi-randomised trials on acupuncture treatment and ADHD. However, none of the fourteen studies met the inclusion criteria. The review highlighted the absence of high quality RCTs in the treatment of ADHD and called for the inclusion of qualitative research methods and adherence to established methodological standards. Furthermore, a regular follow up and analysis of the intention to treat (ITT) should be conducted and CONSORT/STRICTA should be applied. This systematic review's quality was excellent (Appendix II).

c. ADHD and Atomoxetine

Durell *et al*. (2013) implemented a multicentre RCT to evaluate the efficacy of Atomoxetine (ATX) on ADHD symptoms. ATX was found to be superior to PCB on most outcome measures, was generally safe and improved participants` executive

functioning. The overall quality of this study was acceptable, but the authors received funding by the company producing Strattera (ATX) (see table 8 in Appendix II).

Upadhaya *et al*. conducted four RCTs between 2013 and 2015, with a cohort comprising 2017 adult ADHD participants from 152 outpatient sites in 18 countries. They evaluated a) the safety and tolerability of ATX (Camporeale, Upadhaya *et al.*, 2013), b) the maintenance of response (Upadhaya *et al.*, 2013), c) the time-to-onset and -resolution of adverse effects (AE) (Upadhaya *et al*., 2015), and d) compared the baseline characteristics of European and non-European participants (Upadhaya *et al*., 2013).

The authors found that AE-related discontinuation was, although higher in the ATX group, similar across groups and that acceptable ATX safety regarding treatment of adult ADHD was demonstrated. In addition, ATX was shown to be superior in maintaining significantly stronger responses to treatment up to one year compared to a placebo. Clinically relevant rebound effects after abrupt discontinuation could not be observed. Common AEs/TEAEs were demonstrated to mostly appear during an early treatment phase with a median resolution time of 3-53 days. Demographic and baseline-related characteristics of European and non-European participants were shown to be similar. The overall quality of those four trials was appropriate, but they were partially funded by the main manufacturer of Atomoxetine (Appendix II).

Childress (2016) provided an overview on 'ADHD and Atomoxetine', including pharmaconetics, dosing, relapse prevention and emotional lability issues. Combined MPH-ATX therapies, executive functions, common comorbidities and diverse AEs were addressed. ATX was assessed as a safe and worthwhile first line treatment option. Critical appraisal found that the author had not sufficiently described her methodology

(Appendix II) and disclosed commitments to several pharmaceutical companies, including the main manufacturer of Atomoxetine.

Clemow and Bushe (2015) evaluated trajectory and maintenance of response of Atomoxetine treatment for both child and adult ADHD. Onset and duration of effect, responder rates and effect sizes and the span to optimal response were evaluated. The onset of action appears within 1-2 weeks but may increase to its optimal response for 24 weeks or longer. Although the ATX plasma half-time is about 5 hours, single dose effects may remain for 24 hours, hypothetically due to neuro-adaptive changes. Responder rates were demonstrated to be similar to amphetamine treatment. 50 % of participants maintained their response for at least six months after discontinuation. The scientific quality of studies included was not adequately assessed, which renders conclusions tentative. The authors were funded by the main manufacturer of Atomoxetine (Appendix II).

Ravishankar *et al*. (2016) performed a meta-analysis of 13 randomised, placebo-controlled trials. ATX was more efficient than placebo in treating both inattention and hyperactivity/impulsivity. They did not fulfil the criteria for a well-conducted systematic review. No demographic details were included, and no sources of funding or conflicts of interest were disclosed (Appendix II).

Asherson *et al*.(2014) conducted an integrated analysis of most RCTs implemented by the main manufacturer of Atomoxetine. Data of 1961/1413 participants of shorter-term/long-term trials were pooled and evaluated regarding symptom reduction and response rates. Both a clinically significant reduction of ADHD major symptoms and sound response rates were detected. Neither the scientific quality nor the

characteristics of the review`s studies were reported. No potential publication bias was considered. Thus, conclusions might be regarded with caution (Appendix II).

Sobanski *et al.* (2015) pooled data from 13 RCTs with a total of 4372 adult ADHD persons conducted by the main manufacturer of Atomoxetine. They identified 5 different response clusters within the long-term studies and 4 clusters in the short-term trials. Varying response rates were found, which appeared to be associated with baseline severity. The authors state that further research was needed to allow more precise predictions of response to treatment with ATX.

The authors failed to report details about ADHD-related specificities of the reviewed trials' population. The scientific quality of the studies reviewed in the paper was not reported. The authors were all employed by the main producer of Atomoxetine and failed to consider the risk of publication bias (Appendix II).

Walker *et al*. (2015) conducted a review regarding the safety and efficacy of ATX treatment of adult ADHD. The evaluation of six long-term and five short-term trials found that ATX was associated with greater symptom relief, compared to placebo. Executive functions were evaluated and found to be improved. 10 % of the patients experienced common AE like nausea, dry mouth, decreased appetite, insomnia and fatigue. Furthermore, the meaning of participants' metabolizer status was illustrated, i.e. the role of the polymorphic CYP2D6 gene for metabolic manifestation in four different phenotypes was explained.

The authors concluded that ATX intake can result in long-standing symptom-relief and functional improvement in ADHD-diagnosed adults. The scientific quality of the studies included in the review was not assessed, and the authors failed to report potential

conflicts of interest, since they were funded by the main manufacturer of Atomoxetine (Appendix II).

2.5. Summary and Discussion

a. ADHD and self-perceived stress

There is growing evidence that ADHD-diagnosed individuals experience higher levels of everyday stress (e.g. Hirvikoski *et al.*, 2009; Corominas-Roso *et al.*, 2015) and that elevated self-perceived stress is associated with an increased level of stress factors (Hirvikoski *et al.*, 2009). ADHD symptoms and self-perceived stress are positively associated (Combs *et al.*, 2012). Levels of self-perceived stress are higher compared to non-affected controls and associated with lower levels of emotional well-being (Miklósi *et al.*, 2016).

Those findings may support the suggestion for refined diagnostic adult ADHD criteria (e.g. Wender, 1995; Barkley, Murphy and Fischer, 2008). The reviewed papers support the implementation of 'self-perceived stress' as one of two major measurement parameters in the present dissertation project.

b. ADHD and acupuncture

A heterogeneous picture arises from the three reviewed papers on ADHD and acupuncture. Xinquiang et al. (2014) emphasise that a multifactorial condition like ADHD is well-suitable to the holistic treatment principles of TCM.

A large body of documented clinical trials, case reports and expert experiences resulted in summarized TCM guidelines regarding the treatment of ADHD-related complaints.

Methodological challenges and economic limitations in complementary medicine may have led to the current small number of RCTs of high quality. Authors of systematic reviews may also determine their inclusion criteria too narrowly (Kane, 2004). Furthermore, more research is warranted on the role of duration and frequency of treatment in acupuncture (Lee *et al.*, 2011).

Besides using questionnaires and rating scales, an increased use of bio markers (e.g. EEGs) (Li 2005) may lead to a more comprehensive assessment of trials. The integration of TCM-based differential diagnoses into trials may be promising (Li 2005). The use of waitlist control groups in studies on acupuncture could be explored more (Hong and Cho, 2011). The trinity of needling-related, specific non-needling and non-specific components of acupuncture (Langevin *et al.*, 2011) needs to be considered when designing acupuncture-related trials. Acupuncture research may benefit from a mixed methods research (MMR) approach (e.g. Bartlam, 2016). Although small-scale, the present dissertation project considers this idea.

c. ADHD and Atomoxetine

Both inattention and hyperactivity/impulsivity subtypes may benefit from Atomoxetine therapy, but the treatment of inattention appeared more effective (Ravishankar *et al.*, 2016). It appears as a safe first treatment option for children/adolescents and adults (Childress, 2016). Six of the ten papers reviewed were responder studies (Asherson *et*

al., 2014; Clemow and Bushe, 2015; Sobanski *et al.,* 2015; Camporeale, Upadhaya *et al*., 2013; Upadhaya *et al*., 2013; Upadhaya *et al*., 2015).

Responder studies follow a dichotomous approach which leads to a partial loss of numbers of the original sample. Such relative loss of data requires bigger cohorts since the explanatory power of smaller samples decreases. Furthermore, responder studies barely consider intra-individual variability (Kleist, 2010), which is important for the results of the ATX-studies described above. Five of the eleven reviewed ATX-related papers lacked methodological quality, rendering conclusions tentative. The literature review further revealed that nine authors of the eleven reviewed papers were funded by atomoxetine-producing pharma companies. The question of publication bias thus appears justified (Cochrane, 2016; Lexchin, 2012).

2.6. Synthesis

As outlined above, people diagnosed with ADHD are affected by higher levels of self-perceived stress. Stress is a complex phenomenon that may result in a wide variety of serious consequences for those affected (Taylor, 2006). The literature review discussed above confirmed these findings throughout all three categories.

The reviewed literature regarding the pharmaceutical treatment with atomoxetine revealed that ATX appears to be an efficient and relatively well-tolerable therapeutic support for ADHD-diagnosed persons. However, theoretical reservations regarding the widely common sole application of responder designs, were outlined above. Moreover, insights regarding potential long term risks of psycho-pharmaceutical treatment of

ADHD were found to still be less investigated (Fredriksen and Peleikis, 2015) with a serious risk of publication bias..

The conducted literature search illustrated that despite many remaining questions, acupuncture might potentially contribute to reducing the severity of ADHD-symptomatology (Lee *et al*., 2011). In addition, the potential of a combined biomedical and Chinese medicine-related approach was outlined (Ni *et al.*, 2014). The literature search did not yield any research specifically addressing therapeutic interventions targeting the perception of stress – whether pharmaceutical, acupuncture-, or TCM-related. Stress is impacted by both endogenous and exogenous factors (Lazarus, 1993). Applying the understanding of stress and its effects according to Chinese medicine, the concept of the Zhang/organ system 'liver' may be considered.

In Chinese medicine, the 'organ system liver' warrants the sufficient flow of qi, blood, and emotions (e.g. Maciocia, 2015). Accordingly, stressors and stress-perceptions are believed to result in stagnations or blockages of qi or blood in different areas or functional units of the body, manifesting in various somatic, psychological, and psychosomatic ways (Maciocia, 2015). Many ADHD-related acupuncture point prescriptions involve points particularly referring to this concept (e.g. Scott and Barlow, 2003).

By gaining insights about both the possible impact of acupuncture on *self-perceived stress* and *ADHD core symptomatology*, as well as about the *combined approach,* the present research project presents an early step to close the detected gap. Increasing knowledge about stress-vulnerability and higher levels of self-perceived stress in ADHD-diagnosed individuals, and Chinese medicine approaches on stress appears

worthwhile, especially considering that no literature addressing this intersection is currently available.

3. Methodology

3.1. Application of the PICO scheme

3.1.1. Population

One adult ADHD person who already regularly takes Atomoxetine hydrochloride, antecedently prescribed by an external specialist/psychiatrist, was to take part in the study. The prospective participant should be aged between 25 (after adolescence, since adolescent ADHD can differ from the adult appearance) and 60 (to preclude potential geriatric issues). Psychological/psychosomatic comorbidities (e.g. depressive, anxiety, sleeping or substance abuse-related disorders) may be verifiable in the participant's history since such comorbidities are over-represented within adult ADHD-populations (Barkley, 2006). In order to avoid potential bias that may affect the dependent variable 'self-perceived stress' or the self-rating of current ADHD symptomatology, acute psychological comorbidities should not exceed a level of 'mild'. Referring to ICD-10 terminology (WHO, 1998), this would include e.g. depressive disorders whose severity did not exceed a level of 'mild'/F32.0 (resp. F33.0/F41.2).

3.1.2. Intervention

A series of acupuncture treatments over a time span of eight weeks. Studies investigating the implementation of acupuncture in the treatment of ADHD last between three (Liu, 2006), four (Xu, 2007; Liu, 2007), eight (Qie, 2005), and twelve (Cai, 1999; Cheng, 2009; Li, 2004; Li, 2009; Wang, 2006; Zhang, 2000) weeks.

Four or six weeks were suspected to be too short to adequately treat a constitutional, life-long specificity such as ADHD. Longer periods (10 weeks+) of regular treatment sessions may have evoked stress in ADHD persons, which might have diminished the participant's treatment adherence. During the intervention phase, the participant maintained his usual pharmacotherapy. A wash-out/medication-free phase was ruled out due to UK-specific legal and ethical frameworks (Charlesworth, 2017). In addition, there is evidence that the therapeutic effect of Atomoxetine seems to last beyond ATX discontinuation (Michelson et al., 2003; Wernicke et al., 2004). Acupuncture treatment was to be given twice a week, with a total of 15 treatments. One absence in four treatments was tolerated as long as there were at least two sessions in between missed sessions. In total, two missed treatment sessions were acceptable. Before the intervention phase and in addition to the required external professional ADHD diagnosis, a TCM pattern diagnosis was generated. A respective set of 6-8 regular acupuncture points was to be defined (see Appendix IV).

A selection of those points was to be applied during the intervention phase, point combinations could vary between treatments, since TCM requires adjusting treatment protocols to the patient`s current condition (e.g. Focks and Hillenbrand, 2001). Body acupuncture according to TCM pattern-diagnoses (e.g. Maciocia, 2015) was to be

applied. Needle-type to be utilised were 0,25 x 25mm sterile single use, with a retention time of approximately 30 minutes per session. In the case of injuries during treatments, the author-practitioner would handle them according to established safety measurements (see section 3.14 'Ethical Issues Analysis'). Besides offering the participant free treatments, no further incentives were to be given.

3.1.3. Comparison

The comparator to the acupuncture-intervention respectively the combined therapy (acupuncture and Atomoxetine) was intended to be the pharmacotherapy with Atomoxetine alone. Dosage of Atomoxetine and in-take modalities were not to be changed during the course of the study.

3.1.4. Outcome

Primary parameter to be measured, according to the RQ, was the level of self-perceived stress. Therefore, the established 'Perceived Stress Scale' (PSS) (Cohen, 1983) (Appendix VI), was to be applied and handed out to the participant once during their usual Atomoxetine in-take phase (described as 'baseline'), twice during the intervention phase (after weeks 3 and 6), at the end of the intervention (after week 8), and finally four weeks and eight weeks after the end of the intervention (described as 'follow-ups').

The Current Symptom Scale (CSS) (Barkley and Murphey, 1998) (Appendix VII) was to be applied to evaluate potential changes in the participant's ADHD-related core-symptomatology. CSS questionnaires were handed out after one, the PSS questionnaires after the next treatment, in order to avoid the participant overwhelm. Exceptionally, at the end of the intervention phase, as well as at the follow ups, both questionnaires were handed out at the same time. The participant was to complete each questionnaire (Appendices VI, VII) within a day.

Semi-structured interviews were to be undertaken a) during the usual Atomoxetine intake phase and b) at the end of the intervention phase. These interviews were to evaluate the participants' self-perceived stress, their inner tension and restlessness, and their subjectively perceived impact of both the Atomoxetine and the combined therapy. Finally, they also addressed ADHD core symptomatology. See interview schedules in Appendix VIII.

3.2. Rationale for the chosen methodology

Regarding the RQ stated above, a gap in the research literature was detected. According to the literature reviewed above (e.g. Lee, 2011), further research was justified. Therefore, a clinical trial appeared indicated as an early step of further investigation. According to previous discussions with the author's tutors, an in-depth single case study design appeared to be a potentially sufficient approach to answer the Research Question. Although results from a single case study are not generalisable, they still deliver meaningful insights and possibly justify more extended research projects.

3.2.1. Theoretical considerations

Till date, systematic reviews, in combination with meta-analyses provide the highest level of evidence (Cochrane, 2019). These require a certain number of randomly controlled trials (RCTs) meeting scientific quality criteria. Both RCTs and systematic reviews/meta-analyses are based on the positivist assumption that there is a final, clearly detectable truth behind each phenomenon, and hence in the analysis of data sets. Besides RCTs, experimental/
quasi-experimental designs and surveys are relevant quantitative methods based on the positivist paradigm (Guba and Lincoln, 1994).

Both methods appear difficult to apply for the present project, since their experimental designs appear contrary to the idea of investigating the self-perception of stress in everyday real life. The gap of knowledge regarding the potential impact of acupuncture on self-perceived stress, indicated the need for pilot research to gather basic findings that may then justify more comprehensive research, and lead to the implementation of research designs like the RCT.

In contrast to this, the constructivist paradigm postulates a multiplicity of realities and perceptions and attempts to enlighten possible values beneath particular findings through inductive approaches (Christie *et al.*, 2000). Since the present project intended to measure concrete endpoints, constructivist approaches did not seem feasible.

Finally, critical theory assumes that numerous realities are constructed by the researchers working on a project. Therefore, truth is postulated to be findable only within those particular socially constructed realities (Easton, 1982). The researcher's subjectivity is implicated in the production of knowledge (Guba and Lincoln, 1994). Critical theory was ruled out for the present project for similar reasons as constructivism.

According to the above considerations, a paradigm combining aspects of both positivism and constructivism seemed reasonable (Perry *et al*., 1997). *Critical realism* assumes that phenomena indeed can be determined (e.g. Guba and Lincoln, 1994; Perry *et al.*, 1997). Therefore, a triangulation of cognition processes may help ascertain the reality of a particular phenomenon (Perry *et al.*, 1997). Experiences are interpreted within the following three domains: The real domain of generative mechanisms and causal powers that result in patterns of observable occurrences under certain conditions. Next, the actual domain in which patterns of occurrences take place whether they are observed or unobserved. Finally, the empirical domain, where experiences can be obtained via direct observation (Bhaskar, 1978).

Critical realism-associated research gains insights into the real world theoretically and experimentally by identifying and describing generative mechanisms, resulting in observed events (Wollin, 1995). Case studies, the combination of qualitative and quantitative methods, as well as the application of triangulation are associated methods (Guba and Lincoln, 1994).

Since the present project intended to evaluate both individual perceptions as well as objectifiable endpoints, a case study mixed methods design appeared most appropriate. Case study designs are often criticised due to their widely qualitative character and are assumed to be less objective, quantifiable, and robust, compared to experiments, representative surveys, or systematic analyses of archived data (Yin, 2003).

Some authors prefer different approaches for particular phases of a research project. During the descriptive phase, surveys are implemented. For the evaluation of causalities between observed phenomena during the explanatory phase, the 'gold standard' of RCTs, or experiments may be implemented. Case studies may be applied during the explorative phase of a research project (Shavelson and Townes, 2002).

Departing from this view, case studies can also be considered a comprehensive strategy that uses a variety of techniques and methods in order to answer a specific research question. Case studies may combine more than one technique of data collection, and apply different specific methods of data analysis according to the particular research question (Holtmann, 2008). Nevertheless, the risk of a certain lack of objectivity, quantifiability, and robustness remains (Holtmann, 2008).

The present study attempted to address this issue by including a quantitative approach of data collection. Case studies can generally be said to observe phenomena in a real world context, especially when lines between the observed phenomenon and its context are less strictly definable, e.g. when there is no control of the participant's behaviour, or other contextual variables – in contrast to experimental studies where they are clearly separated (Yin, 2003). Case study research can thus be described as

a comprehensive method in which design, data collection, and analysis are interrelated. In a descriptive context, case studies can lead to an enhanced understanding of complex conditions since they attempt to systematise observations. Applied in more explanatory contexts, case studies allow for a deeper insight into an observed phenomenon, as well as more comprehensive interpretation (Yin, 2003). As a method, they approximate the research validity of experiments or surveys (Holtmann, 2008).

3.2.2. Theory and the present project

Since the present research projects contain both explorative and descriptive elements, a case study design appeared well-justified. Nevertheless, it may be questioned whether a single case study or a case study series would have addressed the present research questions best: According to Yin (2003), single case studies are the method of choice when (1) the particularly evaluated case is specifically appropriate to contribute to test, to confirm, to expand, or to reject a certain hypothesis or theory; for (2) contexts that were previously not investigated, as well as for (3) situations or symptomatology that do not fit into a single disease or disorder.

Case study *series* are often assumed to be more robust (Herriot and Firestone, 1983), but they are more elaborate, more expensive, and time consuming (Holtmann, 2008). Their key benefit is the opportunity of direct or theoretical replication, similarly to experimental research. The more frequent or consistent the findings are, the more strongly gained insights may become substantiated (Holtmann, 2008). Since a gap in the existing literature was detected regarding the potential impact of (additional) acupuncture treatment on the variable ‘self-perceived stress’, the second criteria of the

above-mentioned indications for a single design was met. A series would have been more elaborate, more expensive, and more time-consuming, which was not feasible due to financial and logistical limitations.

Considering the points above, a *single* case study design seemed most appropriate to adequately investigate the research question of the present project.

3.2.3. Measurement instruments of the qualitative data

Qualitative data were collected through semi-structured interviews, once during the participant's regular Atomoxetine intake phase, and once after completion of the acupuncture-based intervention phase. Interviews are considered to reveal in-depth information on an investigated topic, explicitly in sequence with quantitative methods (DeJonckheere and Vaughn, 2019).

The semi-structured approach warrants a gathering of the required information through focussed interviews while still providing a sufficient level of adaptability (Valenzuela and Shrivastava, 2002). Both interview's schedules are illustrated in Appendix VIII.

3.2.4. Measurement instruments of the quantitative data

For this study, the 10-item version of PSS (see Appendix VI) was selected, since its psychometric properties were found to be superior (Lee, 2012). In the process of developing this Methodology, the CSS (see Appendix VII) was assessed as superior to the (adult) ADHD Symptom Rating Scale for answering the Research Question, since it

better evaluates the current severity of ADHD-related symptoms, while ASRS evaluates the overall presence of ADHD. The CSS contains three blocks of questions. The first 18 items address both attention deficit and hyperactivity. Odd numbered items are associated with inattentive, while even numbered items are associated with hyperactive-impulsive symptoms. The second block refers to how the extent the problems that were addressed in the first block may interfere with the participant's functionality in diverse areas of life. Lastly, the third block refers to impulsive behaviour in social contexts (Knouse and Safren, 2009).

Both questionnaires apply patient-related outcome measurements. Patients' perceptions and experiences of their own health may deliver crucial information for providing the best possible patient-centred care. Such data are utilised for research, quality improvement, audits, or evaluation of clinician performance (Kingsley and Patel, 2017). In order to reduce the risk of bias, the participant was asked to complete the questionnaires at home, in his usual environment, and without any time pressure (Kingsley and Patel, 2017).

Follow-ups were considered since they may deliver information about the stability of potential treatment-induced impacts (Held, 2010). Multiple data collection allowed for the quantitative analysis of data to reveal insights about intervention modalities (e.g. frequency of treatment, or confounding factors).

3.3. Rationale for the Mixed Methods Approach

Quantitative and qualitative data were considered of equal importance in addressing the two components (self-perceived stress; ADHD core symptomatology) of the

Research Question. While quantitative data contextualised this study`s findings within the literature, the qualitative data explored the participant's perceptions in more depth. Findings gained from both data collection methods were combined through a triangulation process (Farmer *et al.*, 2006; see section 4.3.). This mixed methods approach was implemented in order to increase the understanding of the project's findings (Bryman, 2007). The fact that the whole project was run by one single-operating researcher justifies this approach further (O'Cathain *et al.*, 2010).

3.4. Recruitment

It was intended that one participant would be recruited from ADHD diagnosed patients in shared clinics in which the author works. They participant was not to have received any previous acupuncture treatment for ADHD. Potential participants would be, as was the participant of the present study, contacted primarily by letter in which the research question, design, methods of data collection, details on treatment (frequency, duration of sessions), as well as the handling of respective data was explained (May, 2019a). Then, if interested in participating, they would be invited to a face-to-face conversation to discuss any arising questions and where they were handed out the PIS/consent form (May, 2019a).

3.4.1. Rationale for the Recruitment Method

A thorough and cautious recruitment that considers both legal and ethical requirements is fundamental for any responsible research project. Clinical competence, as well as sufficient sensitivity is required in order to recognise individual conditions and

motivations of a potential participant taking part in a research study (Gruen and Haefeli, 2009).

The chosen method warranted the sufficient provision of information about aims and modalities of the study for the potential participant from the first contact on. Since potential participants were already patients in clinics where the author worked, anamnestic data regarding their health-related conditions were already known. Since the present study applied a single case design, neither a potential selection nor a potential non-response-bias was presumed.

A pre-existing trusting therapeutic relationship with the shared clinic where the author worked may have encouraged the potential participant to ask any participation-related questions, and to appropriately consider potential benefits or risks of participation. Since personal contacts with potential participants lead to higher response- and success-rates, patient contact and recruitment method was chosen because of the probability of near-term recruiting a compatible participant.

3.5. Participant Information Sheet and consent form

Please see the Participant Information Sheet (PIS) and the consent form in the Data Repository (May, 2019a).

3.6. Pseudonymisation and Data Storage

Any data collection was handled according to both the Data Protection Act (DPA) and the General Data Protection Regulation (GDPR). As far as possible, all data was to be stored on a complex-password-protected cloud to which only the author and his nominated person (NCA-Research Director) have access. At the beginning of the study, the participant was given a pseudonym. The respective look-up table was held as printed copy only, stored in a locked, fireproof cabinet to which only the author/researcher has access. A printed copy was securely mailed to the research director as the executor of the closure plan, who stored it securely and would have destroyed it if necessary, according to the provisions set out in the DRP. A local contact was assigned to destroy the local look-up table (and therefore, had access to the locked, fireproof cabinet local to the researcher, see section 3.14.).

Any (anonymised) manually-held data (e.g. paper versions) was stored in a locked, fireproof cabinet to which only the author and his nominated person have access to.

In accordance with the DPA/GDPR and the NCA dissertation guidelines, a data processing diary would be kept for clear, detailed records of data processing activities.

Modalities regarding the secure destruction of data are outlined in section 3.14 (Closure Plan) and in the Data Repository (May, 2019a). Any data collected for this dissertation will be held no longer than five years from the collection date.

3.7. Contingency Plan

Due to the single case study design, not reaching the required number of participants was a low risk. If the participant would have dropped out through unforeseeable circumstances, the whole procedure would have been repeated with a newly recruited participant. Good communication was to be implemented in order to reduce the risk of preventable drop out.

If no participant would have been recruited within the scheduled time frame, the time period would have been extended. If still no participant who suited the inclusion criteria would have been recruited, the patient reaching method might have been extended. Therefore, TCM/CM colleagues, psychologists, or physicians the author cooperated with, might have been asked to be involved by forwarding the original recruitment letter to ADHD-diagnosed patients of theirs that may have fulfilled the inclusion criteria. Therefore, the DRP would have needed to be partially varied, for which a specifically refined ethical approval according to the *Variations of ethical approval* set out by the NCA would have to be requested.

3.8. Timeline

After receiving Ethical Approval by the *Research Ethics Committee for Approval of a Research Study in the field of Acupuncture of the NCA*, and after successful recruitment, the original study started on 28 August 2018. After an initial diagnostic (according TCM) process and a semi-structured interview, an eight weeks intervention phase in which acupuncture was applied twice per week and questionnaires/rating scales were handed out thrice, was implemented. Following the last acupuncture

treatment, another semi-structured interview was conducted. Questionnaire-data were collected again four weeks and eight weeks after completion of the intervention phase.

3.9. Limitations and Risks of Bias (ROBs)

In the present study, a certain information bias, and an interviewer-bias may have arisen.

The information bias could occur since it was not detectable to what extent the participant's comorbidities may impact the outcome parameters. Interviewer bias was due to the fact that interviews generally transport a certain amount of empathy that may increase the flow of information. Since author, researcher and the intervention-providing practitioner were the same person, and author and participant had a pre-existing therapeutic relationship, this constituted a serious risk of (relational) bias.

Because separate study personnel could not be employed due to structural and funding limitations, this bias had to be minimised by addressing it repeatedly in communication. The participant was therefore repeatedly prompted not to embellish their answers in questionnaires, rating scales or interviews. Also, the participant inevitably received intense attention, which may have affected the outcome parameters and his expectations. These unavoidable biases will be addressed in section 5. 'Discussion' below. To avoid data collection bias when interviewing the participant, leading questions were designed in order to avoid closed 'yes' or 'no' responses (Smith and Noble, 2017). In order to avoid question-order-bias, general questions were asked previous to more specific or sensitive questions (Shah, 2019). To address the risk of confirmation bias, the author-researcher constantly prompted himself to maintain an unbiased mindset (compare Shah, 2019). Constant comparison with the original data,

as well as the application of a triangulation protocol was also carried out in order to address this potential ROB.

Regarding the participant, the risk of an acquiescence bias, as well as acceptance bias, may have been given. To outweigh these ROB, questions were designed open-ended, and the participant was encouraged repeatedly to answer truthfully and honestly (see Shah, 2019).

3.10. External and Internal Validity; Construct Validity

An in-depth single case study-design was applied. Thus, the results are not generalisable. In single case studies, the assessment of the extent of external validity is not directly applicable (e.g. Yin, 1994; Cochrane, 2016). As opposed to quantitative research, qualitative research focuses on explaining a particular phenomenon by identifying, for example, 'generative mechanisms' or 'causal powers' (e.g. Guba and Lincoln, 1994; Yin, 1993). Internal validity depends on the extent to which an observed effect remains systematically unbiased (Cochrane, 2016). In case studies, internal validity is generated through case analysis, or the assurance of internal coherence of the findings. Triangulation may support a case study's credibility as well (Guba and Lincoln, 1985).

The internal validity of the present study might be given only to a certain extent, but the construct validity still warrants examination, since it addresses if sufficient operational measurement methods for the investigated theme have been applied (Emory and Cooper, 1991; McDaniel and Gates, 1991). A structured interviewing guide and the implementation of a study protocol, help to warrant a systematic interview-process

(Yin, 1994). In combination with a structured transcription process and analysis of the data, this may reduce the inherent subjectivity of a (single) case study (Dick, 1990; Lincoln and Guba, 1985).

A chain of evidence might be implemented from the formulation of the research question over the process of data collection to the presentation of conclusions (Yin, 1994). A triangulation of findings was found to substantiate (hypothetical) constructs that may assist the potential generalisability of findings gained by case study research (Bonoma, 1985). The latter steps were applied in the present research project (see e.g. section 4. 'Findings'; 4.3 'Triangulation Protocol') to affirm construct validity.

3.11. Data Analysis Plan

All quantitative data collected by PSS and CSS questionnaires were analysed with the 'AnalyzeEverything'-programme (Norrsken Data Teknik, 2017) (see section 4.2.1. 'Data Analysis'/'Analysis of Quantitative Data'). This programme utilises artificial intelligence by aligning independently potential statistical pathways with the input data, and sorting all results according to their statistical quality and plausibility.

Both interviews were transcribed and underwent a content analysis. Both participant's and researcher's themes were identified and categorised in several working steps. Elements of a combined deductive/inductive approach according to Schultz (2015) were applied (see section 'Data Analysis'/'Analysis of Qualitative Data' below). Content analysis is a valid and replicable method for drawing inferences from a specific content, according to its particular context (Krippendorff, 1969) and was chosen since it attempts to adopt advantages of quantitative content analysis (Mayring, 2000).

Narrative analysis was rejected since it is utilised for the analysis of narrative interviews (Drehsing and Pehl, 2015) which does not apply to the research question of the present project. Discourse analysis was discarded since it primarily focuses on communication practices, and the relationship between language and societal structures (Flick, 2010).

For the transcription, the 'expanded version' of the 'simplified transcription system' according to Drehsing and Pehl (2015) was chosen due to easy implementation (Kuckartz, 2008). More detailed transcription symbolism such as GAT (e.g. Dittmar, 2004) (which includes phonetic or phonological properties) would have exceeded the author's linguistic qualification. A triangulation protocol was applied to combine both methods' findings. Guidelines by Farmer *et al.* (2006) were taken into account (see section 4.3. 'Triangulation Protocol' below). All findings are presented in tables, charts/graphs and text form (see section 4. 'Findings' below).

3.12. Skills Analysis

For this study, the researcher-practitioner needed to be skilled in TCM-diagnoses and acupuncture, and also experienced in handling different therapeutic situations, e.g. the special requirements of a challenging clientele. Furthermore, semi-structured interviews needed to be focused and well-structured. To improve his interviewing skills, the author received tutoring from a social-psychologist researcher. To improve his data-analysis skills he received tutoring from a statistician.

3.13. Disseminating Knowledge

The findings generated by this study are intended for publication in professional journals, presentations at lectures and conferences, as well as with ADHD-self-help groups (to be shared with both health professionals and affected individuals) in order to increase qualified information on a less-known treatment option. Furthermore, the findings will be presented to potential funders in order to support the funding of comprehensive future research on the issue addressed by this study.

3.14. Closure Plan

In the case of a serious accident or illness that may have prevented the author from continuing the study, the participant would have been informed by e-mail notification and call, see Data Repository (May, 2019a). Any personal data that linked the pseudonym and the actual identity of the participant collected up until then would have been securely destroyed. Nominated to carry out the closure plan (May, 2019a) was the NCA-Research Director. A local contact was assigned to destroy the local look-up table (and had access to the locked, fireproof cabinet local to the researcher) in that case.

3.15. Ethical Issues Analysis

Acupuncture is considered to be safe and inexpensive, compared to other conventional therapies (Li *et al*., 2011). Any treatment was about to be applied *lege artis*, in order to prevent any potential adverse effects. If such effects (e.g. vegetative, cardio-vascular, or gastro-intestinal symptoms) may have had appeared nevertheless, the author-

researcher-practitioner would have handled the situation according to his professional experience, and would have considered modifications to prevent reoccurrence. For example, if a blood vessel would have been hurt by the insertion of a needle, the position of the needle would have been modified in future insertions. If a blood vessel would have been hurt during the removal of a needle, the respective spot would have been squeezed under consideration of usual rules. In the case of development of a hematoma, the respective point would have been excluded in following session(s), until it had been resorbed. If it would have had come to contact between a needle and nerve tissue, the position of the needle would have been immediately modified.

Both methods of data collection (questionnaires/rating scales and interviews) may have supported the participant's introspective capabilities, which may have incited uncomfortable feelings and distress. It could not be excluded that given (e.g. psychological or psychosomatic) comorbidities would not exacerbate during the intervention phase. Sufficient time was warranted to address this. The author-researcher-practitioner is trained and well-experienced in the handling of sensitive therapeutic situations. For instance, dialogue techniques from client-centred counselling may have come into play, in order to have conveyed to the participant that he was well cared for, and that adverse emotional reactions can be resolved. In addition, the participant was allowed to get in touch in between treatments by mail or phone.

If medically indicated, a modification of the acupuncture protocol may have been considered. Given the potential case of more severe conditions, additional acupuncture treatments (free of charge), adjusted according to the participant's particular symptomatology, may have been offered. Since such intervention might constitute bias, it would have needed to be discussed in the final report. If an exacerbation of

ADHD/comorbidity symptoms might have occurred during the intervention phase, treatment would have been stopped. Since the interpretation of such phenomena may have exceeded the professional competence of the acupuncture-providing practitioner, the participant would have been referred to their family physician or psychotherapist. The additionally consulted practitioner would have been asked for a letter of support that confirms the safety of the given acupuncture treatment, so that the intervention phase may be recommenced.

The author-practitioner-researcher declared his intention to treat the participant with respect and dignity, guarding their safety and wellbeing according to the principles of Good Research Practice as formulated by the Medical Research Council, 2012. Furthermore, any steps of this project were taken in full accordance with the Declaration of Helsinki (World Medical Association WMA, 2013). The expectation, justified by the reviewed literature, was that the participant may benefit from participating in the study. Hence, both the study and the intervention were justified adequately. A Local Ethics Enquiry Document (LEED) is included in the Data Repository (May, 2019a).

3.16. Data Analysis

In accordance with the author`s supervisor, detailed descriptions of the analyses of both qualitative and quantitative date are integrated into the ‘Findings’ below (section 4.).

4. Findings

4.1. Findings of Qualitative Data Analysis

4.1.1. Analysis of Qualitative Data

Interviews were transcribed and translated into English (May, 2019a/b). Translations were cross-checked by an Academic English writing tutor with native fluency in both English and German. Next, both participant's and researcher's themes were identified through the application of elements of the combined deductive/inductive approach according to Schultz (2015). At first, units of analysis had to be identified. Interviews were therefore broken up into useful segments of data, respectively sentences or paragraphs. These segments of data were given a maximum seven word summary each. This procedure was termed *open coding* (according to Schultz, 2015).

Regarding the pre-interventional interview, 175 of such open codes were identified for the participant and 53 for the interviewer/researcher. Regarding the post-interventional interview, 105 open codes were identified for the participant and 19 for the interviewer/researcher. Subsequently, lists of all identified open codes were checked for similar or redundant codes in order to reduce the number of codes to 46 regarding the pre-interventional, and eight regarding the post-interventional interview. During this step, the data were constantly compared with the original data to assess if the new codes still matched ('constant comparison' according to Schultz, 2015).

The next step aimed to determine five to seven overarching themes or categories for the identified open codes. First, the 46, respectively eight codes were further reduced to 13 (pre-interventional), respectively four (post-interventional) sub-codes that were then further narrowed down to seven (pre-interventional interview), respectively three (post-interventional interview) *closed codes* that represented the final main themes.

These final themes needed to reflect the purpose of the research, be exhaustive, and be sensitive to what was represented in the data (Schultz, 2015). For this purpose, paper maps were created. The pre-interventional interview mapping, included ten, the post-interventional interview mapping nine A3-papers that were horizontally glued together. Up until then, the procedure was pursuing an inductive approach.

Since no underlying theory or theory-based hypothesis was postulated in this research project, the term ‘inductive’ may be considered according to the ‘bottom to top’ approach (Observations – Patterns – Broader Generalisation/Tentative Hypothesis – Theory), at least as relating to the first three steps, as outlined by Schultz (2015). Regarding the post-interventional interview, both inductive and deductive/ ‘top down’ approach (Theory/Specific Framework – Hypothesis – Observation – Confirmation or Rejection) elements were applied in order to confirm if a particular segment of data complied with the categorised main theme of the pre-interventional interview. Each sentence or paragraph was first labelled with a closed code from the content analysis of the pre-interventional interview.

Next, all the individual quotes for each main theme from both interviews were brought together. To illustrate theme distribution, print-outs of the interviews were cut into segments (May, 2019d), and all the individual quotes of a particular main theme were

highlighted in different colours. In addition, ideas within a particular theme were labelled ‘sub themes’. All individual quotes of each of the ten main themes and their sub themes were gathered on a DIN A0 format each (2019d). Finally, all main themes were entered in a table (May, 2019d) with examples for each main theme, occurrences of particular sub themes and intersections between the themes, as well as a summary of pre- and post-interventional findings regarding each individual main theme.

4.1.2. Findings of Qualitative Data Analysis

The content analysis of the interviews revealed the followingly listed main themes.

- Main theme 1: ‘Current Complaints/ Symptoms (incl. non-specific)’
- Main Theme 2: ‘Paramount ADHD-core symptomatology – changes over course of life?’
- Main theme 3: ‘Resilience & beneficial factors/awareness-process’
- Main theme 4: ‘Stress-Perception: Triggers & Causal/Symptomatic Factors (incl. Frequency)’
- Main theme 5: ‘Burden’
- Main theme 6: ‘ATX-Intake: Impact then & now; currently beneficial?’
- Main theme 7: ‘Additional bodily phenomena/symptoms’
- Main theme 8: ‘Increased • (Self-) Controllability; • (Self-) Awareness; (Self-) Efficacy; • Centeredness; • Ability to focus’
- Main theme 9: ‘Treatment-associated Changes (incl. non-specific) & treatment-experiences positively associated’

- Main theme 10: ‘(Acupuncture-)Treatment-associated: • Decreased inner tension;
  • Positively impacted hyperactivity’

Main themes 1-7 first were inductively identified by analysing the pre-interventional interview. They were then deductively double-checked for their occurrence in the post-interventional interview. Main themes 8-10 only emerged in the post-interventional interview since they addressed themes regarding the received therapeutic intervention that were not addressed within the first pre-interventional interview. Below, the identification of main themes one to ten is described in detail:

4.1.2.1. Main Themes

- Main theme 1: ‘Current Complaints/Symptoms (incl. non-specific)’

The theme ‘Current Complaints/ Symptoms (incl. non-specific)’ was inductively identified in the analysis of the pre-interventional interview. Intersections with the second main theme, ‘Paramount ADHD-core symptomatology – changes over course of life?’ were observed. Next, this main theme was deductively double-checked in the analysis of the post-interventional interview.

While both hyperactivity/impulsivity and attention deficit were strongly prominent in the participant’s childhood, hyperactivity decreased already at an early age. Pre-interventional, all ADHD-aspects were consistently prominent (‘combined type’). An

increasing uncontrollability affected him seriously and increased his challenging restlessness. Furthermore, he became more forgetful and suffered from pronounced anxiety. His symptomatology was suddenly changing, which in turn caused more anxiety and increased restlessness.

> "Currently, (…) pretty much all combined. (…) both aspects are strongly represented. Besides, the restlessness, (…) have this restlessness, as a rule. (…) Right now, both aspects are consistently present. So both aspects feel really strong at the moment. (…)" #00:05.09 – 11#

Postinterventional, the 'combined type' was dominant. The most burdening complaint appeared to be hyperactivity, which was usually perceived as pronounced restlessness. Although all symptoms were still present, a higher controllability, and an increased awareness were reported, resulting in an increased self-management-ability and self-efficacy.

> "I'd say both aspects are present, prominent (…). Erm, currently they both taking turns a lot (…). Erm (…), but I'd say I'm more in control of it, nevertheless. So I just have an increased awareness about what is happening. So I'm able to better grasp it (…). I'm able to assess it more reliably. Right now it doesn't get to me, it just doesn't get to me. Eh, I'll just call it this overpowering force for now, this (…), which makes one feels so powerless, erm (…), that's just gotten less severe (…). So I'm (…) still able to eh withdraw for a moment, and reflect on it, and say: Now this or that is going on, and accordingly, I am more able to take action myself, So that's working out for sure (…)." #0:03:23 – 4#

- Main Theme 2: 'Paramount ADHD-core symptomatology – changes over course of life?'

The second identified main theme, inductively identified first at the analysis of the pre-interventional interview, was 'Paramount ADHD-core symptomatology – changes over

course of life?'. This, again, was deductively double-checked in the analysis of the post-interventional interview. Pre- and post-interventional intersections with the main theme 'Current Complaints/Symptoms (incl. non-specific)' were observed.

While both impulsivity/hyperactivity and attention-deficit were reported to have been "very, very extreme" during his childhood, hyperactivity decreased already during adolescence. Inner loneliness, as well as depressiveness appeared to be consistently present since childhood/adolescence, as well as a feeling of being 'under pressure'.

> "(…) regarding my jitteriness or impulsivity, and concentration difficulties which were very, very extreme during my childhood,(…). I had severe problems with listening, paying attention to teacher's explanations was extremely difficult for me. (…) they read something out to us, and then I still haven't, or it just didn't land, or I was totally resistant, on the inside. Hence, this was, indeed (…), and this hyperactivity was (…) way stronger than today.
> Now (…) those aspects are currently surfacing again, in the way I just explained it to you.
>
> This restlessness, this, in between, I have this (…) this restlessness. But, (…) I wouldn't call this hyperactivity. Yes, back then as a kid, it was very, very distinct. Which meant, I couldn't sit still, and, and, always moving, and, and hectic, (…)."
> #00:20:38 – 29#

Post-interventional, the 'combined type' still arose with both ADHD-main aspects. Their respective weighting varied a lot, and restlessness, associated with the term 'hyperactivity', burdened him the most. Although combined symptomatology still persisted, a perceived empowerment in challenging situations and increased controllability were reported.

> "And it's still there, and it's annoying. But I still can get a grip of it occasionally. Thus, I still can preserve this feeling that I can still, despite everything, have it under control. And that itself, despite everything, feels a lot better. When one just feels a bit more powerful, feels oneself through that. That IT doesn't have power over you but you can, whatever, direct it. So that I don't have this, this powerlessness that, where you, where you just don't know ok what am I going to

> do now, I am feeling this way but I just don't know how to deal with it (…). And that's really taken a turn for the better." #00:06:06 – 18#

- Main theme 3: 'Resilience & beneficial factors/awareness-process'

Third, the pre-interventional main theme, 'Resilience & beneficial factors/awareness-process' was inductively identified, and deductively double-checked in the analysis of Interview II. Post-interventional, intersections with the main theme 'Increased • (Self-) Controllability;

• (Self-) Awareness; • (Self-) Efficacy; • Centeredness; • Ability to focus' were detected.

During his early adulthood he recognised that 'consistency' appeared to be beneficial, and therefore, an applicable goal. He benefitted from practising meditation techniques and other spiritual practices. He felt he was no longer able to apply these practices.

> "Regarding the vulnerability: I try to, when I recognize, it's coming, could become stressful now, I try to prevent it. (…) Currently, I don't handle it well. So, right now, I am finding it very hard, so, I would say, now, at the moment, I am not handling it well. Because it's all slipping from my hands, (…)." #00:31:38 – 63#

Post-interventional, he reported an increased awareness and self-management-ability/self-efficacy. An increased centeredness, as well as an enhanced ability to focus were crucial improvements associated with the acupuncture treatments, as well as more tranquillity and decreased inner tension. Treatments appeared to have been psycho-emotionally intense experiences – feelings of gratitude, love, sadness, and awareness were reported. He stated that acupuncture "positively affected" his life.

> "I(…) I just have an increased awareness about what is happening. So I'm able to better grasp it (.). I'm able to assess it more reliably. Right now it doesn`t get to me, it just doesn't get to me. Eh, I'll just call it this overpowering force for now, this (…), which makes one feels so powerless, erm (…), that's just gotten less severe (…). So I'm able to, at least I am able to, still able to eh withdraw for a moment, and reflect on it, and say: Now this or that is going on, and accordingly, I am more able to take action myself, so that's working out for sure (…)." #0:03:23 – 4#

- Main theme 4: 'Stress-Perception: Triggers & Causal/Symptomatic Factors (incl. Frequency)'

As a fourth main theme, the theme 'Stress-Perception: Triggers & Causal/Symptomatic Factors (incl. Frequency)' was inductively identified pre-interventional, and deductively double-checked in the analysis of the post-interventional interview.

Regarding their pre-interventional stress perception, a "very, very strong" frequency, and a "medium to strong", respectively "very strong" stress-intensity were reported. While the participant accepted his symptoms, he was also concerned that his behaviour was negatively affecting other people. A frantic state of mind, stronger impatience, a raised voice, and an increased impulsivity were manifestations of his experience of stress. Stress was experienced very often and accompanied by extreme sadness, sometimes to the extent that it induced a feeling of paralysis.

> "I get hectic, I get very hectic. My voice changes, I get very loud. (…) Impulsive, (…) my ability to concentrate decreases, (...) I would say it's concentration deficiency. Right (…), and more impatient (...)." #00:41:59 – 91#

Treatment was associated with a “positive effect”. Although stress had not disappeared entirely, the participant managed to overcome stressful situations more quickly compared to pre-interventional. It was stated that either “his perception was altered”, or that he “could get out of difficult situations faster”. Inner tension occurred less, and lasted for shorter periods of time, which was associated with an increased centeredness, and ability to focus.

> “(…) the stress, the stress still exists. It has not (…) disappeared. But. Erm, that’s also the case, that I just can catch myself faster. So I get out of situations more quickly again, or I can stop myself. Erm (…), that’s definitely improved. (…)” #00:14:13 – 34#

- Main theme 5: ‘Burden’

The theme ‘Burden’ was the fifth main theme inductively identified in the analysis of the pre-interventional interview, and deductively double-checked in the analysis of the post-interventional interview. Pre-interventional, intersections with the main theme ‘Increased • (Self-) Controllability; • (Self-) Awareness; • (Self-) Efficacy; •Centeredness; • Ability to focus’ were detected (see below).

His pre-interventional perception of stress was very burdensome, especially since he felt less control in stressful situations, and even occasionally felt paralysed. The experienced lack of consistency appeared to be at the root of this perception.

> “Since the fear of not having any consistency, was just very big. And this is currently, to come back again on how burdensome it is, currently that’s just VERY burdensome (…).” #00:49:56 – 104#

Post-interventional, his stress-perception appeared less burdening since his 'perception of powerlessness' decreased, while, his self-efficacy simultaneously increased.

> "And it's still there, and it's annoying. But I still can get a grip of it occasionally. (…) That IT doesn't have power over you but you can, whatever, direct it. So that I don't have this, this powerlessness that, (…) And that's really taken a turn for the better." #00:06:06 – 18#

- Main theme 6: 'ATX-Intake: Impact then & now; currently beneficial?'

'ATX-Intake: Impact then & now; currently beneficial?' was inductively identified as the sixth main theme in the analysis of the pre-interventional interview, and deductively double-checked in the analysis of the post-interventional interview.

At the beginning of his ATX-intake, he sufficiently gained benefit from the pharmaceutical therapy. After a while, he noticed a habituation to the standard-dosage. ATX appeared to be only helpful to a certain level.

> "In the past it helped me, helped me extremely. I just noticed, it made me calmer, increased my attention. But it was also, once I crossed a certain line, the pills didn't help anymore. Then I didn't have these perceptions anymore. But simply because I probably, in part, didn't do things that I should have done, you see. Like, to organise myself in a better way, (…) and (…), then I just couldn't do it." #00:59:52 – 128#

Comparing the ATX only- vs the combined therapy, the participant'sperception was positive about the combined therapy. It was perceived as "better", and as "making a positive difference".

> "(…) I can only say that it's been positive. Because I still took the medicine like I always take it, and we just applied the treatment, hence, acupuncture was applied the way it was applied, and eh, so, (…) So I honestly can't say anything else than that it's better WITH acupuncture, rather than without. That is my response. So it definitely makes a difference. A positive one. So, in this case, WITH the acupuncture." #00:19:10 – 48#

- Main theme 7: 'Additional bodily phenomena/symptoms'

As the seventh main theme, the theme 'Additional bodily phenomena/symptoms' was identified. Again, it was inductively developed in the analysis of the pre-interventional phase, and deductively double-checked in the analysis of the post-interventional interview. Pre-interventional, intersections with the main theme 'Stress-Perception: Triggers & Causal/Symptomatic Factors (incl. Frequency)' were observed. Post-interventional intersections with the main theme 'Treatment-associated changes and treatment-experiences positively associated' (see below) were detected.

> "Sometimes in my right arm, (…) like a kind of shaking. Then it's shaking as if it was a nerve-related thing. And sometimes, I feel it in my stomach." #01:01:24 – 132#

Post-interventional, no treatment-associated bodily perceptions were at first reported. At a later point, when asked if he wanted to add anything else, "sensations of pressure", or a "tingling feeling" during treatments were reported.

> "Ok. Because you have asked me a bodily-related question. I can't say anything, but, regarding the body something came up for me: Hence, I can't say anything about [how I felt] during, I mean, AFTER the treatments, I just can tell you: DURING the treatments I did notice how it, that it, worked. So that's what I, that's what I noticed. I mean, that it's definitely working. So. Erm, what I experienced in a positive way, not negatively. Be it a sensation of pressure during [the treatment], be it a tingling feeling, I did feel that, erm, (…) right. So that's what I wanted to add regarding bodily sensations since I just had said that I didn't experience anything bodily-related (…). During the sessions I definitely noticed something. During the treatments. As they were happening (…), yes." #00:23:02 – 56

Three new main themes arose during the analysis of the post-interventional interview:

- Main theme 8: 'Increased • (Self-) Controllability; • (Self-) Awareness; • (Self-) Efficacy;
  • Centeredness; • Ability to focus'

This main theme was inductively identified.

Post-interventional, the 'combined type' still showed up with hyperactivity-associated restlessness. Increased (self-)awareness and a strengthened self-controllability were repeatedly associated with the acupuncture-treatments. In addition, an increased centeredness, as well as an enhanced ability to focus, were reported to have positively affected his hyperactivity/restlessness, inner tension, and *attention-deficit.* Furthermore, the participant's coping- and self-management-abilities were stated to have increased.

> (…) Despite everything (…), eh, for me that goes along with my ability to focus. Because when I'm hyperactive, I can just barely focus (…). Erm, positively. It had a positive impact [on that]. So, as mentioned before, CENTEREDNESS, a bit, IN CERTAIN MOMENTS MORE more FOCUSSED in certain moments, AS WELL, which is not always easy for me, but (…). Exactly, positive." #00:20:25 – 50#

- Main theme 9: ‘Treatment-associated Changes (incl. non-specific) & treatment-experiences positively associated’

This second post-interventional main theme was inductively identified. Intersections were found between the main themes ‘Stress-Perception: Triggers & Causal/Symptomatic Factors (incl. Frequency)’, ‘Resilience & beneficial factors/awareness-process’, ‘ATX-Intake: Impact then & now; currently beneficial?’, ‘ATX-Intake: Impact then & now; currently beneficial?’, as well as ‘Additional bodily phenomena/symptoms’.

Treatment-associated changes (see above), as well as perceptions *during* the treatments, were overall positively assessed. The perception that “something just had changed” occurred already at the beginning of the intervention phase. During the original treatment sessions, intense psycho-emotional perceptions were reported. Compared to the established ATX-only-therapy, the additional acupuncture was stated to “make a positive difference”, and to “have positively affected” his life.

> “(…) Since I had this, this positive perception regarding the treatment, I had that eh, quite quickly. That happened after the first, after the first treatment already. If it was directly after, unfortunately I just don’t know, anymore, if it was immediately after the treatment, or, eh, if it then occurred during the course of the day, the course of the evening, or the next day. But it’s a fact that I (…) noticed it quite quickly. Thus, that eh, there’s a positive effect.” #00:15:08 – 38#

- Main theme 10: ‘(Acupuncture-)Treatment-associated: • Decreased inner tension; • Positively impacted hyperactivity’

Furthermore, the third post-interventional main theme, ‘(Acupuncture-) Treatment-associated: • Decreased inner tension; • Positively impacted hyperactivity’, arose by inductively analysing the post-interventional interview. Associated main themes were ‘Resilience & beneficial factors/awareness-process’, and • ‘Increased (Self-) Controllability; • (Self-) Awareness; (• Self-) Efficacy; • Centeredness; • Ability to focus’. Here, the focus was on ‘Increased (Self-) Controllability’.

Acupuncture treatments were perceived to positively affect hyperactivity, as well as frequency and duration of states of inner tension. They were credited with improved coping-abilities, as well as increased controllability and ability to focus.

> Positively. (…) So I, erm, did notice during the treatment that something’s happening. Be it physical, be it erm, regarding my tension. Erm, (…) it yet gave me, I would say it just, just, definitely gave me more tranquillity, in any case (…).” #00:09:12 – 20#

> “(…) despite everything (…), eh, for me that goes along with my ability to focus. Because when I’m hyperactive, I can just barely focus (…). Erm, positively. It had a positive impact [on that] (…).” #00:20:25 – 50#

4.1.2.2. Sub Themes

In addition to the main themes, sub themes were identified. In the following section, their relationship to the main themes is explained:

- Regarding main theme 1 ('Current Complaints/ Symptoms (incl. non-specific)'), the following sub themes emerged: 'Uncontrollability'; 'Combined type paramount'; and 'Behaviour patterns/ self-confidence-issues'. In addition, post-interventional sub-themes, 'Hyperactivity is like a kind of restlessness', and 'Uncontrollability', were identified.

- Regarding main theme 2 ('Paramount ADHD-core symptomatology – changes over course of life?'), pre-interventional, the sub themes Childhood; 'Adolescence'; 'Adulthood'; 'Extreme anxiety'; 'Inner loneliness'; and 'Consistent pressure' emerged. Post-interventional, the sub theme 'Adulthood' was deductively identified.

- Regarding main theme 3 ('Resilience & beneficial factors/awareness-process'), the sub themes, 'Beneficial: Consistency'; 'Negative Learning Spiral'; 'Beneficial: Spirituality'; 'Relevance of a positive Learning Effect'; 'At present: Self-management-Ability' emerged in the post-interventional interview. In the post-interventional interview, the sub theme 'Relevance of a positive Learning Effect' was deductively re-detected while the additional sub themes 'Increased Awareness' and 'Self-management-Ability' newly emerged.

- Regarding main theme 4 (‘Stress-Perception: Triggers & Causal/Symptomatic Factors (incl. Frequency)’), pre-interventional, the sub themes ‘Frequency (stress)’; ‘Intensity (stress)’; ‘Characteristic factors of stress -perception showed up as both triggering *and* causal factors’; as well as ‘Paralysed by stress’ were identified. From these, the sub themes ‘Frequency (stress)’, and ‘Intensity (stress)’, were deductively re-detected in the analysis of the post-interventional interview.

- Regarding main theme 5 (‘Burden’), pre-interventional, the sub theme ‘So strongly burdensome – even gets paralysed’ emerged. This was not identifiable in the post-interventional interview anymore.

- Regarding main theme 6 (‘ATX-Intake: Impact then & now; currently beneficial?’), pre-interventional, the sub themes ‘Wide contextual differences’ and ‘Considering the pharmaceutical therapy in a more comprehensive context’ were detected. Both were not identifiable in the post-interventional interview anymore. As a new sub theme, post-interventional the theme ‘Combined therapy felt more helpful than ATX alone’, was identified.

- Regarding main theme 7 (‘Additional bodily phenomena/symptoms’), pre-interventional, the sub themes ‘Twitching’; ‘Voice’; and ‘Stomach’ emerged. Those were not observable during the post-interventional interview anymore, whereas the additional sub theme ‘Bodily sensations during the treatment’ arose.

- In main theme 8 (‘Increased • (Self-) Controllability; • (Self-) Awareness; • (Self-) Efficacy; • Centeredness; • Ability to focus’) no additional sub themes emerged.

- Regarding main theme 9 (‘Treatment-associated Changes (incl. non-specific) & treatment-experiences positively associated’), the sub themes ‘Treatment-experiences: more tranquillity; feelings of love & thankfulness, of sadness & awareness’ and ‘Quick onset of (considered) treatment-effects’ emerged.

- In main theme 10 (‘(Acupuncture-)Treatment-associated: • Decreased inner tension; • Positively impacted hyperactivity’) no additional sub themes emerged.

4.2. Findings of Quantitative Data Analysis

4.2.1. Analysis of Quantitative Data

As outlined in the Methodology section, all data from both questionnaires were analysed with the programme ‘Analyze Everything’ (AE). Two data sets were generated, one fed with the data of the PSS, the other with the data of the CSS. All non-numeric data were handled as classes and, if possible, clustered into groups. Regarding the PSS, the designations of the ten items B.1.-B.10. were maintained.

Since the CSS is divided into three distinct sections that address four particular areas, items were respectively grouped. These three sections were abbreviated as follows: ‘att.def. bhv.’, for the block of items that addresses aspects of the participant’s attention deficit-related behaviour; ‘hyperact./imp. bhv’ for items addressing his hyperactivity-/impulsivity-related behaviour; ‘function’ for the block of questions thematising the extent to which attention deficit- and hyperactivity-/impulsivity-related behaviour impairs his functionality in various areas of life; and ‘impulsivity’ for that block of items that address the extent of the participant’s impulsivity.

First, class comparisons were graphically illustrated through bar charts for total scores, for total sub-group scores, as well as for each item of both questionnaires (May, 2019b).

Although the present number of data was too small for hypothesis-tests, hypothesis-tests were carried out. This was first done by applying the DUNCAN test. When standard deviations proved to be inadequate in *all* classes, the STUDENT hypothesis-test was applied. In hypothesis-tests, equality of the measured data is always assumed. If the test falsified this, the inequality of the respective classes was concluded (StatSoft, Inc., 2013).

Next, a chronological change of the measured quantities was postulated. Therefore, a regression line (as a function equation) was constructed (StatSoft, Inc., 2013). The correlation co-efficient, in its square, demonstrates the particular set of data that becomes explained by the particular function (‘statistical validity’). Generally spoken, when a correlation coefficient is ≤ 0.7, the addressed relationship is not predictable anymore since another relation, or no relations at all, are more probable. A relatively reliable correlation co-efficient is a minimum of $r = 0.9$, or $r^2 = 0.81$, respectively. A

correlation co-efficient $r = 0.975$ or $r^2 = 0.9$, would have been truly reliable, implicating that an examined intervention almost surely lead to a postulated impact (Nordmann, 2007). This, in turn, is unfeasible in a study (StatSoft, 2011; Nordmann, 2007).

By application of the correlation coefficient, the hypothesis was either confirmed, or falsified (respectively 'interpreted'). Regressions were presented by graphs (May, 2019b). Since, due to the small number of data, the *objective criteria* of the DUNCAN test (or, alternatively, the STUDENT-t-test) cannot be met, they then were checked for possible mathematical statements. Four recurring patterns regarding the previously performed class-wise comparison were identified and categorised.

Two tables were generated (Section 4.2.2.; tables 2 and 3). The respective particular regression graphs were additionally added to these tables, in order to show the possible egression over time.

4.2.2. Findings of the analysis of the CSS

4.2.2.1. Description of the total score of the CSS

Applying DUNCAN hypothesis-test, a recognisably higher pre-interventional measurement-related value was detected, compared to both the 'during the intervention phase' and the post-interventional measurement values.

The 'during the intervention phase'-values were found to present a recognisable standard deviation, while post-interventional measurement values showed no such

deviation. Thus, a process of change can be predicted although it cannot be proven. The respective regression function shows the change over time.

Regarding this item, a 35 % reduction of the CSS total score between the pre-interventional and the 'during the intervention phase'-measurement points was detected. From 'during the intervention phase' to post-interventional, it decreased 17 %. A total reduction of 47 % from pre-interventional to post-interventional measurement values was detected. Due to the low number of data (< 96), no analysis can be significant. The present analysis was carried out at a significance level of 95 % as is mandatory (this significance assessment applies to all the subgroups below).

Taking this into account, the present bar chart and calculation are significant. Thus, a process of change can be predicted although it cannot be proven.

4.2.2.2. Description of the total score of the subgroup 'att.def. bhv.'

By applying the STUDENT hypothesis-test, a recognisably higher pre-interventional measurement value-related bar was detected, compared to both the 'during the intervention phase'- and the post-interventional measurement values.

The 'during the intervention phase'-values were found to present a recognisable standard deviation, while post-interventional measurement values showed no such deviation.

Regarding this score, a 30 % reduction between the pre-interventional and the ‘during the intervention phase’-measurement points was detected. From ‘during the intervention phase’ to post-interventional, it decreased 12 %.

A total reduction of 39 % from pre-interventional to post-interventional measurement values was detected.

4.2.2.3. Description of the total score of the subgroup ‘function’

The STUDENT hypothesis-test found that the ‘during the intervention’-measurement values showed a standard deviation, while the ‘post’-values were even smaller. Regarding this item, a 40 %-reduction of the total score between the pre-interventional and the ‘during the intervention phase’-measurement points was detected. From ‘during the intervention phase’ to post-interventional, the score decreased 23 %.

A total reduction of 55 % from pre-interventional to post-interventional measurement values was detected.

4.2.2.4. Description of the total score of the subgroup ‘hyperactive/impulsive behaviour’

The STUDENT hypothesis-test found that the ‘during the intervention’-measurement values showed a standard deviation, while the ‘post’-values were even smaller. Regarding this item, a 33 % reduction of the total score between the pre-interventional

and the ‘during the intervention phase’-measurement points was detected. From ‘during the intervention phase’ to post-interventional, the score decreased 29 %.

A total reduction of 53 % from pre-interventional to post-interventional measurement values was detected.

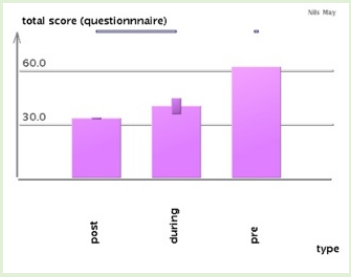
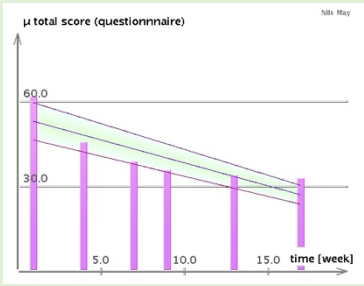
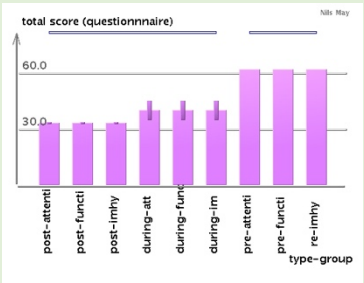
4.2.2.5. Description of the total score of the subgroup ‘impulsivity.’

The STUDENT hypothesis-test found that ‘during the intervention phase’-measurement values showed a certain standard deviation. However, this deviation was so small that both ‘during the intervention phase’- and post-interventional measurement values can be considered as originally constant.

Considered purely descriptively, a 37 %-reduction of the subgroup total score between the pre-interventional and the ‘during the intervention phase’-measurement occurred. From ‘during the intervention phase’ to post-interventional, it decreased by 10 %.

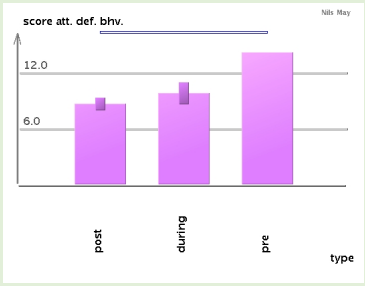
A total reduction of 30 % from pre-interventional to post-interventional measurement values was detected.

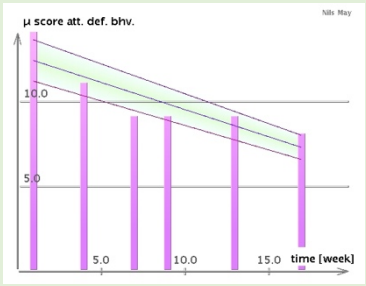
Table 2: Current Symptom Rating Scale Self-Report (CSS) Total Scores and Subgroup Total Scores

Category/Explanation	Item	Class Comparison	Regression Analysis
Type 0-1-2 **'Pre'-measurement value > 'during' or 'post'** **High standard deviation detected 'during'** **Measurement values 'post' < 'pre'** **Negligible standard deviation of 'post' measurement values** **Process of change identified**	• CSS Questionnaire Total Score I	 DUNCAN hypothesis-test: Higher 'pre' measurement value-related bar compared to both 'during'- and 'post'-measurement values. Recognisable standard deviation in 'during'-values, no deviation in 'post'-measurement values. Process of change predictable but not proven due to $n = 1$. The regression function shows the change over time. 35 % reduction of CSSR total score from 'pre'- to 'during'-t. 17 % from 'during' to 'post'. 47 % total reduction from 'pre'- to 'post'-measurement values. Due to the low number of data (< 96) analysis not significant, Significance level of analysis 95 %. Process of change predictable but not provable due to $n = 1$.	
– cont. Type 0-1-2 –	• CSS Questionnaire Total Score III	 STUDENT hypothesis-test: Description in the box above.	

– cont. Type 0-1-2 –

• Subgroup Total Score ‘att. def. behaviour’





STUDENT hypothesis-test:

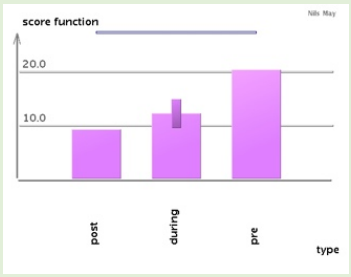
Higher ‘pre’-measurement value-related bar observed compared to both the ‘during’- and ‘post’-measurement values.

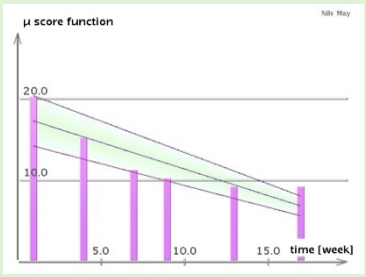
Recognisable standard deviation of during’-values, no deviation in ‘post’-measurement values.
30 % reduction of subgroup score between the ‘pre’- and the ‘during’.
12 % decrease from ‘during’ to ‘post’.
39 % reduction from ‘pre’- to ‘post’-measurement values.

Due to the low number of data (< 96) analysis not significant, Significance level of analysis 95 %.
Process of change predictable but not provable due to $n = 1$

– cont. Type 0-1-2 –

• Subgroup Total Score ‘function’





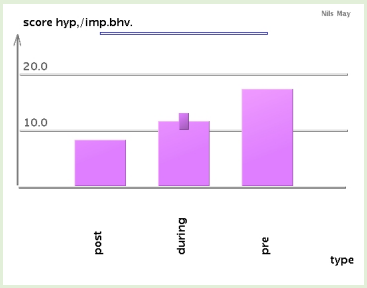
STUDENT hypothesis-test:

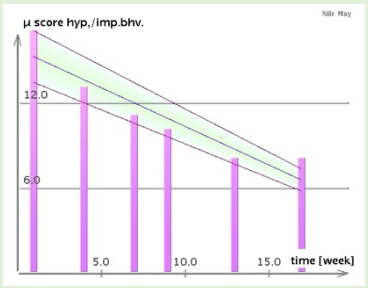
Standard deviation in ‘during’-measurement values, ‘post’-values are even smaller.
‘Pre’-measurement values only collected once.

40 % reduction of subgroup score from ‘pre’- to ‘during’-measurement:
23 % decreased from ‘during’ to ‘post.’
55 % reduction from ‘pre’- to ‘post’-measurement values
.

– cont. Type 0-1-2 –

• Subgroup Total Score 'hyperactive/ impulsive behaviour'





STUDENT hypothesis-test:

Standard deviation in 'during'-measurement values, 'post'-measurement values are even smaller.
'Pre'-measurement values were only collected once.

33% reduction of subgroup score from 'pre'- to 'during'-measurement.
29% decrease from 'during' to 'post'.
53% total reduction from 'pre'- to 'post'-measurement values.

Due to the low number of data (< 96) analysis not significant, Significance level of analysis 95 %.
Process of change predictable but not provable due to $n = 1$.

Type 1-1-2/ Type 1-1-2 reverse

'Pre'-data only collected once

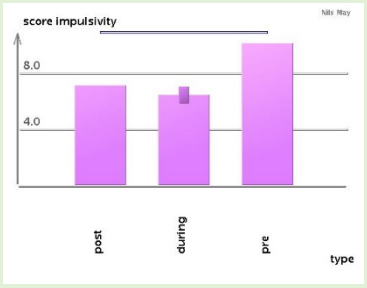
Standard deviation is '0' Standard deviations of data collected 'during', or 'post' is also '0'

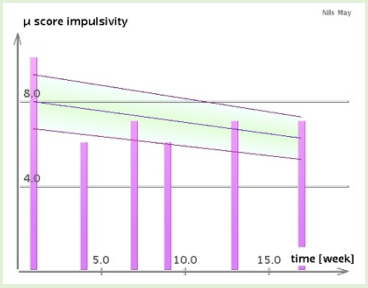
'pre'-measurement value was higher ('worse'), lower in the Type 112 'reverse' than measurement values

'during' and 'post', process of change not clearly identifiable

Higher (or lower, at the 'reverse' version) measurement value may be divergent by coincidence, no association with intervention can be proven
Causal conclusions cannot be drawn

• Subgroup Total Score 'impulsivity'





STUDENT hypothesis-test:

Standard deviation in 'during'-measurement values.
'During'- and 'post'- measurement values can be considered constant due to negligible deviation.

37 % reduction of the subgroup total score from 'pre'- to 'during'-measurement.
10 % increase from 'during' to 'post'.
30 % total reduction of from 'pre'- to 'post'-measurement.

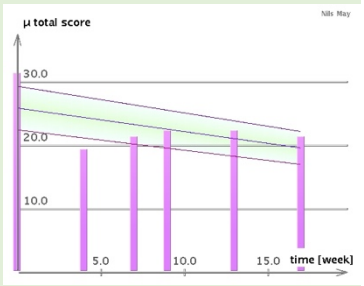
4.2.2.2. Findings of the analysis of the PSS

4.2.2.2.1. *Description of the total score of the PSS*

The STUDENT hypothesis-test was applied on the total score of the PSS. Although a marginal standard deviation is given regarding both the 'during the intervention phase'- and post-interventional measurement values, this data can be considered as constant.

Besides the limitations characteristic for this category of graphs ('Type Z'), a 33 % reduction of the PSS total score between the pre-interventional and the 'during the intervention'-measurement was detected. From 'during the intervention' to post-interventional, it increased by 4 %. A total reduction of 31 % from pre-interventional to post-interventional measurement values was detected.

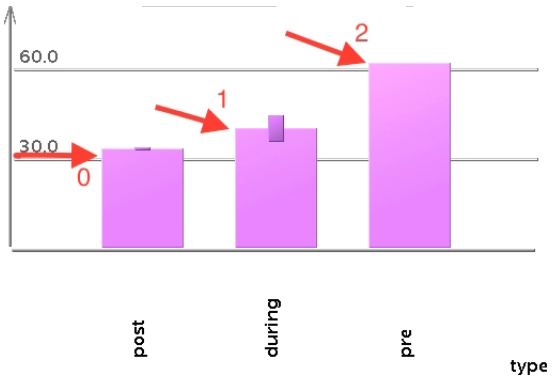
Table 3: Self-perceived Stress Self-Report Scale (PSS) Total Score

Category/Explanation	Item	Class Comparison	Regression Analysis
Type Z **'Pre'- measurement value > than 'during'- and 'post'-measurement values** **Similarly high standard deviation of *both* 'during'- *and* 'post'-values** **deviation may stem from other unknown impact factors**	**• PSS Questionnaire Total Score**	 STUDENT hypothesis-test: Data can be considered as constant despite marginal standard deviation for 'during'- and 'post'-measurement values. 31 % reduction of the PSS total score.	

4.2.3. Categorisation of generated bar charts and regressions/graphs

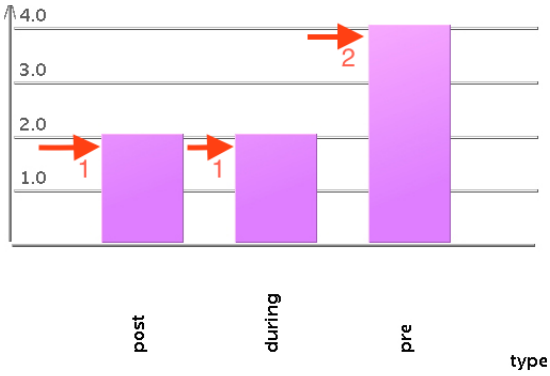
The first category includes graphs where the pre-interventional measurement value was lucidly higher ('worse') than those measured during the intervention phase, or post-interventional. Measurement values collected during the intervention-phase showed a high standard deviation. Measurement values collected post-interventional were notably lower than pre-interventional. The standard deviation of the post-interventional measurement values was negligibly small.

Here, an identifiable process of change was recognised. These graphs and functions were categorised 'Type 0-1-2'. This labelling was chosen since it demonstrates a recognizable increase or decrease, referring to the different heights of the bars in the chart.



Example for a graph of the Category 'Type 0-1-2', referring to the heights of the bars from left to right

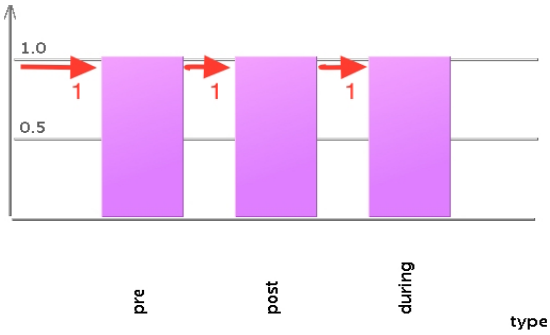
Graphs that were assigned to the second category, ‘Type 1-1-2’, illustrate that this data was constant within two classes, whereas the third class (‘pre-interventional’) was inconclusive due to only one data-collection. They were found to present a standard deviation of ‘0’, not only pre-interventional (which was identical throughout *all* categories since there was only one pre-interventional data collection); but also during the intervention phase as well as post-interventional. This labelling was chosen, again, due to the different heights of the bars in the chart.



Example for a graph of the Category ‘Type 1-1-2’, referring to the heights of the bars from left to right

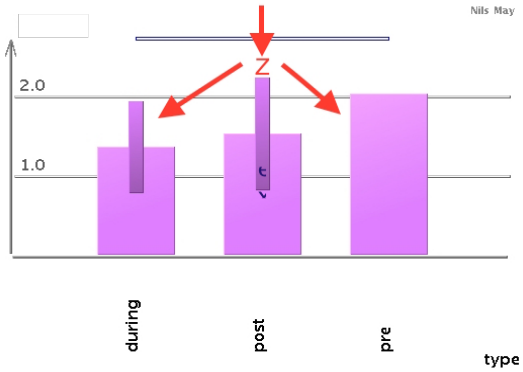
Although the pre-interventional measurement value was higher (‘worse’) than the measurement values during the intervention phase or post-interventional, no process of change was clearly identifiable. Since the only higher (or lower, in the ‘reverse’ version) measurement value may be due to coincidence, an association with the intervention method cannot be predicted.

The third category included graphs where *no* change could be observed. This category was termed ‘Type 1-1-1’. This labelling was chosen due the heights of the bars in the chart (identical in this type).



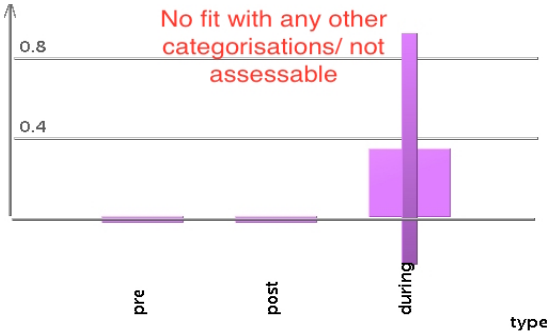
Example for Category ‘Type 1-1-1’, referring to the similar height of the bars

Graphs where the pre-interventional measurement value was higher than both ‘during the intervention phase’- and post-interventional measurement values, but where the standard deviation of *both* ‘during the intervention phase’- *as well as for* post-interventional values was similarly high, were categorised under ‘Type Z’. ‘Z’ stands for ‘zigzag’ – a strong deviation in some, or all classes, without a specific direction of development. A possible explanation, only an external unknown impact but not the examined intervention can be predicted.



Example for Category ‘Type Z’, referring to ‘zigzag’ motion of the bars

Graphs that did not fit into any other category or were not assessable were labelled ‘Type No fit with any other Categorisations/Not assessable’.



Example for Category Type 'Type No fit with any other Categorisations/Not assessable'

4.2.3.1. Categorisation of the CSS total score and subgroup total scores

The total score of the CSS, as well as the total scores of the subgroups addressing the participant's attention deficit-associated behaviour ('att. def. bhv.'), the participant's hyperactivity-/impulsivity-related behavior ('hyperact./imp. bhv.') or the extent to which the attention deficit-related issues of the previous block interfere with the participant's functionality (abbreviated as 'function') were categorised under 'Type 0-1-2'. The total score of the subgroup that addresses the participant's impulsivity behaviour (abbreviated 'impulsivity') was categorised under 'Type 1-1-2'.

For detailed explanation regarding the categorisation, please see section 4.2.3. above.

4.2.3.2. Categorisation of the PSS total score

The total score of the PSS was categorised into the 'Type 1-1-2'.

For detailed explanation regarding the categorisation, please see section 4.2.3. above.

4.3. Triangulation Protocol

4.3.1. Introduction

The triangulation protocol is depicted in detail as follows. The sequence of its particular steps and associated activities is outlined in table 4 below. The *convergence coding* follows: Contextual factors regarding theme frequencies and quotes are listed in table 9 in Appendix III. Table 5 on page X provides an overview regarding the convergence of the diverse themes. Then, data is analysed for levels of agreement, partial agreement, or silence regarding its theme meaning and prominence, and data collection method-related coverage/examples (sections 4.3.2.1., 4.3.2.2., 4.3.2.3.). Then, the results of the outlined process are assessed for the extent of convergence (section 4.4.). Finally, a completeness comparison is carried out (section 4.3.4.).

Table 4: The Triangulation Protocol

Step	Activity
1. Sorting	Sort findings from data sources into similarly categorized segments to identify content overlap and divergence.
2. Convergence Coding	Identify themes from each data source. Determine the degree of convergence of a) the *essence of the meaning and prominence the themes presented* and b) the *data collection-method-related coverage and specific examples provided* for each theme. Characterise degree and type of *convergence* using typifications of concurrence within theme-areas.
2.1 Convergence Coding Scheme	
2.1.1 Agreement	Full agreement between sets of results on both elements of comparison (e.g., *data collection-method--related coverage and specific examples provided* are the same).
2.1.2 Partial Agreement	Agreement in one but not both components.
2.1.3 Silence	One set of results covers the *theme* **or** *example*. The other set of results is silent on the *theme* **or** *example*.
2.1.4 Dissonance	Disagreement between sets of results on both elements of comparison (e.g. *meaning and prominence* are different).
3. Convergence Assessment	Review all compared segments for global assessment of the level of convergence.
4. Completeness Assessment	Compare nature/scope of individual topics for each data source/method to enhance the findings. Identify key-differences in scope and/or coverage.
5. Feedback/Report	Feedback/report of triangulated results to the college (NCA) for review and clarification.

* According to Farmer, T., Robinson, K., Elliott, S.J., Eyles, J. (2006), Developing and implementing a triangulation protocol for qualitative health research. *Qualitative Health Research*, 16(1), 377-94.

4.3.2. Convergence Coding Scheme

Table 5: Convergence Coding Matrix for Contextual Factors

• Contextual Theme	Convergence Scale							
	• Theme Meaning & Prominence				• Data collection method-related coverage/examples			
	AG	PA	S	DA	AG	PA	S	DA
1. Current Complaints/Symptoms (incl. non-specific)		•				•		
Incl. 1.1 Current Extent of Participant's Attention Deficit	•				•			
Incl. 1.2 Current Extent of Impairment of Participant's Functionality	•				•			
Incl. 1.3 Current Extent of Participant's Impulsivity/hyperactivity	•				•			
2. Paramount ADHD-Core-Symptomatology: Changes over Course of Life?			•				•	
3. Resilience & beneficial factors/awareness-process			•				•	
4. Stress-Perception: Triggers & Causal/Symptomatic Factors (incl. Frequency)	•				•			
5. Burden		•				•		
6. ATX-Intake: Impact then & now; currently beneficial?			•				•	
7. Additional bodily phenomena/symptoms			•				•	
8. Increased • (Self-) Controllability; • (Self-) Awareness; • (Self-) Efficacy; • Centeredness; • Ability to focus		•				•		
9. Treatment-associated Changes* & treatment-experiences positively associated, * incl. non-specific			•				•	
10. (Acupuncture-)Treatment-associated: • Decreased inner tension; • Positively impacted hyperactivity			•				•	
Total	4	3	6	0	4	3	6	0

Note: AG = Agreement; PA = Partial Agreement; S = Silence; DA = Dissonance

4.3.2.1. Agreement

In four of 13 themes, agreement in both *theme meaning and prominence*, and *data collection method-related coverage/examples* was detected.

In the theme, ‘current extent of impairment of the participant’s functionality’, impacts of ADHD core symptoms on various aspects of participant’s life (home, work, social interactions, financial issues) were addressed. All applicable aspects included in the respective questionnaire (CSS), were also thematised in the interviews, and were represented by a similar number of examples. Particularly pre-interventional, both sources revealed that the participant was highly impaired regarding their ‘functionality’. A positively associated impact of the intervention arose both in the post-interventional interview, as well as in the quantitative analysis of the CSS.

4.3.2.2. Partial Agreement

One out of three examples of only partial agreement regarding both *meaning and prominence*, as well as the *data collection method-related coverage/examples* was the theme ‘Burden’.

The *meaning* of ‘burden’/’how burdensome something was’, was slightly deviating depending on its contextualisation within the questionnaires and interviews. In the questionnaires, the theme ‘Burden’ referred to the distinct severity of impairment due to the ADHD core symptoms, the interviews considered this theme more widely: For example, a perceived lack of consistency or perceived paralysis in overwhelming

situations were considered as “very burdensome” for the participant. Both *prominence of the theme* and *data collection method-related coverage* could be assessed as both similar or deviating: The originally considered theme ‘Burden’ was, since it was quite narrowly considered in the qualitative arm, raised only a few times in the interviews.

At the same time, wide intersections with the main theme, ‘Current Complaints/Symptoms’, arose, making it prominent. In the quantitative arm, (questionnaires both PSS and CSS) the theme ‘Burden’ was inherently part of diverse subcategories, as well as of particular items, e.g. “In the past month, how often have you felt that difficulties were piling up so high that you could not overcome them?”. So the *prominence*, as well as *data collection method-related coverage* can be considered as both a) agreement or b) partial agreement. The same can be applied to the *examples*. While there are some examples that address the narrowly considered theme ‘Burden’ within the interviews, the questionnaires answers do not mention the term ‘burden’, or ‘burdensome’, instead, the theme is often addressed indirectly. Due to this ambiguity, it was classified as ‘partial agreement (PA)’.

4.3.2.3. Silence

While no instances occurred in which disagreement on both *meaning and prominence*, as well as *data collection method-related coverage/examples* was present, silence about both categories in one data arm was detected in six themes. This was not surprising, since the interviews (qualitative data arm) did address aspects and themes that were not addressed by the questionnaires (quantitative data arm).

Qualitative research aspires to explore a particular field of interest more deeply than is achievable by quantitative tools (Flick *et al*., 2010). So, for example, the theme 'Paramount ADHD Core Symptomatology – Changes over Course of Life?' that only emerged in the interviews but not in the questionnaires, intended to capture the individual ADHD-related history of the participant, and to assess the prominence of a certain subtype over the course of their life. The purpose of the CSS was to evaluate the *current severity* of distinct ADHD-aspects. As a standardised tool, the questionnaires had the aim to collect quantifiable data.

The individualised semi-structured interviews, addressed the modalities of the participant's psycho-pharmaceutical medication – which was not an integral part of the established questionnaires.

Furthermore, the two themes that addressed issues related to the acupuncture treatment in intervention phase, were not addressed by the questionnaires. So the detected silences occurred as expected.

4.3.3. Convergence Assessment

When monitoring both the *meaning and prominence of themes*, and the *data collection-method-related coverage and specific examples provided*, partial or full agreement was given in 31 % (full) and 23 % (partial) of the *theme,* and identical percentage values in the *example* areas. When comparing the two data sets, no examples of disagreement were detected.

46 % of the *theme* and *example* areas showed an instance of presence in one, and silence/absence in the other set of data, which appears to come closest to disagreement or dissonance of findings between both sets of data. These differences may be associated with the distinct scope and focus of the particular data set, which is why it would have been unlikely that those particular *themes* or *examples* would have emerged in the respective other data set.

4.3.4. Completeness Comparison

The convergence assessment revealed that the two data sets agreed significantly in *meaning* and available *examples*. The semi-structured interviews added insights on main themes that the questionnaires were silent about. For example, details about treatment-related experiences, the participant's regular pharmaceutical therapy, and additional physical symptoms.

They provided insights about resilience, beneficial factors and the participant's self-awareness process. They complemented the insights gained by the analysis of the questionnaires, with more details on individual stress-perception and manifestations of ADHD symptomatology. For example, the participant vividly described an improved ability to focus and an increased perception of 'centeredness', which he associated with the received treatments. The interviews thus provided insights which the applied questionnaires did not address, such as reflections on individual treatment processes and other aspects that were difficult to quantify (see section 4.3.2.3. 'Silence' above).

The interviews broadened the insights on stress-perception and ADHD symptom-severity gained by the questionnaires, and allowed for more a more nuanced individual

interpretation. The analysis of their quantitative data helped substantiate the findings from the analysis of the interviews.

5. Discussion

5.1. Self-perceived stress

5.1.1. Pre-interventional stress-perception

Stress was perceived as “very burdensome” (May, 2019c), especially since the participant felt powerless pre-interventional and in lack of control in stress-associated situations. Stress-triggering factors like sadness, perceptions of exclusion, and financial worries were also causal factors regarding his stress-perception. Generally, stress was reported to be accompanied by an extreme sadness.

The pre-interventional score-measurement-value of the participant’s stress-perception reached a PSS-score of 31. Scores of 20 or higher are considered high stress (Cohen *et al*., 1983). According to both sources of data collection, stress and stress-associated complaints were a relevant impairment factor in this study participant’s life. Findings regarding his elevated pre-interventional self-perceived stress-level are consistent with previous research (Combs *et al*., 2012; Corominas-Roso *et al.,* 2015; Hirvikoski *et al.*, 2009; Miklósi *et al.*, 2016).

Findings of the present case study may support attempts of refining criteria for diagnosing ADHD (e.g. Wender, 1995; Barkley, Murphy and Fischer, 2008). Even though derived implications can be considered tentative due to the single case study design, findings

indicate that the implementation of ‘self-perceived stress’ as one of two main measurement parameters was well-justified.

Besides above-stated coherence between the present study’s findings and those of previous research projects, contextualising the perceived-stress-related findings appears difficult: Two of the respectively reviewed studies applied the 14 item-version of the PSS, one made use of the short four-item-version. The only one that applied the ten-item-version utilised (compare Combs *et al*., 2012) carried out regression analyses in search for correlations with other measurement instruments that were not applied here. Thus, no concrete comparison of the PSS data of the present project with those of the reviewed papers was possible.

The only theoretically comparable measurement value was a reported baseline PSS score range in the sample of the latter-mentioned (Combs *et al*., 2012) paper between 0 and 38. Since their sample included both HI- as well as IA-subtype participants that were found to significantly differ regarding the severity of their perceived-stress-levels, the only possible comparison shows highly elevated levels of perceived stress in both the reviewed study as well as in the present project.

It may be questioned to what extent the participant’s stress-perception was impacted by his comorbidities, depressive and anxiety disorder. Both comorbidities are associated with elevated stress-levels (e.g. Hammen, 2005; Shin and Liberzon, 2010).

High levels of self-perceived stress associated with ADHD were found by the reviewed literature in both samples including (Miklosi *et al.*, 2016) or excluding (Coromias-Roso *et al.*, 2015) individuals with comorbid depressive or anxiety disorders. Higher levels of ‘self-perceived stress’ in ADHD-diagnosed individuals without comorbid depressive or anxiety

disorders were reported by Corominas-Roso *et al*., 2015. Combs *et al*. (2012) stated that their research indicated that ADHD-symptomatology, substantially impacts stress perception even when comorbidities like depressive or anxiety disorders are taken into account. In coherence with the reviewed literature, a highly elevated baseline stress-level was detected in the present study. An inability to specifically allocate the variable 'stress' to ADHD, may not preclude it as a parameter in further investigations in the field.

5.1.2. Stress-perception during the intervention phase and post-interventional

Analysis of the quantifiable answers to the stress-related items asked by the PSS, as well as the participant's stress perception-related observations in the qualitative interviews demonstrate a decreased stress-induced burden.

Unfortunately, no literature that addressed the potential impact of an acupuncture intervention on the variable 'self-perceived stress' was available. Observations on self-perceived stress' thus cannot be interpreted within the context of the reviewed literature, as is usually done.

Although the PSS total score between pre-interventional and post-interventional decreased by 31 %, there was no standard deviation that allowed for concrete conclusions. It could be concluded that without a statistically relevant impact, no remarkable impact on 'self-perceived stress' occurred. The participant's statements in the pre-interventional interview related a burdensome intensity and frequency of stress. The participant did not describe a post-interventional decline in stressful situations, nor a significantly decreased intensity of stress.

However, treatments were reportedly associated with a “positive effect” (May, 2019d). Although stress had not disappeared, the participant managed to overcome stressful situations faster post-interventional. He stated that either “his perception was altered”, or that he “could get out of difficult situations faster” (May, 2019d). Inner tension was reported to have occurred less and for shorter periods of time.

The intervention was associated with an increased controllability, (self-) awareness and centeredness, and an enhanced ability to focus. Post-interventional, his stress-perception was reported as less burdensome since his ‘perception of powerlessness’ had decreased while his self-efficacy had simultaneously increased.

This improvement may have been of course associated with other unknown impact factors. Later in the course of the post-interventional interview, the participant reported that he already noticed a positive change in his condition after the second or third treatment, but he retrospectively identified the onset of these changes already after the first treatment. When asked about the duration of such positively associated changes, the participant declined to speak on “particulars”, but said that he “just could say” that “it all had a positive impact” on him, and that “something had been changing in a positive sense” (May, 2019d).

Although such subjective considerations are not scientifically valid, it might be considered whether the described perception of such an early onset of changes may indirectly be responsible for the lacking statistical proof of a potential interdependence between the investigated variable ‘self-perceived stress’, and the *course* of the intervention.

5.2. ADHD core symptomatology

5.2.1. Pre-interventional ADHD core symptomatology

Detailed information about the development of the participant's ADHD-symptomatology, its current manifestations and most severe challenges were revealed by the qualitative data of the present study. Congruent with the literature (e.g. Biedermann *et al*., 2000), the participant disclosed that the hyperactivity-associated symptomatology had been very pronounced during his childhood, and had decreased during his adolescence and adulthood. In his adulthood, the combined subtype-typical mixture appeared to have been most prominent, as is common in the adult ADHD population (Chabbabildas *et al*., 2001).

Baseline scores of the CSS complemented the picture by adding a 'quantifiable coating'. Both inattention and restlessness/hyperactivity seriously challenged him. In the interviews, he elucidated how ADHD-related symptoms seriously interfered with various aspects of his life. His descriptions were congruent with the findings of previous research (e.g. Whalen *et al.*, 2002).

5.2.2. ADHD core symptomatology during the intervention phase and post-interventional

According to both sources of data collection, the severity of his symptomatology considerably decreased over the course of the intervention phase. The post-interventional interview revealed that both the frequency of occurrence and the duration of states of inner tension had decreased, and a positive effect of the treatments on the participant's hyperactivity. Besides all methodological limitations of the present study (see Methodology section 3.9. above; Discussion section 5.7. below), analysis of the CSS

revealed a post-interventional 47 % reduced total score. Interference of the participant's functionality due to his inattentiveness or his hyperactivity/impulsivity decreased by 39 %, respectively 53 %, compared to pre-interventional measurements. Impairment of his functionality decreased by 55 % and his impulsivity decreased by 33 %.

Considering these results in the context of previous research appears challenging: Envisioning the results of at least one of two reviewed systematic reviews, the meta-analysis of two RCTs showed a significant effect of acupuncture combined with conventional pharmaco-therapy. They had concluded a limited evidence for the effectiveness of acupuncture as a symptomatic treatment of ADHD, although a high risk of bias in the underlying primary data was reported, which prevents firm conclusions (Lee *et al.*, 2011).

The other reviewed systematic review (Li *et al.*, 2011) that had applied in- and exclusion criteria according to the Cochrane standard, could not find even tentative evidence for the effectiveness of acupuncture in the treatment of ADHD while the third reviewed paper (a consensus paper), mentioned that the majority of studies on acupuncture in the treatment of ADHD were still case reports. Some bigger clinical studies were reported to have demonstrated effectiveness of acupuncture or combined therapy, but at the same time, methodological shortcomings and limitations of those papers were admitted.

Findings of the present study regarding the impact of acupuncture on ADHD core symptomatology thus partially appear congruent with the reviewed previous research's findings, but need to be considered within this project's methodological limitations (see section 5.7. 'Limitations and Risks of Bias' below).

5.3. The Chinese medicine-related perspective

Data analysis revealed that the participant positively assessed the acupuncture treatments, and that he perceived considerable relief from stress-associated, as well as inattention- and hyperactivity-related complaints, which he clearly associated with the received intervention. While the frequency of stress did not decrease, its controllability, as well as his centeredness, his self-awareness, his ability to focus, and his self-efficacy were reported to have increased.

Viewed from a Chinese medicine-related perspective, this appears to be just consequential since some of the applied acupuncture points (e.g. Sanyinjiao/Sp 6) are said to strengthen the organ system related to the Chinese-medical concept of the 'spleen' that is associated with the '*zhongqi*'/'the qi of the centre', which in turn is associated with an individual's 'centeredness' and ability to focus.

Another point of the protocol (Taichong/liver 3) is postulated to have a regulating effect on the aforementioned organ system related to the Chinese medicine concept of the 'liver', which in turn is associated with an individual's ability to handle stressful experiences (e.g. Maciocia, 2015). While these aspects cannot be explored within the scope of the present project, such explanation-models regarding the possible stress-related effect of acupuncture could present starting points for future biomedical investigation.

5.4. The application of patient-related outcome measures

Patient-related outcome measures are widely accepted in a variety of conditions (Hostettler *et al.*, 2018). Nevertheless, the expectation that the additionally received

therapy might be more beneficial than the pharmaceutical one alone, might have biased the participant's assessment (Prediger *et al.*, 2016).

Furthermore, patient-related outcome measures generally provide a certain risk of social desirability bias (Segal *et al*., 2013), which may have been even more pronounced in the present study due to the pre-existing therapeutic relationship, and the fact that investigator and treatment-providing practitioner were the same person. In addition, conscious or unconscious tendencies may influence the participant's perception of his complaints and thus falsify his responses (Moeller, 2014).

Therefore, it may be critically asked why no observer-rated scales were additionally applied to measure the severity of the participant's ADHD core symptomatology. It also needs to be stated that the research question could have been worded more precisely: Although it was clearly formulated that the parameter 'stress' was investigated in terms of *self*-perceived stress, it was not made clear whether the parameter, 'severity of ADHD core symptomatology' was meant to be investigated via *self*-report, or by *observer*-based evaluation. This point was not adequately addressed in either the research question or in the DRP, respectively in the methodology section.

At the time the study was conducted, the author-researcher was not experienced in the application of observer-based adult ADHD rating scales. Due to the fore-mentioned structural limitations, no external expert (e.g. a psychiatrist experienced in such tools) would have been incorporable into the research project. Most importantly, self-report rating scales were found to be sufficient instruments to measure ADHD in adults, especially for research proposes, and to highly correlate with data from other sources (Magnusson, 2006). Thus, the measurement of ADHD core symptomatology based on self-rating was assessed to be appropriate to address the research question.

5.5. Placebo

Despite a subjectively affirmed causal relation between the given intervention and a perceived decreased severity of ADHD-symptomatology, besides the above – and below in section 5.6 – mentioned bias, an additional possible placebo-effect may have played a certain role. Placebo effects have been demonstrated in many therapeutic interventions, including a wide range of pharmaceutical applications (Benedetti and Dogue, 2015).

Since placebo responses are based on learning, anxiety reduction, or an activation of the reward system, they are associated with neuro-biological activity, were sometimes found to be as powerful as well-proven pharmaceutical interventions (Benedetti and Dogue, 2015). Although several trials have found verum acupuncture to have divergent effects compared to sham needling (Egorova *et al*., 2015; Liu *et al*., 2011; Schaechter *et al*., 2007), an at least proportional placebo effect cannot be ruled out in the present study, since sham acupuncture was found to provoke clearly measurable physiological effects (Lundeberg *et al.*, 2011) as well.

Some critics question the justifiability of acupuncture research-derived evidence in general: they argue that a therapeutic method that attempts to treat numerous disorders based on completely different patho-physiological processes, with a lack of a clearly evident *unique* underlying mechanism of effect, must be based on placebo (e.g. Crislip, 2015).

Although the present study cannot refute such arguments in detail, some considerations may be briefly elucidated: Various signalling pathways and biochemical mechanisms till

date were identified to be responsibly involved in the clinical effects of acupuncture (Fan *et al*., 2017). The possibly most relevant pathway revealed to be fundamental to acupuncture *in general* (Burnstock, 2014), is the initiation of purinergic signalling, a system that utilises adenosine triphosphate (ATP) and adenosine within the regulation or signalling of all organ systems and all systems in the human body (Verkhratsky *et al*., 2014). A systematic review of all till date available systematic reviews and meta-analyses indicates that the hypothesis that acupuncture is limited to placebo-mechanisms can be considered as scientifically disproven (Janz and McDonald, 2017).

5.6. Limitations and Risks of Bias

Although insights regarding a potentially positive impact of acupuncture on the perception of stress and an increased controllability of stressful experiences, centeredness, and an enhanced ability to focus, as well as on a potential impact of acupuncture on the severity of ADHD core symptomatology were generated, several possible limitations and ROBs need to be considered: Limitations were given due to the single case study design and the single pre-interventional data collection and a certain risk of interviewer bias and respondent bias (social desirability bias; friendliness bias) is inherent in interview methodology (Smith and Noble, 2017).

Moreover, a certain risk of language-related bias (Centre for evidence-based medicine, 2019), a pre-existing therapeutic relationship, the modalities of metric data collection, as well as the fact that author, researcher and intervention-providing practitioner were the same person, may have biased the outcome. Moreover, unidentified confounding factors, as pointed out in section 5.7.2. ‘Quantitative data-related particularities’ below, may have impacted the measured variables (Stat 507, 2018) of the participant’s perception.

The application of a mixed methods approach, a comprehensive transparent study report and a triangulation partially compensated these inherent weaknesses to enhance the study's construct validity (Yin, 2004) to make it potentially replicable. The precisely outlined triangulation found that both data sources addressed both parts of the research question, therefore contributing to its enhanced comprehension.

According to Dick (1990), such techniques can reduce the subjectivity inherent in the case study method. So, 'a chain of evidence' may be implemented from the onset of the research question throughout the course of the project to the final conclusions (Yin, 1994).

5.7. Data-collection method-related particularities

Some aspects that emerged specifically related to a) the qualitative, and b) the quantitative data, are addressed below.

5.7.1. Qualitative data-related particularities

The comprehensive analysis of the interviews provided extensive insights in the participant's condition. He was found to have distinct introspection skills and, although very unstructured in his self-expression, gave very differentiated replies to questions. Emotional uncontrollability (pre-interventional reported to have increased over time), restlessness and increased forgetfulness were described as most challenging. 'Restlessness' appeared to be the participant's individual term for the 'professional term' 'hyperactivity'.

Furthermore, a pronounced anxiety was stated. The fact that his complaints were “changing all of a sudden”, was perceived as very burdensome and in turn intensified his anxiety. Moreover, a continued, chronic inner loneliness, and lack of consistency appeared as seriously challenging.

These findings illustrated difficulties regarding the clear ability to associate symptoms to either the investigated subject (ADHD), respectively the participant’s simultaneously existing comorbidities (see section 5.8. below). However, stress was found to be a key issue (see section 5.4. above), congruent with previous research’s findings.

5.7.2. Quantitative data-related particularities

The analysis of both questionnaires showed differences between the pre-interventional data collection and the measurements undertaken during the intervention phase respectively post-interventional. All total scores and sub group scores showed a recognisable improvement.

Due to the low number of data (< 96), no analysis of the data collected in the context of the present project can be significant. The present analysis was carried out at a significance level of 95 % as it is mandatory for such analyses. Within the given context, the changes regarding the CSS total and sub group scores were statistically significant.

When discussing the findings derived from the quantitative arm of data collection cited above, the small amount of available data due to the single case study design must be considered. Most criticisable might be the fact that there was only one pre-interventional

data collection: Any comparison of data collected during the intervention or post-interventional with the pre-interventional outcome refers to this single measurement value only. Therefore, no pre-interventional standard deviation was calculable and it remains unclear which variables might have potentially influenced the pre-interventional outcome.

Therefore, besides the design-associated limitations of a single case study, any subjectively perceived improvements with the investigated intervention remain tentative. Nevertheless, changes in the measurement values occurred over time during the treatment course, and might thus be associated with the applied intervention. Significant changes in the CSS-areas ‘attention deficit behaviour’, ‘hyperactivity/impulsivity-related behaviour’ and ‘function’ were shown in the context of the explored intervention.

The intervention seemed to significantly have impacted the participant’s attention deficit-related behaviour (abbreviated ‘att. def. bhv.’) as well as his hyperactivity/impulsivity-related behaviour’ (abbreviated ‘hyperact./imp. bhv.’.

The extent to which the attention deficit- and hyperactivity/impulsivity-related behaviour interfered with the participant’s functionality in various areas of life (abbreviated ‘function’), also significantly decreased during the course of the given intervention.

5.8. Specificity

Can observed changes in the investigated parameters justifiably be linked to the given treatment? Due to the design-associated limitations and ROBs as discussed in section 5.6. above, no satisfactory answer can be given. Taking into consideration the quantitative data, partially significant changes were detected. As outlined above, they partially allowed

to predict a process of change that might have been associated with the given intervention.

Specificity in acupuncture research is a general challenge: As outlined by Langevin *et al*. (2011), in acupuncture treatments, three areas and their respective intersections come into effect: Needling-related aspects (style, theory, needling parameters, number of sessions, duration of sessions), specific non-needling aspects (psychological, patient history, diagnosis, explanations, life style advice; physiological aspects like palpation, tonus), as well as non-specific aspects (time, attention, empathy, credibility, patient's expectations, practitioner's expectations).

Considering all aspects of the three outlined areas and their intersections in a rigorous design, to then systematically 'filtrate the needling-related' aspects when it comes to analysis, makes the evaluation of the effectiveness of acupuncture intervention truly challenging.

5.9. Further issues arising from the research

It has been noted that the role of frequency and duration of acupuncture treatments is still unknown, and that more research on these sub themes is warranted (e.g. Lee, 2011). The present study could not address these issues, but confirmed the need for more research.

The question whether acupuncture might be more beneficial if provided alone, or in combination with pharmacotherapy is also crucial. It has to be stated here that although in section 3.3 'Measurement instruments of the present data' it was outlined that "multiple data collection allowed for the quantitative analysis of data, which could reveal insights

about intervention modalities (e.g. frequency of treatment, or confounding factors)", these insights could not be generated by this research project.

5.10. Personal reflections on the research process

The themes addressed by this project`s research questions were of profound professional and personal interest to the author. The process of coming up with the initial idea to realising the final study was long and complex. Experiencing the different challenges of providing treatment in the context of a research project compared to the usual clinical context, was a moving experience. In particular the imperative to constantly address both specific requirements (e.g. methodological or therapeutic specificities) without losing the 'bigger picture' (the frame set by the research questions) was both challenging and rewarding.

5.11. Implications of the present project's findings on practice and future research

The presented findings indicate that the given acupuncture-based intervention might be promising. To investigate if such assumptions could be sufficiently proven with an adequate amount of data, the implementation of comprehensive studies with a sufficiently robust design that builds on the present project, appears to be both indicated and justified. In a possibly feasible bigger future study, designs/methods such as RCTs and the MMR approach may be maintained since the theoretic framework of the present study outlined that qualitative methods be applied not merely for pragmatic or contextual reasons but may contribute profoundly to generating of knowledge on a complex health intervention like acupuncture in the treatment of ADHD.

As a first step, the author intends to give presentations on the subject as well as help build a network of TCM/CM practitioners and health professionals of other disciplines, in order to distribute the promising findings of the present project to a wider audience – including both health professionals and affected individuals. Although the possible impact of acupuncture on the investigated parameters could not be finally proven, the findings encourage the author to put the gained insights into practice, and to investigate sources of funding for further research in the field.

6. Conclusion

In this in-depth single case study, a mixed-methods design was implemented to investigate to what extent acupuncture impacts self-perceived stress and ADHD core symptomatology in an adult, atomoxetine-taking ADHD participant.

Therefore, semi-structured interviews were carried out pre- as well as post-interventional, and two established self-report questionnaires were applied at different timepoints before, and during an eight weeks-long acupuncture-based intervention phase, as well as post-interventional: the Self-perceived Stress Scale (PSS) and the Current Symptom Scale Self-Report (CSS).

Acupuncture treatments were provided twice the week, following an antecedently generated TCM pattern diagnosis. A set of six-eight regular (body-) acupuncture points was defined. A selection of those points was applied during the particular treatment sessions, whereby point combinations varied between treatments since TCM requires adjusting treatment protocol to the patient's current condition. All data was systematically

analysed and underwent a pre-defined triangulation process in which a high rate of convergence was detected.

The application of a mixed methods approach, a comprehensive transparent study report and a triangulation partially compensated its inherent design-related weaknesses and enhanced the study's construct validity (Yin, 2004) to make it potentially replicable.

Both sources of data collection revealed recognisable alterations regarding both parts of the research question: According to the PSS, the participant's extent of self-perceived stress significantly decreased (by 31 %). The interviews illuminated that while the number or intensity of stressful experiences did not decrease, the participant did perceive increased (self-) awareness, improved centeredness, the increased ability to focus, as well as enhanced self-efficiency that enabled him to overcome stressful experiences more quickly. It was further reported that he perceived the combined therapy as more successful than the pharmaceutic therapy alone.

The total score of the CSS, and thereby the extent of the ADHD core symptomatology, decreased by 47 %, comparing pre- and post-interventional measurements. The subgroup score measuring the extent of the participant's attention-deficit-related behaviour, decreased by 39 %, the score addressing the extent of impairment of the participant's functionality in various areas of life decreased by 55 % and the score addressing the extent of his hyperactive/impulsive behaviour, decreased by 53 %.

Those four measurement values were, taking the limitations regarding the small number of data due to the design into account, still significant since a sufficient standard deviation was detected regarding those measurement points taken *during* the intervention phase, which allowed for predicting a process of change.

Although mathematically not provable, this process might have been associated with the provided intervention. The subgroup score of the area of questions addressing the extent of the participant's impulsivity decreased by 30 %. All analysis was carried out at a significance level of 95 % as it is mandatory for such analyses. An irrefutable weakness of the study was that due to the low number of data (< 96; what would have been the minimum amount of data essential to generate statistically significant results (Kringel, 1996) and therefore may have led to substantial conclusions), no analysis of the data collected could reach statistical significance.

The post-interventional interview revealed that acupuncture treatments were stated to have positively affected the participant's hyperactivity, his states of inner tension, as well as his attention-deficit. Compared to the treatment with ATX only, the combined therapy was perceived as more successful. The participant reportedly assessed the acupuncture treatments as very beneficial, and noted that they had "positively impacted his life" (May, 2019d). Recognisable changes were perceived from the beginning of the intervention phase.

The present study provides a first step in closing the gap regarding the possible impact of acupuncture on the perception of stress detected in the literature review. Insights regarding a potentially positive impact of acupuncture on the perception of stress and the modalities of dealing with stressful experiences through increased controllability, centeredness and an enhanced ability to focus were made. Regarding a potential impact of the acupuncture-based intervention on the severity of ADHD core symptomatology, impressive findings were generated. The temporal course of the intervention was visually exemplified by regression graphs.

Nevertheless, due to various ROBs and other limitations associated with the design, no concrete conclusions regarding the question to what extent the detected changes in both the participant's stress-perception and his ADHD core symptomatology may be specifically associated with the method acupuncture, can be drawn. This critical objection needs to be considered in future investigations in the field.

However, the findings of the present study can be considered as promising. Further research with more robust design that avoids the shortcomings and limitations associated with the present project therefore appears well-justified and highly recommended.

References

American Psychiatric Association (1994) *Diagnostic and Statistical Manual of Mental Disorders: DSM-IV*. Washington, DC., American Psychiatric Association.

AMSTAR (2015) *Publications. AMSTAR Checklist.* [online] Available at: <https://amstar.ca/Amstar_Checklist.php> [Accessed 12th November 2017].

Aromataris, E. and Riitano, D. (2014) Systematic Reviews. *AJN, American Journal of Nursing*, 114(5), 49-56.

Arnsten, A. (2009) Toward a New Understanding of Attention-Deficit Hyperactivity Disorder Pathophysiology. *CNS Drugs*, 23(Supplement 1), [e-journal] 33-41. doi: 10.2165/00023210-200923000-00005.

Asherson, P., Bushe, C., Saylor, K. *et al.* (2014) Efficacy of atomoxetine in adults with attention deficit hyperactivity disorder: An integrated analysis of the complete database of multicenter placebo-controlled trials. *Journal of Psychopharmacology*, 28(9), 837-846.

Barkley, R.A. (1997) *ADHD and the Nature of Self-control.* New York, Guilford Press.

Barkley, R.A. and Murphy, K.R. (1998) *Attention Deficit Hyperactivity Disorder: A Clinical Workbook (2nd ed.).* New York: Guilford Press.

Barkley, R.A. (2006) Associated cognitive, developmental and health problems. In: Barkley, R.A., Murhpy, K.R. eds. (2006) *Attention-deficit Hyperactivity Disorder: A Clinical Workbook*. 3rd ed. Guilford Press, New York, pp. 122-183.

Barkley, R.A., Murphy, K.R., Fischer, M. (2008) *ADHD in Adults: What the Science Says*. New York, Guilford.

Bartlam, B., Waterfield, J., Bishop *et al*. (2016) The Role of Qualitative Research in Clinical Trial Development. *Journal of Mixed Methods Research*, 12(3), 325-343.

Benedetti, F. and Dogue, S. (2015) Different Placebos, Different Mechanisms, Different Outcomes: Lessons for Clinical Trials. *PLoS ONE* [e-journal] 10(11), e0140967. https://doi.org/10.1371/journal.pone.0140967.
Bhaskar, R. **(**1978) *A realist theory of science*. 2nd Edition, Hassocks: Harvester Press.

Biederman, J., Mick, E., and Faraone, S.V. (2000) Age-dependent decline of symptoms of attention deficit hyperactivity disorder: Impact of remission definition and subtype. *American Journal of Psychiatry*, [e-journal] 157(5), 816-818. doi:10.1176/appi.ajp.157.5.816.

Bonoma, T. (1985) Case research in marketing: opportunities, problems, and a process. *Journal of Marketing Research*, 22(5), 199-208.

Brassett-Harknett, A. and Butler, N. (2007). Attention-deficit/hyperactivity disorder: An overview of the aetiology and a review of the literature relating to the correlates and life course outcomes for men and women. *Clinical Psychology Review*, 27(2), 188-210.

Bryman, A. (2007) Barriers to Integrating Quantitative and Qualitative Research. *Journal of Mixed Methods Research*, [e-journal] 1(1), 8-22, https://doi.org/10.1177%2F2345678906290531.

Burnstock, G. (2014) Purinergic signalling in acupuncture. *Science*, 346(6216), 23-25.

Cai, T. and Lai, X. (1999) Observation on therapeutic effects 155 cases of child attention deficit hyperactivity disorder treatment with acupuncture and moxibustion. *Chinese Acupuncture and Moxibustion,* 1(1), 5-7.

Camporeale, A., Upadhyaya, H., Ramos-Quiroga, J. *et al*. (2013) Safety and tolerability of atomoxetine hydrochloride in a long-term, placebo-controlled randomized withdrawal study in European and non-European adults with attention-deficit/hyperactivity disorder. *The European Journal of Psychiatry*, 27(3), 206-224.

Centre for evidence-based medicine (2019) *Biases Archive – Catalog of Bias*. [online] Available at: https://catalogofbias.org/biases/ [Accessed 16th June 2019].

Chhabildas, N., Pennington, B.F. and Willcutt, E.G. (2001) A comparison of the neuropsychological profiles of the *DSM-IV* subtypes of ADHD. *Journal of Abnormal Child Psychology*, [e-journal] 29(6), 529-540. doi: 10.1023/A:1012281226028.

Charlesworth, K. (2017) pers. comm. [MSc Planning Day] 22nd July.

Childress, A. (2015) A critical appraisal of atomoxetine in the management of ADHD. *Therapeutics and Clinical Risk Management*, 12, 27-39.

Cheng, Y., Cui, J., Cao, Y. (2009) Acupuncture needle and auricular application in treating paediatric hyperactivity 32 cases. *Medical Information Medicine and Surgery,* 22(10), 909-910.

Christie, M., Rowe, P., Perry, C. and Chanard, J. (2000) *Implementation of Realism in Case Study Research Methodology*. [pdf] International Council for Small Business, Annual Conference, Brisbane, 2000. Available at: <https://pdfs.semanticscholar.org/197e/276358e5113a95f1b15bcd7b9780f8929f2b.pdf> [Accessed 17th May 2019].

Chronis, A.M., Jones, A.H., Raggi, V.L. (2006) Evidence-based Psychosocial Treatments for Children and Adolescents with Attention Deficit/Hyperactivity Disorder. *Clinical Psychology Review*, [e-journal] 26(4), 486-502. doi.org/10.1016/j.cpr.2006.01.002.

Chu, J. and Schwartz, J. (2002) The muscle switch in myofascial pain relief. Effects of acupuncture and other needling methods. *Electromyographic Clinical Neurophysiology,* 42(5), 307-311.

Clemow, D. and Bushe, C. (2015) Atomoxetine in patients with ADHD: A clinical and pharmacological review of the onset, trajectory, duration of response and implications for patients. *Journal of Psychopharmacology*, 29(12), 1221-1230.

Cochrane Collaboration (2019) *Levels of evidence*. [online] Available at: <https://consumers.cochrane.org/levels-evidence> [Accessed 17th May 2019].

Cochrane Deutschland (2016) Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften – Institut für Medizinisches Wissensmanagement. *Bewertung des Biasrisikos (Risiko systematischer Fehler) in klinischen Studien: ein Manual für die Leitlinienerstellung,* 1. Auflage 2016 [*Working unit of the medical bodies – institute for the management of medical knowledge: a manual for the generation of guidelines*]. [online] Available at: Cochrane Germany: http://www.cochrane.de/de/rob-manual; AWMF: <http://www.awmf.org/leitlinien/awmf-regelwerk/ll-entwicklung.html> [Accessed 28th May 2019].

Cohen, S. (2005) Keynote presentation at the eighth international congress of behavioral medicine: The Pittsburg common cold studies: Psychosocial predictors of susceptibility to respiratory infections diseases. *International Journal for Behavioral Medicine*, [e-journal] 12(1), 123-131. doi: 10.1207/s15327558ijbm1203_.

Cohen, S., Tyrrell, D. A. J. and Smith, A. P. (1993) Negative life events, perceived stress, negative affect, and susceptibility to the common cold. *Journal of Personality and Social Psychology*, [e-journal] 64(1), 131-140. doi: 10.1037/0022-3514.64.1.131.

Cohen, S., Kamarck, T. and Mermelstein, R. (1983) A Global Measure of Perceived Stress. *Journal of Health and Social Behavior*, 24(4), 385-396.

Combs, M.A., Canu, W.H., Broman-Fulks, J.J. *et al.* (2012) Perceived Stress and ADHD Symptoms in Adults. *Journal of Attention Disorders*, [e-journal] 20(10), 1-10, http://dx:10.1177/1087054712459558.

Costantino, G., Montano, N. and Casazza, G. (2015) When should we change our clinical practice based on the results of a clinical study? Searching for evidence: PICOS and PubMed. *Internal and Emergency Medicine*, 10(4), 525-527.

Corominas-Roso, M., Palomar, G., Ferrer, R. *et al*. (2015) Cortisol Response to Stress in Adults with Attention Deficit Hyperactivity Disorder. *International Journal of Neuropsychopharmacology*, 18(9), 1-10.

Cortese, S., Faraone, S., Konofal, E. *et al.* (2009) Sleep in Children With Attention-Deficit/Hyperactivity Disorder: Meta-Analysis of Subjective and Objective Studies. *Journal of the American Academy of Child and Adolescent Psychiatry*, 48(9), 894-908.

Crislip, M. (2015) Science-Based Medicine. Exploring Issues and Controversies in Science and Medicine. *Mel asks, and I do my best to answer. On acupuncture*. [online] 9th January 2015. Available at: <https://sciencebasedmedicine.org/mel-asks-and-i-do-my-best-to-answer/> [Accessed 17th May 2019].

Dallman, M.F., Pecoraro, N., Akana, S.F. *et al*. (2003). Chronic stress and obesity: A new view of "comfort food." *Proceedings of the National Academy of Sciences of the United States of America*, 100, 11696-11701. doi: 10.1073/pnas.1934666100.

DeJonckheere, M. and Vaughn, L.M. (2019) Semistructured interviewing in primary care research: a balance of relationship and rigour. *Family Medicine and Community Health*, [e-journal] 7(2), e000057. doi: 10.1136/fmch-2018-000057.

Dick, B. (1990) *Convergent Interviewing*. Brisbane, Interchange.

Dittmar, N. (2004) *Transkription. Ein Leitfaden mit Aufgaben für Studenten, Forscher und Laien* [*Transcription. Manual and instructions for students, researchers, and laymen*], 2nd edn., Wiesbaden, Springer VS.

Dresing, T. and Pehl, T. (2015) *Praxisbuch Interview, Transkription & Analyse. Anleitungen und Regelsysteme für qualitativ Forschende*. [pdf] 6. edition. Marburg. Available at: <www.audiotranskription.de/praxisbuch> [Accessed 6th November 2019].

Durell, T., Adler, L., Williams, D. *et al.* (2013) Atomoxetine Treatment of Attention-Deficit/Hyperactivity Disorder in Young Adults With Assessment of Functional Outcomes. *Journal of Clinical Psychopharmacology*, 33(1), 45-54.

Eapen V. (2012). Neurodevelopmental Genes Have Not Read The DSM Criteria: Or, Have They? *Frontiers in psychiatry*, [e-journal] *3*(75), 1-3. doi: 10.3389/fpsyt.2012.00075.

Eastwood, B.J., Gregor, R.D., MacLean, D., Wolf, H.K (1996) Effects of recruitment strategy on response rates and risk factor profile in two cardiovascular surveys. *International Journal of Epidemiology*, 25(1), 763-769.

Egorova, N., Gollub, R. and Kong, J. (2015) Repeated verum but not placebo acupuncture normalizes connectivity in brain regions dysregulated in chronic pain. *NeuroImage: Clinical*, [e-journal] 9, 430-435. https://doi.org/10.1016/j.nicl.2015.09.012.

Emory, C. W. and Cooper, D. R. (1991) *Business Research Methods*, 4th edn. Irwin, Boston.

Faggion, C. (2015) Critical appraisal of AMSTAR: challenges, limitations, and potential solutions from the perspective of an assessor. *BMC Medical Research Methodology*, [e-journal] 15(1), 63-68. doi: 10.1186/s12874-015-0062-6.

Fan, A.Y., Miller, D. W., Bolash, B. *et al.* (2017) Acupuncture's Role in Solving the Opioid Epidemic: Evidence, Cost-Effectiveness, and Care Availability for Acupuncture as a Primary, Non-Pharmacologic Method for Pain Relief and Management-White. *Journal of Integrative Medicine*, [e-journal] 15(6), 411-25. doi: 10.1016/S2095-4964(17)60378-9.

Farmer, T., Robinson, K., Elliott, S.J. and Eyles, J. (2006) Developing and implementing a triangulation protocol for qualitative health research. *Qualitative Health Research*, 16(1), 377-394.

Faraone, S.V. and Larsson, H. (2019). Genetics of attention deficit hyperactivity disorder. *Molecular* Psychiatry, [e-journal] 24(4), 562-575. doi: 10.1038/s41380-018-0070-0.

Faraone, S.V., Sergeant, J., Gillberg, C. *et al*. (2003) The worldwide prevalence of ADHD: is it an American condition? *World Psychiatry*, 2(2), 104-113.

Flick, U., von Kardorff, E. and Steinke, I. (2010) *A Companion to Qualitative Research*, London, Sage Publications.

Flick, U. (2002) *An Introduction to Qualitative Research*, 2nd edn. Thousand Oaks, CA., Sage Publications.

Focks, C. and Hillenbrand, N. (ed) (2001) *Leitfaden Traditionelle Chinesische Medizin. Schwerpunkt Akupunktur* [*Manual on Traditional Chinese Medicine. Focus: Acupuncture*], Essen, Urban und Fischer.

Fredriksen, M. and Peleikis, D. (2015) Long-Term Pharmacotherapy of Adults With Attention Deficit Hyperactivity Disorder: A Literature Review and Clinical Study. *Basic & Clinical Pharmacology & Toxicology*, 118(1), 23-31.

Furman, L. (2005) What Is Attention-Deficit Hyperactivity Disorder (ADHD)? *Journal of Child Neurology*, 20(12), 994-1002.

Gentile, J. P. and Atiq, R. (2006) Psychotherapy for the patient with adult ADHD. *Psychiatry (Edgmont)*, *3*(8), 31-35.

Goble, A. and Le Grande, M. (2008). Do chronic psychological stressors accelerate the progress of cardiovascular disease? *Stress and Health*, [e-journal] 24(1), 203-212. doi: 10.1002/smi.1202.

Grün, B. and Haefeli, W. E. (2009) Die richtige Rekrutierung von Studienteilnehmern [The proper recruitment of study participants]. *Bundesgesundheitsblatt – Gesundheitsforschung – Gesundheitsschutz*, [e-journal] 52(4), 402-409. doi: 10.1007/s00103-009-0822-8.

Guba, E. G. and Lincoln, Y. S. (1994) Competing paradigms in qualitative research. In: Denzin, N.K. and Lincoln, Y.S. (Ed.), *Handbook of qualitative research*, pp.105-117, Thousand Oaks, CA, US: Sage Publications, Inc.

Hammen, C. (2005) Stress and Depression. *Annual Review of Clinical Psychology*, 1(1), 293-319.

Green, B., Johnson, C. and Adams, A. (2006) Writing narrative literature reviews for peer-reviewed journals: secrets of the trade. *Journal of Chiropractic Medicine*, 5(3), 101-117.

Han, J. and Terenius, L. (1982). Neurochemical Basis of Acupuncture Analgesia. *Annual Review of Pharmacology and Toxicology*, 22(1), 193-220.

Held, U. (2010) Welche Arten von Studiendesigns gibt es und wie werden sie korrekt eingesetzt? [What kind of study designs do exist, and how to appropriately apply them] *Swiss Medical Forum*, 10(41), 712-714.

Herriott, R. E. and Firestone, W. A. (1983) Multisite qualitative policy research: optimising description and generalizability, *Educational Researcher*, 12(2), 14-19.

Hirvikoski, T., Lindholm, T., Nordenström, A. *et al*. (2009) High self-perceived stress and many stressors, but normal diurnal cortisol rhythm, in adults with ADHD (attention-deficit/hyperactivity disorder). *Hormones and Behavior*, 55(3), 418-424.

Hostettler, S., Kraft, E. and Bosshard,,C. (2012) Patient-reported outcome measures: Die Patientensicht zählt. Grundlagenpapier der DDQ/SAQM [Patient-reported outcome measures: Patient's perspective counts. A framework paper of the DDQ/SAQM], *Schweizer Ärztezeitung.* 99(40*)*, [e-journal] 1348-1352. https://doi.org/10.4414/saez.2018.17187.

Holtmann, J. P. (2008) Der Fallstudienansatz als Forschungsstrategie [The case study approach as a research strategy]. In: *Pfadabhängigkeit strategischer Entscheidungen*. Edition KWV. Springer Gabler, Wiesbaden.

Hong, S.-S. and Cho, S.-H. (2011) Acupuncture for attention deficit hyperactivity disorder (ADHD): study protocol for a randomised controlled trial. *Trials*, 12(1), 173-180.

Hüther, G. (2002) Kritische Anmerkungen zu den bei ADHD-Kindern beobachteten neurobiologischen Veränderungen und den vermuteten Wirkungen auf Psychostimulanzien (Ritalin) [Critical notes on neuro-biological alterations in ADHD-children and on the suspected effects of central stimulances (Ritaline)]. In: Bovensiepen, G., Hopf, H., Molitor, G. (2002) *Unruhige und unaufmerksame Kinder.* Frankfurt, Brandes and Apsel.

Joanna Briggs Institute (2017) *Critical Appraisal Tools. Checklist for Analytical Cross Sectional Studies,* [online] Available at: <http://joannabriggs.org/research/critical-appraisal-tools.html> [Accessed 22nd November 2017].

Kane, M. (2004) *Research Made Easy in Complementary and Alternative Medicine.* Edinburgh, Churchill Livingstone.

Katz, M., Adar L., A., Kol-Degani, H. *et al.* (2010) A Compound Herbal Preparation (CHP) in the Treatment of Children With ADHD: A Randomized Controlled Trial. *Journal of Attention Disorders*, 14(3), 281-291.

Kemeny, M. E. and Schedlowski, M. (2007) Understanding the interaction between psychosocial stress and immune-related diseases: A stepwise progression. *Brain, Behavior, and Immunity*, [e-journal] 21(1), 1009-1018. doi: 10.1016/j.bbi.2007.07.010.

Kingsley, C. and Patel, S. (2017) Patient-reported outcome measures and patient-reported experience measures, *BJA Education*, [e-journal] 17(4), 137-144, https://doi.org/10.1093/bjaed/mkw060.

Kirschbaum, C., Pirke, K. and Hellhammer, D. (1993) The 'Trier Social Stress Test' – A Tool for Investigating Psychobiological Stress Responses in a Laboratory Setting. *Neuropsychobiology*, 28(1-2), 76-81.

Kleist, P. (2010) *Wie sinnvoll sind Responderanalysen in klinischen Studien? [How meaningful are responder-analyses in clinical studies?)]* [pdf] Swiss Medical Forum. Available at: <https://doi.emh.ch/10.4414/smf.2010.07105> [Accessed 23rd December 2017].

Knouse, L. E. and Safren, S. (2009) Adult attention-deficit hyperactivity disorder. In: M. Blais and L. Baer (Eds.), *Handbook of Clinical Rating Scales and Assessment in Psychiatry and Mental Health*. Humana Press: Totowa, N.J.

Kou, W., Bell, J., Gareus, I. *et al*. (2005) Repeated acupuncture treatment affects leukocyte circulation in healthy young male subjects: a randomized single-blind two-period crossover study. *Brain, Behavior, and Immunity*, 19(4), 318-324.

Krengel, U. (1991) *Einführung in die Wahrscheinlichkeitstheorie und Statistik* (3rd edn.), Braunschweig, Vieweg.

Krippendorff, K. (2004) *Content Analysis: An Introduction to Its Methodology* (2nd edn.), Thousand Oaks, CA: Sage.

Kuckartz, U., Drehsing, P., Raedker, S., Stefer, C. (2008) *Qualitative Evaluation – Der Einstieg in die Praxis* [*Qualitative Evaluation – Putting it into Practice*]. Wiesbaden, VS Verlag für Sozialwissenschaften.

Lammers, C. H. and Schneider, W. (2009) Die therapeutische Beziehung. Verfahrensübergreifende Aspekte [The therapeutic relationship. Non-method-specific aspects]. *Psychotherapeut*, 54(9), 469-485.

Lange, G., Sheerin, D., Carr, A. *et al*. (2005) Family factors associated with attention deficit hyperactivity disorder and emotional disorders in children. *Journal Of Family Therapy,*
[e-journal] 27(1), 76-96. doi: 10.1111/j.1467-6427.2005.00300.x.

Langevin, H.-M., Wayne, P.-M., MacPherson, H. *et al.* (2011) Paradoxes in Acupuncture Research: Moving Forward. *Evidence-Based Complementary and Alternative Medicine*, [e-journal] Volume 2011, Article ID 180805, 11 pages. doi: 10.1155/2011/180805.

Lazarus, R. S. (1993) From psychological stress to the emotions: A history of changing outlooks. *Annual Review of Psychology,* [e-journal] 44(1), 1-21. doi/10.1146/annurev.ps.44.020193.000245.

Lee, E. (2012) Review of the Psychometric Evidence of the Perceived Stress Scale. *Asian Nursing Research*, 6(4), 121-127.

Lee, J., Joo, E. and Choi, K. (2012) Perceived Stress and Self-esteem Mediate the Effects of Work-related Stress on Depression. *Stress and Health*, 29(1), 75-81.

Lee, M., Choi, T., Kim, J. e*t al*. (2011) Acupuncture for Treating Attention Deficit Hyperactivity Disorder: A Systematic Review and Meta-Analysis. *Chinese Journal of Integrative Medicine*, 17(4), 257-260.

Lexchin, J. (2012) Sponsorship bias in clinical research. *The International Journal of Risk and Safety in Medicine,* [e-journal] 24(4), 233-42. doi: 10.3233/JRS-2012-0574.

Li, S., Yu, B., Zhou, D. e*t al.* (2011) Acupuncture for Attention Deficit Hyperactivity Disorder (ADHD) in children and adolescents (Review) [online] *Cochrane Database of Systematic Reviews*. Available at: https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD007839.pub2/abstract [Accessed 6th September 2017].

Li, S., Yu, B., Yan, B. *et al.* (2009) Randomized-controlled study of treating attention deficit hyperactivity disorder of preschool children with combined electro- acupuncture and behavior therapy. *Chinese Archives of Traditional Chinese Medicine* 27(6), 1215-1224.

Li, H. (2005) Clinical study on acupuncture in treating infantile attention-deficit hyperactivity disorder. *Journal of Acupuncture and Tuina Science*, 3(2), 31-33.

Li, H. (2004) Prof. Zhang Jia-Wei's Clinical study on acupuncture treatment of 380 cases of infantile attention-deficit hyperactivity disorder. *Shanghai Journal of Acupuncture and Moxibustion,* 23(8), 23-25.

Lincoln, Y.S. and Guba, E.G. (1985) *Naturalistic Inquiry*. Newbury Park, Sage.

Liu, W. H., Hao, Y., Han, Y. J. *et al*. (2015) Analysis and Thoughts about the Negative Results of International Clinical Trials on Acupuncture. *Evidence-based complementary and alternative medicine,* [e-journal] 2015, 671242. doi: 10.1155/2015/671242.

Liu L., and Li, W. (2006) Acupuncture combined with auricular point sticking treatment of children with ADHD in 48 cases. *Shandong Journal of Traditional Chinese Medicine,* 25(7), 466-467.

Liu, M. (2007) A clinical observation on otopoint pressure-massage on 40 ADHD cases. *Zhejiang Journal of Traditional Chinese Medicine,* 42(9), 533.

Lundeberg, T., Lund, I., Sing, A. and Näslund, J. (2011) Is placebo acupuncture what it is intended to be?. *Evidence-based complementary and alternative medicine*. [e-journal] 2011(1), 932407. doi:10.1093/ecam/nep049.

Lundberg, J., Franco-Cereceda, A., Alving, K., Delay-Goyet, P. and Lou, Y. (1992) Release of Calcitonin Gene? Related Peptide from Sensory Neurons. *Annals of the New York Academy of Sciences*, 657(1), 187-193.

Maciocia, G. (2015) *The Foundations of Chinese Medicine*. London, Elsevier Health Sciences UK.

Magnússon, P., Smári, J., Sigurðardóttir, D. *et al*. (2006) Validity of Self-Report and Informant Rating Scales of Adult ADHD Symptoms in Comparison With a Semistructured Diagnostic Interview. *Journal of Attention Disorders,* [e-journal] 9(3), 494-503. doi: 10.1177/1087054705283650.

McDaniel, C. and R. Gates, R. (1991) *Contemporary Market Research*. West, St. Paul.

McDonald, J. and Janz, S. (2017) The Acupuncture Evidence Project [online] Available at: <https://www.acupuncture.org.au/wp-content/uploads/2017/04/The-Acupuncture-Evidence-Project_Mcdonald-and-Janz_-Revised-Edition_21-Feb_For-publication.pdf> [Accessed 7th June 2019].

May, N. (2019a) *DRP re-resubmission final version 21resp.22August 2018 Nils May. REC additions incorporated.pdf*. [Data Repository]. Stored at: https://ncoayork-my.sharepoint.com/:f:/r/personal/karencharlesworth_nca_ac_uk/Documents/Nils%20May%20data%20repository/4%20Any%20Ethics%20resubmissions/EA%20re-submission%2021st%20resp.%2022nd%20August%202018?csf=1&e=81HZG9.

May, N. (2019b) *Pseudonymised raw data* [Folder]. [Data Repository]. Stored at: https://ncoayorkmy.sharepoint.com/:f:/r/personal/karencharlesworth_nca_ac_uk/Documents/Nils%20May%20data%20repository/7%20Pseudonymised%20raw%20data?csf=1&e=NrmYoW.

May, N. (2019c) *Transcription pre-interventional Interview CSNM 2018 17.01.2019.pdf* [Data Repository]. Stored at: https://ncoayork-my.sharepoint.com/:b:/r/personal/karencharlesworth_nca_ac_uk/Documents/Nils%20May%20data%20repository/7%20Pseudonymised%20raw%20data/Transcription%20pre-interventional%20Interview%20CSNM%202018%2017.01.2019.pdf?csf=1&e=Ef5RNX.

May, N. (2019d) *Transcription Interview II (post-interventional) SCS_2018 double line space. Nils May PDF.pdf*. [Data Repository]. Stored at: https://ncoayork-my.sharepoint.com/:b:/r/personal/karencharlesworth_nca_ac_uk/Documents/Nils%20May%20data%20repository/7%20Pseudonymised%20raw%20data/Transcription%20Interview%20II%20(post-interventional)%20SCS_2018%20double%20line%20space.%20Nils%20May%20PDF.pdf?csf=1&e=ukiyTx.

May, N. (2019e) *Other documents related to this study* [Folder]. [Data Repository]. Stored at: https://ncoayorkmy.sharepoint.com/:f:/r/personal/karencharlesworth_nca_ac_uk/Documents/Nils%20May%20data%20repository/12%20Other%20documents%20related%20to%20this%20study?csf=1&e=TjhwZS.

Michelson, D., Adler, L., Spencer, T. *et al*. (2018) Atomoxetine in adults with ADHD: two randomized, placebo-controlled studies. *Biological Psychiatry,* [e-journal] 53(2), 112-120. https://doi.org/10.1016/S0006-3223(02)01671-2.

Moeller, H.-J. (2014) Self-rating scales. In: Alexopoulos, G., Kasper, S., Moeller, H.J. *et al*. (2014) *Guide to Assessment Scales in Major Depressive Disorder* [e-book], Springer International Publishing Switzerland, pp. 23-34. doi: 10.1007/978-3-319-04627-3_3.

Miklósi, M., Máté, O., Somogyi, K. and Szabó, M. (2016) Adult Attention Deficit Hyperactivity Disorder Symptoms, Perceived Stress, and Well-Being. *The Journal of Nervous and Mental Disease*, 204(5), 364-369.

Morse J.M., Barrett, M., Mayan, M. *et al*. (2002) Verification strategies for establishing reliability validity in qualitative research. *International Journal of Qualitative Methods*, [pdf] 1(2) 1-19. Available at: <https://sites.ualberta.ca/~iiqm/backissues/1_2Final/pdf/morseetal.pdf> [Accessed 07th June 2019].

Mueller, A. K., Fuermaier, A. B. M., Koerts, J. *et al*. (2012) Stigma in Attention Deficit Hyperactivity Disorder. ADHD *Attention Deficit Hyperactivity Disorder*, [e-journal] 4(101). https://doi.org/10.1007/s12402-012-0085-3.

Mulinari, S. (2012) Monoamine theories of depression: historical impact on biomedical research. *Journal of Historical Neuroscience*. [e-journal] 21(4), 366-392. doi: 10.1080/0964704X.2011.623917.

Munder, T., Brütsch, O., Leonhart, R., Gerger, H. and Barth, J. (2013) Researcher allegiance in psychotherapy outcome research: An overview of reviews. *Clinical Psychology Review*.
[e-journal] 33(4), 501-511. doi.org/10.1016/j.cpr.2013.02.002.

Munn, Z., Moola, S., Riitano, D. and Lisy,K. (2014) The Development of a Critical Appraisal Tool for Use in Systematic Reviews: Addressing Questions of Prevalence. *International Journal of Health Policy and Management*, [e-journal] 3(3), 123-128. doi: 10.15171/ijhpm.2014.71.

Ni, X., Zhang-James, Y., Han, X. *et al*. (2014) Traditional Chinese Medicine in the Treatment of ADHD. *Child and Adolescent Psychiatric Clinics of North America*, 23(4), 853-881. Nordmann, H. (2019) pers. comm. 17th May.

Nordmann, H. (2007) *Statistik und Wahrscheinlichkeit leicht gemacht* [*Statistics made easy*]. Norderstedt, Books on Demand.

Norris, N. (1997) Error, bias and validity in qualitative research. *Educational Action Research*, 5(1), 172-176. doi: 10.1080/09650799700200020.

Norrsken Data Teknik (2017) AnalyzeEverything. [computer programme] Norrsken Data Teknik. Available at: < http://www.norrsken-data-teknik.com/Analyze/down.html > [Accessed 11th November 2017].

O'Cathain, A., Murphy, E. and Nicholl, J. (2015) Three techniques for integrating data in mixed methods studies. *BMJ British Medical Journal,* [e-journal] 341(1). http://dx.doi.org/10.1136/bmj.c4587.

Pannucci, C.J. and Wilkins, E.G. (2010) Identifying and avoiding bias in research. *Plastic and reconstructive surgery*, [e-journal] 126(2), 619-625. doi: 10.1097/PRS.0b013e3181de24bc.

Pellegrino, E. (1979) The sociocultural impact of twentieth-century therapeutics. The Therapeutic Revolution. In: Vogel, M.J. and Rosenberg, C.E. (1979) *Essays in the Social History of American Medicine*. Philadelphia: University of Philadelphia Press, pp.245-266.

Perry, C., Alizadeh, Y. and Riege, A. (1997) Qualitative Methods in Entrepreneurship Research. *Proceedings of the Annual Conference of the Small Enterprise Association of Australia and New Zealand*, Coffs Harbour, Australia, 21-23 September 1997, pp.547-567.

Philipsen, A., Hornyak, M. and Riemann, D. (2006) Sleep and sleep disorders in adults with attention deficit/hyperactivity disorder. *Sleep Medicine Reviews*, 10(6), 399-405.

Prediger, B., Bühn, S., Becker, M., Pieper, D. (2016) Endbericht: "Systematische Auswertung des aktuellen Forschungsstands zum Kaiserschnitt" Los 1: Beratung der Schwangeren [Final report: "Systematic evaluation of the recent state of research on Caesarian. Lot 1: Consultancy of pregnant women]. [pdf] IFOM – Institut für Forschung in der Operativen Medizin (Universität Witten/Herdecke). Available at: <https://www.bundesgesundheitsministerium.de/fileadmin/Dateien/5_Publikationen/Gesundheit/Berichte/Endbericht_LOS_1_Kaiserschnittforschung.pdf> [Accessed 16.05.2019].

Polanczyk, G., de Lima, M., Horta, B. *et al*. (2007) The Worldwide Prevalence of ADHD: A Systematic Review and Metaregression Analysis. *American Journal of Psychiatry*, 164(6), 942-948.

Qie, Y. (2005) Clinical observations on the treatment of child hyperkinetic syndrome by acupuncture plus flash cupping. *Shanghai Journal of Acupuncture and Moxibustion,* 24(7), 13-14.

Ravishankar, V., Chowdappa, S., Benegal, V. and Muralidharan, K. (2016) The efficacy of atomoxetine in treating adult attention deficit hyperactivity disorder (ADHD): A meta-analysis of controlled trials. *Asian Journal of Psychiatry*, 24, 53-58.

Remor, E. (2006) Psychometric Properties of a European Spanish Version of the Perceived Stress Scale (PSS). *The Spanish Journal of Psychology*, 9(1), 86-93.

Rösler, M., Retz, W., Retz-Junginger, P. *et al*. (2004) European Archives of Psychiatry and Clinical Neuroscience, [e-journal] 254(6), 365-371. http://dx.doi:10.1007/s00406-004-0516-z.

Schächter, J.D., Connell, B.D., Statson, W.B. (2007) Correlated change in upper limb function and motor cortex activation after verum and sham acupuncture in patients with chronic stroke. The Journal of Alternative and Complementary Medicine, [e-journal] 13(5), 527-532. https://doi.org/10.1089/acm.2007.6316.

Schultz, J. (2015) *Analysing your interviews.* [video/online] South Hampton: E-Learning Videos. Available at: <https://www.youtube.com/watch?v=Or7SgKCfA80> [Accessed 1st February 2018].

Scott, J. and Barlow, T. (2003) *Akupunktur in der Behandlung von Kindern* [*Acupuncture in the Treatment of Children*]. Kötzting/Bayer. Wald: Verl. für Ganzheitliche Medizin Wühr.

Segal, C., Holve, E. and Sabharwal, R. (2013) Collecting and Using Patient-Reported Outcomes (PRO) for Comparative Effectiveness Research (CER) and Patient-Centered Outcomes Research (PCOR): Challenges and Opportunities. [pdf] *Issue Briefs and Reports. EDM Forum Commmunity.* Paper 10. Available at: http://repository.academyhealth.org/edm_briefs/10. [Accessed 16th May 2019].

Shah, Shivannee (2019) Seven Biases to Avoid in Qualitative Research. [online] Available at: <https://www.editage.com/insights/7-biases-to-avoid-in-qualitative-research> [Accessed 7th May 2019].

Shavelson, R.J., and Towne, L. (Eds.). (2002) *Scientific research in education*. Washington, DC: National Academies Press.

Shea, B.J., Bouter, L.M., Peterson, J. *et al*. (2007) External validation of a measurement tool to assess systematic reviews (AMSTAR). *PloS one*, *2*(12), e1350. doi: 10.1371/journal.pone.0001350.

Shin, L.M. and Liberzon, I. (2010) The neurocircuitry of fear, stress, and anxiety disorders. *Neuropsychopharmacology: official publication of the American College of Neuropsychopharmacology*, *35*(1), 169-191. doi: 10.1038/npp.2009.83.

Simon, V., Czobor, P., Balint, S. *et al.* (2009) Prevalence and correlates of adult attention-deficit hyperactivity disorder: meta-analysis. *British Journal of Psychiatry*, 194(3), 204-211.

Simon, N.M., Smoller, J.W., McNammara, K.L. *et al*. (2006). Telomere shortening and mood disorders: Preliminary support for a chronic stress model of accelerated aging. *Biological Psychiatry*, [e-journal] 60(1), 432-435. doi: 10.1016/j.biopsych.2006.02.004.

Smith, J. and Noble. H. (2014) Bias in research. *Evidence Based Nursing*, [e-journal] 17(1), 100-101. doi: 10.1136/eb-2014-101946.

Sobanski, E., Leppämäki, S., Bushe, C. *et al*. (2015) Patterns of long-term and short-term responses in adult patients with attention-deficit/hyperactivity disorder in a completer cohort of 12 weeks or more with atomoxetine. *European Psychiatry*, 30(8), 1011-1020.

Spencer, T., Biederman, J. and Mick, E. (2007) Attention-Deficit/Hyperactivity Disorder: Diagnosis, Lifespan, Comorbidities, and Neurobiology. *Journal of Pediatric Psychology*, 32(6), 631-642.

Stat 507 Epidemiological Research Methods (2018) *3.5 – Bias, Confounding and Effect Modification.* [online] Available at: <https://newonlinecourses.science.psu.edu/stat507/node/34/> [Accessed 9th August 2019].

StatSoft, Inc. (2013). Electronic Statistics Textbook. [online] Tulsa, OK: StatSoft. WEB: Available at: <http://www.statsoft.com/textbook/.> [Accessed 14th April 2019].

Stubberfield, T., Wray, J. and Parry, T. (1999) Utilization of alternative therapies in attention-deficit hyperactivity disorder. *Journal of Paediatrics and Child Health,* 35(5), 450-453.

Sung, H., Kim, Y., Kim, I., Jang, S., Kim, Y., Na, D., Han, K., Hwang, B., Park, D. and Ko, J. (2004). Proteomic analysis of differential protein expression in neuropathic pain and electroacupuncture treatment models. *PROTEOMICS*, 4(9), 2805-2813.

Takano, T., Chen, X., Luo, F. *et al*. (2012). Traditional acupuncture triggers a local increase in adenosine in human subjects. *The journal of pain: official journal of the American Pain Society*, [e-journal] 13(12), 1215-1223. doi: 10.1016/j.jpain.2012.09.012.

Taylor, S.E., Burklund, L.J., Eisenberger, N.I. *et al*. (2008) Neural bases of moderation of cortisol stress responses by psychosocial resources. *Journal of Personality and Social Psychology, 95*(1), 197-211.

Uher, J. (2018) Quantitative Data From Rating Scales: An Epistemological and Methodological Enquiry. *Frontiers in Psychology*, [e-journal] 9(2599). doi: 10.3389/fpsyg.2018.02599.

Ulett, G.A., Han, S, and Han, J.S. (1998) Electroacupuncture: mechanisms and clinical application. *Biological Psychiatry*, 44(2), 129-138.

Upadhyaya, H., Tanaka, Y., Lipsius, S. *et al*. (2015) Time-to-onset and -resolution of adverse events before/after atomoxetine discontinuation in adult patients with ADHD. *Postgraduate Medicine*, 127(7), 677-685.

Upadhyaya, H., Adler, L., Casas, M. *et al*. (2013) Baseline characteristics of European and non-European adult patients with attention deficit hyperactivity disorder participating in a placebo-controlled, randomized treatment study with atomoxetine. *Child and Adolescent Psychiatry and Mental Health*, 7(1), 14-22.

Upadhyaya, H., Ramos-Quiroga, J., Adler, L. *et al*. (2013) Maintenance of response after open-label treatment with atomoxetine hydrochloride in international European and non-European adult outpatients with attention-deficit/hyperactivity disorder: a placebo-controlled, randomized withdrawal study. *The European Journal of Psychiatry*, 27(3), 185-205.

Valenzuela, P. and Shrivastava, P. (2002) *Interview as a Method for Qualitative Research*. [pdf] Southern Cross University and the Southern Cross Institute of Action Research (SCIAR), Available at: <https://www.public.asu.edu/~kroel/www500/Interview%20Fri.pdf> [Accessed at: 1st June 2019].

Verkhratsky, A. and Burnstock, G. (2014) Biology of purinergic signalling: Its ancient evolutionary roots, its omnipresence and its multiple functional significance. *Bioessays*, [e-journal] 36(7), 697-705. doi: 10.1002/bies.201400024.

Walker, D., Mason, O., Clemow, D. and Day, K. (2015) Atomoxetine treatment in adults with attention-deficit/hyperactivity disorder. *Postgraduate Medicine*, 127(7), 686-701.

Wang, Z., Li, M. and Yan, J. (2006) Clinical observations on treatment of attention deficit disorder in child by combined acupuncture and medicine. *Chinese Journal of Information on Traditional Chinese Medicine,* 13(6), 78-79.

Wender, P. H. (1995). *Attention-deficit-hyperactivity-disorder in adults*. Oxford, UK: Oxford University Press.

Wernicke, J., Adler, L., Spencer, T. *et al*. (2004) Changes in Symptoms and Adverse Events After Discontinuation of Atomoxetine in Children and Adults With Attention Deficit/Hyperactivity Disorder. *Journal of Clinical Psychopharmacology*, 24(1), 30-35.

Whalen, C., Jamner, L., Henker, B. *et al*. (2002) The ADHD spectrum and everyday life: Experience sampling of adolescent moods, activities, smoking, and drinking. *Child Development*, [e-journal] 73(1), 209-227. doi: 10.1111/1467-8624.00401.

White, H. and Shah, P. (2011) Creative style and achievement in adults with attention-deficit/hyperactivity disorder. *Personality and Individual Differences*, 5(11), 673-677.

Wilens, T.E, Faraone, S.V., Biederman, J. (2004) Attention-deficit/hyperactivity disorder in adults. *Journal of the American Medical Association JAMA,* 292(5), 619-623.

Wollin, A.S. (1995) *A Hierarchy-Based Punctuated-Equilibrium Model of the Process of Emergence and Change of New Rural Industries*. Unpublished PhD thesis, Griffith University Faculty of Commerce and Administration, Brisbane.

World Health Organization (1992) *The ICD-10 Classification of Mental and Behavioural Disorders: Descriptions and Guidelines.* Geneva, World Health Organisation.

Xu, X., Liu, H. and Peng, J. (2007) Comparative observation on acupuncture and western medicine for treatment of minimal brain dysfunction. *Chinese Acupuncture and Moxibustion,* 27(12), 904-906.

Yin, R.K. (2004) *The Case Study Anthology*. London, UK, Sage.

Yin, R.K. (2003) *Case study research: design and methods*. [pdf] SAGE Publications Inc. Available at: <http://cemusstudent.se/wp-content/uploads/2012/02/YIN_K_ROBERT-1.pdf> [Accessed 17th May 2019].

Yin, R.K. (1994) *Case Study Research: Design and Methods*. London, UK, Sage.

Yuen, J.C. (2003) *The Eight Extraordinary Vessels*. In: Howard, S. (2005) Channel Systems of Chinese Medicine. New England School of Acupuncture.

Zhang Y. and Zhang, X. (2000) Observations on therapeutic effects 41 cases of attention deficit disorder in child by combined acupuncture and Jingling oral liquid medicine. *Hunan Journal of Traditional Chinese Medicine,* 16(5), 22-23.

Appendices

Appendix I: Search term combinations

Search-strategy: The databases cited below were first searched for sextuple, fivefold, quadruple, or triple combinations of search term categories, which yielded no results. Therefore searches for the combinations ADHD and self-perceived stress; ADHD and acupuncture; ADHD and atomoxetine; acupuncture and self-perceived stress; acupuncture and atomoxetine; as well as atomoxetine and self-perceived stress were conducted.

The following regular search terms (in bold blue letters) that were combined with MeSH tags (if available) on PubMed or independently selected synonyms (in conventional blue letters), were applied (number of results after implementation of the inclusion- and exclusion criteria listed in brackets behind the search terms):

1. **ADHD** *OR* Attention Deficit Hyperactivity Disorder *OR* Attention Deficiency hyperactivity Disorder [MeSH-Tag] (1)
Besides the MeSH-Tag 'Attention Deficit Hyperactivity Disorder', the term 'Attention Deficiency Hyperactivity Disorder' was applied to widen the search for a potentially higher number of results. Since the author`s first language is not English, it was recognized yet *after* the DRP finally was accepted that here it was kind of a wording mistake. Since the major search term here was 'ADHD', it is assumed that the application of the term 'attention deficiency' not seriously impacted the results of the literature search. This mistake will be considered and be refrained from in future projects.

Above-mentioned terms were combined with …

2. *AND* **self-perceived stress** *OR* stress *OR* PSS scale *OR* self perceived stress (2)
Here, the synonym 'stress' was chosen to widen the search for a potentially higher number of results. The term 'PSS scale' had emerged in previously sighted literature, and for this reason was applied. The term 'self perceived stress' with a missing hyphen was applied to include non-English language papers that might have used that particular wording (Green *et al.*, 2001).

– or –

3. *AND* **Acupuncture** *OR* TCM *OR* Chinese Medicine (3)
Here, the search terms 'TCM' and 'Chinese Medicine' were applied synonymously, in order to widen the search for a potentially higher number of results.

– or –

4. *AND* **Atomoxetine** *OR* Atomoxetin *OR* Strattera (4)
Here, the synonym 'Strattera' was applied in order to widen the search for a potentially higher number of results. The synonym 'Atomoxetin', with a missing 'e', was additionally applied to capture potentially traceable results written in German.

The data bases PsychInfo, AMED, Alt Health Watch, Science Direct, Clinical Trials.gov., Hindawi, the data base of the University of York, PLOS ONE, and Springer Open were searched as well. Therefore, the search term combinations mentioned above were, if required, particularly modified according to the input modalities of the respective data base.

Appendix II: Critical Appraisal of the reviewed papers

Table 6: Critical Appraisal of reviewed papers regarding ADHD and self-perceived stress

Study	Design	Overall conclusion	Points could be improved
Hirvikoski *et al.* (2009)	Cross-sectional	> Appropriately performed and presented. Conclusions appear reasonable and reliable.	
Combs *et al*. (2012)	Cross-sectional	> Appropriately performed and presented. Conclusions appear reasonable and reliable.	
Miklósi *et* al. (2016)	Cross-sectional	> Appropriately performed and presented. Conclusions appear reasonable and reliable.	• Inclusion criteria of the sample could have been more clearly defined and described.
Corominas-Roso *et al.* (2015)	Cross-sectional	> Appropriately performed and presented. Conclusions appear reasonable and reliable.	

Table 7: Critical Appraisal of reviewed papers regarding ADHD and acupuncture

Study	Design	Overall conclusion	Points could be improved
Ni *et al*. (2014)	Consensus/editorial	> Appropriately written and presented.	• Unclear if the 'interests of the relevant population' are the central focus of the stated opinion.
Lee *et al*. (2011)	Systematic Review/ Meta-analysis	> Overall acceptably performed and presented, with some minor flaws. Conclusions appear reasonable and reliable.	• Not clearly stated if/ to what extent grey literature was used as an inclusion criterion. • No list of excluded studies provided. • Potential conflicts of interest not mentioned.
Li *et al.* (2011)	Systematic review	> Appropriately performed and presented. Conclusions appear reasonable and reliable. Cochrane standard.	

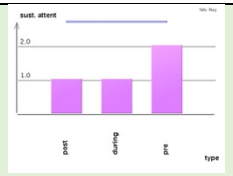
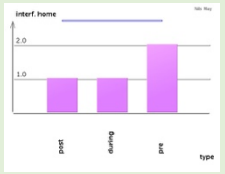
Table 8: Critical Appraisal of reviewed papers regarding ADHD and Atomoxetine

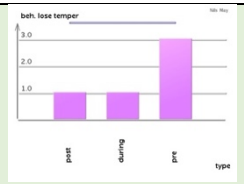
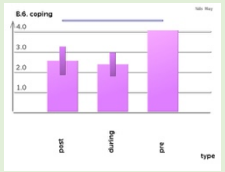
Study	Design	Overall conclusion	Points could be improved
Adler *et al*. (2014)	RCT	> Appropriately performed and presented. Conclusions appear reasonable and reliable.	• No details reported regarding the reliability of outcome measurements. • Most authors have ties with the main manufacturer of ATX.
Upadhaya *et al*. [AE] (2015)	RCT	> Appropriately performed and presented. Conclusions appear reasonable and reliable	
Upadhaya *et al*. [Baseline Eu/Non-Eu)] (2013)	RCT		
Camporeale, Upadhaya *et al*. [Safety/tolerability] (2013)	RCT		
Upadhaya *et al*. [Maintenance] (2013)	RCT		
Childress (2016)	Review (non-systematic)	> Informative review. No concrete methodology stated.	• No specific points of critique since no specific methodology stated.
Clemow and Bushe (2015)	Review (non-systematic)	> Informative review – questionable generalisations/conclusions cannot be assessed as robust/reliable.	• Lack of explicit assessment of the scientific quality of the included papers.
Ravishankar *et al*. (2016)	Review (non-systematic)	> Overall acceptably performed. Some points of critique, conclusions should be regarded with caution.	• Scientific quality of the included studies and likelihood of publication bias not clearly stated. • No (potential) sources of support acknowledged
Asherson *et al*. (2014)	Integrated Analysis	> Appears overall acceptably performed. Some points of critique, conclusions should be regarded with caution.	• No explanation if reviewed literature was analysed by two independent data extractors. • Characteristics of the included studies and scientific quality not clearly reported.
Sobanski *et al.* (2015)	Review (non-systematic)	> Informative review – questionable quality.	• No ADHD-related characteristics of the included studies provided. • Scientific quality of the included studies not reported and not appropriately recognized in conclusions. • Publication bias not reported.
Walker *et al*. (2015)	Review (non-systematic)	> Appears overall acceptably performed. Some points of critique, conclusions should be regarded with caution.	• Scientific quality of the included studies and potential conflicts of interests not reported.

Appendix III: Convergence Coding Scheme

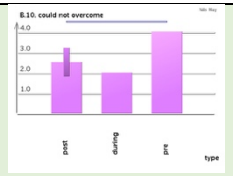
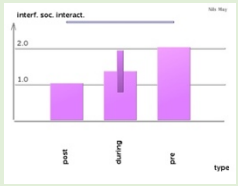
Table 9: Contextual Factor Theme Frequencies and Quotes

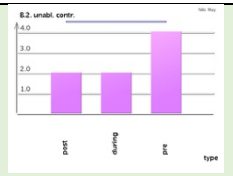
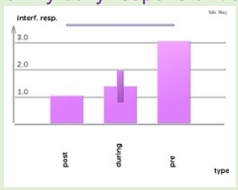
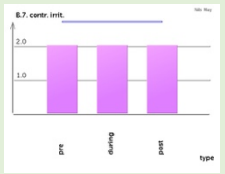
	Number of Occurrence in Interviews or Questionnaires Mentioning Each Factor		
Theme	**Interviews**	**Questionnaires**	**Sample Quotes**
1. Current Complaints/ Symptoms (incl. non-specific)	12 (17)		Pre-interventional: *2. OC: Current ADHD-manifestation?* #00:04:35 – 10# AR: Currently, (…) **pretty much all combined**. (…) **both aspects are strongly represented**. Besides, the **restlessness**, (..) have this restlessness, as a rule. (…) Right now, **both aspects are consistently present**. So **both aspects feel really strong at the moment**. (…) #00:05.09 – 11# Post-interventional: *2. OC: Which ADHD-aspect(s) currently paramount?* #00:02:29 – 3# AR: I'd say **both aspects are present, prominent** (..). Erm, **currently they both taking turns a lot** (..). Erm (…), but I'd say **I'm more in control of it, nevertheless**. So I just have **an increased awareness** about what is happening. So **I'm able to better grasp it** (.). I'm **able to assess it more reliably**. Right now it doesn't get to me, **it just doesn't get to me**. Eh, I'll just call it this overpowering force for now, this (.), which makes one feels so powerless, erm (..), that's just gotten less severe (.). So I'm (…) still able to eh **withdraw for a moment, and reflect on it**, and say: Now this or that is going on, and accordingly, I am **more able to take action myself**, So **that's working out for sure** (..). #0:03:23 – 4# AR: Compared to (.) that time up until two or three months ago (.),(…) **know for sure that things got better** within **the last six or eight weeks in any** case (…). Although quite a lot is going on, and eh, there still is a kind of constant. And, eh, EXACTLY, **also kind of a sadness, or still feel a kind of depression**. But (.) **it just, eh, besides all, turned better** (…). #00:04:07 – 6#
Incl. 1.1 Current Extent of Participant's Attention Deficit	4	6 (CSS) à 18 Items	Pre-interventional: *OC: Primary paramount*? #00:07:47 – 14# AR: **Impulsivity**, and, more recently, **attention**. (…) **more forgetful, more confused**. (…) it's such an **extreme anxiety**, or, so extreme that it overshadows a lot of other things. It's kind of a major symptom, that this (…) can (…) **change all of a sudden**, (…). #00:08:58 – 15# CSS (I: pre-interventional) Instructions: Please circle the number next to each item that best describes your behaviour during the last two/three weeks. 3. Have difficulty Never or rarely Sometimes Often Very often sustaining my attention in tasks or fun activities X

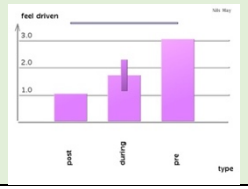
Incl. 1.2 Current Extent of Impairment of Participant's Functionality	9	6 (CSS) á 10 Items	 Pre-interventional: AR: **Currently, I don't handle it well**. So, right now, I am finding it very hard, so, I would say, now, at the moment, I am not handling it well. Because **it's all slipping from my hands**, (…). #00:31:38 – 63# CSS (I; pre-interventional; VI: post-interventional): To what extent do the problems that you may have circled on the previous page interfere with your ability to function in each of these areas of life activities? Areas: Never or rarely Sometimes Often Very often In my home life with my immediate family. X
Incl. 1.3 Current Extent of Participant's Impulsivity	4	6 (CSS) à 8 Items	 Pre-interventional: *OC: Primary paramount*? #00:07:47 – 14# AR: **Impulsivity**, and, more recently, **attention**. (…) **more forgetful, more confused**. (…) it's such an **extreme anxiety**, or, so extreme that it overshadows a lot of other things. It's kind of a major symptom, that this (…) can (…) **change all of a sudden**, (…). #00:08:58 – 15# CSS (I; pre-interventional; VI: post-interventional) To what extent do the problems that you may have circled on the previous page interfere with your ability to function in each of these areas of life activities? Items: Never or rarely Sometimes Often Very often1. Lose temper. X X

			
2. Paramount ADHD-Core-Symptomatology: Changes over Course of Life?	10	n.a.	Post-interventional: *3. OC: Which ADHD-aspect currently charges him most?* #00:04:47 – 15# AR: And **it's still there, and it's annoying**. **But I still can get a grip of it occasionally**. Thus, I still can preserve this feeling that I **can still, despite everything, have it under control**. And that itself, **despite everything, feels a lot better.** When one **just feels a bit more powerful**, feels oneself through that. That **IT doesn't have power over you but you can, whatever, direct it**. So that I don't have this, this powerlessness that, where you, where you just don`t know ok what am I going to do now, I am feeling this way but I just don't know how to deal with it (.). And **that's really taken a turn for the better**. #00:06:06 – 18#
3. Resilience & beneficial factors/ awareness-process	15	6 (PSS) à 4 Items	Post-interventional: AR: Positively. (…) did notice **during the treatment that something's happening. Be it physical, be it erm, regarding my tension**. Erm, (.) it yet gave me, I would say it just, just, **definitely gave me more tranquility**, in any case. As far, as far as I can assess it, (.) eh, I think that I **became a bit more centered**, that it made me, according to MY own terms, as much as I was able to, eh, it **made me a bit more focused**. So, how shall I say, it did not 'make me'[more focused] but that **I simply was more focused, or still AM** (.) more focused, erm. (10) Also more positive. (…) I **could feel a certain thankfulness** again during the treatments (.), which is totally important in my life. (…) could **feel a lot of love during the treatments**, (.) erm, **sadness as well**, and (..) **awareness**. Thus, it helped me in any case again to, erm, so this half hour, 40 minutes (.), erm (.), so in any case I can say that **it positively propelled me forward**. That's **for sure**. So, as far as I could perceive, as I was able to feel **with regard to the acupuncture, I certainly noticed that it positively affects (.) my life**. #00:09:12 – 20# PSS (I: pre -interventional; VI: post-interventional) Never Almost Never Sometimes Fairly Often Very Often B.6. In the past month, how often have you found that you could not cope with all the things you had to do? X X  Sample PSS (Item B.6.; Graph PSS_5; also see section 'Results')

4. Stress-Perception: Modalities; Triggers & Causal/ Symptomatic Factors	17	6 (PSS) à 10 Items	Pre-interventional: *OC: Stress-vulnerability?* #00:25:31 – 48# *OC: Frequency of stress-affection* #00:25:51 – 50# AR: Ok. **Currently very, very strong**. At the moment I`d say it **is very, very strong**. Very pronounced, yes. #00:26:12 – 55# Post-interventional: AR: (…) the stress, **the stress still exists. It has not (.) disappeared**. But. Erm, that's also the case, that **I just can catch myself faster. So I get out of situations more quickly again, or I can stop myself**. Erm (.), **that's definitely improved**. (…) #00:14:13 – 34# PSS (I: pre -interventional; VI: post-interventional) Never / Almost Never / Sometimes / Fairly Often / Very Often B.3. In the past month, how often have you felt nervous or stressed? — Sometimes: X; Fairly Often: X  Sample PSS (Item B.3.; Graph PSS_8; also see section 'Results', as well as under 'Appendices')
5. Burden	6	6 (PSS) à 10 Items; 6 (CSSR) à 10 Items	Pre-interventional: *OC: Factors – how burdensome?* #00:47:41 – 102# **VERY burdensome**. So we`re talking about 'right now', I would say: Currently, it is **VERY BURDENSOME**. Currently, it is ult, it is **VERY debilitating**, erm, currently it`s about, living one day at a time. Similar to what I've already experienced before, yes, but **it`s more like 'managing the day and seeing if I can stay happy somehow'**. And without something from the outside showing up that again (.) somehow(.) derails you. It`s more about this need to take a deep breath, to recharge, (…) in between this **need for (.) consistency**, for, (…) for happiness (…) and there's just this **tremendous need for a certain consistency**, of some kind. (…). Since the **fear of not having any consistency**, was just very big. And this is currently, **to come back again on how burdensome it is, currently that's just VERY burdensome**. (…) #00:49:56 – 104# PSS (I; pre-interventional; VI: post-interventional) Never / Almost Never / Sometimes / Fairly Often / Very Often B.10. In the past month, how often have you felt that difficulties were piling up so high that you could not overcome them? — Sometimes: X; Very Often: X

			 Sample PSS (Item B.10.; Graph PSS_1; also see section 'Results') CSS (I: pre-interventional; VI: post-interventional) To what extent do the problems that you may have circled on the previous page interfere with your ability to function in each of these areas of life activities? Areas: Never or rarely / Sometimes / Often / Very often In my social interactions with others. X X 
6. ATX-Intake: Impact then & now; currently beneficial?	5	n.a.	Pre-interventional: *OC: ATX-treatment: impact on attention-deficit?* #00:59:19 – 125# AR: // **In the past it helped** me, **helped me extremely**. I just noticed, it **made me calmer, increased my attention**. But it was also, once I crossed a certain line, **the pills didn't help anymore**. Then I didn`t have these perceptions anymore. But simply because I probably, in part, didn't do things that I should have done, you see. Like, to organize myself in a better way, (..) and (..), then I just couldn't do it. #00:59:52 – 128#
7. Additional bodily phenomena/symptoms	7	n.a.	Pre-interventional: *OC: Factors – how often?* #00:42:09 – 92# AR: (…) sometimes, in certain situations, (…) it shows up as **some kind of twitch**. (…) that it also physically manifests then, and sometimes **with twitching of the eye**. #01:01:07 – 130#
8. Increased • (Self-) Controllability • (Self-) Awareness • (Self-) Efficacy • Centeredness • Ability to focus	8	6 (PSS) à 10 Items; 6 (CSS) à 10 Items	Post-interventional: *OC: Impact on Hyperactivity a/o attention-deficit?* #00:19:42 – 49# AR: (…) despite everything (.), eh, for me **that goes along with my ability to focus**. Because **when I'm hyperactive, I can just barely focus** (.). Erm, **positively. It had a positive impact [on that].** So, as mentioned before, **CENTEREDNESS**, a bit, IN CERTAIN MOMENTS MORE **more FOCUSSED** in certain moments, AS WELL, which is not always easy for me, but (.). Exactly, positive. #00:20:25 – 50# PSS (I: pre -interventional; VI: post-interventional) Never / Almost Never / Sometimes / Fairly Often / Very Often B.2. In the past month, how often have you felt unable to control the important things in your life? X X

			 Sample PSS (Item B.2.; Graph PSS_9; also see section ‘Results’) CSS (I: pre-interventional; VI: post-interventional) To what extent do the problems that you may have circled on the previous page interfere with your ability to function in each of these areas of life activities? Areas: Never or rarely / Sometimes / Often / Very often In my management of my daily responsibilities. — X / X 
9. Treatment-associated Changes* & treatment-experiences positively associated * incl. non-specific	7	6 (PSS) à 10 Items; 6 (CSS) à 10 Items	Post-interventional: *OC: Positive impact – lasting how long?* #00:15:17 – 39# AR: (…) it now, retrospectively, I can simply say that regarding the study as a whole, so, **I am not talking about the PARTICULARS here, but the whole thing**, and, thus, I **just can say in so far that all in all it had a positive impact on me**. Currently I just can’t comment on it in much detail (.), so, when I was going through it, I **noticed something is changing. In a positive sense**. And in that moment **it was a bit as if, if you want to put it visually**, **as if a little switch had been flicked**. Yes. That’s I can’t say exactly, I can’t say exactly if that occurred after the first treatment, or later (.), as I said before, **all symptoms were there but quite quickly something changed in a positive way**. #00:16:06 – 40# PSS (I: pre -interventional; VI: post-interventional): Never / Almost Never / Sometimes / Fairly Often / Very Often B.4. In the past month, how often have you felt confident about your ability to handle personal problems? — X/X  Sample PSS (Item B.4. Graph PSS 7; also see section ‘Results’) CSS (I: pre-interventional; VI: post-interventional) To what extent do the problems that you may have circled on the previous page interfere with your ability to function in each of

			these areas of life activities? Areas: Never or rarely Sometimes Often Very often In my management of my daily responsibilities. X X (For the associated graph, please see below)
10. (Acupuncture-) Treatment-associated: • Decreased inner tension • Positively impacted hyperactivity	6	6 (CSS) à min. 3 Items	Post-interventional: *OC: Impact on hyperactivity?* #00:19:42 – 49# AR: (…) despite everything (.), eh, **for me that goes along with my ability to focus. Because when I`m hyperactive, I can just barely focus** (.). **Erm, positively. It had a positive impact [on that]**. (…) #00:20:25 – 50# CSS (I: pre -interventional; VI; post-interventional) Instructions: Please circle the number next to each item that best describes your behavior during the last two/three weeks. Item: Never or rarely Sometimes Often Very often 10. Feel 'on the Go' and 'driven by a motor'. X X 

Appendix IV: TCM Diagnoses and Point Protocol

Diagnoses according to the previously collected anamnestic data, and the principles/models applied by Traditional Chinese Medicine (TCM)

* Liver depression and Spleen deficiency
* Heart- and Spleen (Qi)- deficiency
* Heat in Heart and Liver
* Additional: a certain retention of dampness/phlegm

Point Protocol for the study (from which a number of points might be selected for each treatment session)

* Shenmen/ Hand-Shaoyin (He) 7 (neutral or dispersive technique)
* Taichong/ Foot-Jueyin (Lv) 3 (neutral or dispersive technique)
* Shenshu/ Foot-Taiyang (Bl) 23 (tonifying technique)
* Neiguan/ Hand-Jueyin (Pc) 6 (neutral technique)
* Zusanli/ Foot-Yangming (St) 36 (tonifying technique)
* Qihai/ Renmai 6 (tonifying technique)
* Baihui/ Dumai 20 (neutral, dispersive, or tonifying technique)
* Fenglong/ Foot-Yangming (St) 40 (neutral technique)

Appendix V: Treatment Documentation

Table 10: Documentation of the Acupuncture Treatment Sessions during the Study SCS 2018

Date	Points selected (max. 8)/ Stimulation technique	Notes
11 Sept. 2018	• Baihui Du 20 N • Neiguan Pc 6 N • Qihai Ren 6 + • Zusanli St 36 + •Taichong Lv 3 –	**Pulses:** Sp > Jin Mai/ (Spleen) tighten at the surface; (Guan) Hua Mai/slippery) in both middle position and in depth. Ht > Jin Mai/ (Heart) tighten at the surface, as well as in (Cun) the middle position; Xu Mai/empty in depth. Lv > Xian Mai/ (Liver) wiry over all three positions. (Guan)
13 Sept. 2018	• Baihui N • Shenmen Ht 7 – (strong De Qi right side) • Qihai + • Zusanli + • Taichong – (strong De Qi right side)	**Pulses:** Sp > tighten at the surface; middle/in depth as seen above. Ht > more relaxed/less tighten over all positions: Huan Mai Lv > tighten but not wiry at the surface, as well as in the middle position. Slightly Xu/empty in depth. **"How did you feel after the previous treatment?"** A 'bit lost' directly after the treatment since he was 'forbidden' to go swimming; a remarkable relaxation directly after the treatment. **"How do you feel today (current state)?"** 'Quite good'; Emotionally 'more steady', Combined with wariness; A 'certain sadness', nevertheless.
18 Sept. 2018	• Baihui + • Shenmen – (strong De Qi right side) • Qihai + • Fenglong St 40 (strong De Qi) • Taichong (strong De Qi)	**Pulses:** Sp > tighten at the surface; Hua Mai (slippery) in the middle position, as well as in depth Ht > Kou Mai/Hollow at the surface; Se Mai/raw in the middle position, and in depth. Lv > Jin Mai/tighten all over. **"How did you feel after the previous treatment?"** 'Quite good'; afterwards, had a relaxed evening; next day began positively, he was 'with himself' **"How do you feel today (current state)?"** Today, he also had a regular consultation with his psychologist; "Honestly spoken, quite good over the whole time'; "not so exhausted", "not so goopy"; depressiveness ↓; "'feeling of being alone' ↓"; "tiny moments of luckiness in between"
20 Sept. 2018	• Baihui + • Neiguan + Ri • Qihai + • Fenglong • Zusanli + • Taichong – (strong De Qi)	**Pulses:** Sp > Xu Mai/Soft - slightly empty all over. Ht > Xu Mai/Empty all over. Lv > less tighten/wiry at the surface, as well as in the middle position (compared to the first settings), but raw/ Se Mai in depth. **"How did you feel after the previous treatment?"** "Originally, quite relaxed but distracted due to the common flu of his son." **"How do you feel today (current state)?"** "Today, originally well-on, but some trigger moved him into emotions he originally does not want to feel." (But) he could (temporary) move himself out. "A bit restless"; "lots of residual energy", financial worries.

25 Sept. 2018	• Baihui + • Shenmen – Le • Neiguan N Ri • Qihai + • Fenglong + • Taichong –	**Pulses:** Sp > Xu Mai/empty/soft all over. Ht > thin-wiry at the surface; hollow in the middle and in depth Lv > not wiry, but slightly tighten at the surface; raw in the middle and deep position. **"How did you feel after the previous treatment?"** Had a 'deep conversation' with his ex-partner yesterday night: he remained cooler and 'with himself'. Before, he was 'triggered', and completely brought out of his centeredness. Even an eye-tic emerged what had not have happened for a long time. **"How do you feel today (current state)?"** Both dentist and (regularly) psychologist dates previous to the acupuncture session. Imbalance: "Honestly spoken, quite good recently". *"Can (again) experience joy just out of himself!"*
27 Sept. 2018	• Baihui + • Shenmen – Ri • Neiguan + Le • Qihai + • Zusanli + • Taichong –	**Pulses:** Sp > Empty/soft; a bit speedy at the surface, as well as in the middle position. Ht > raw; Xu/empty in depth. Lv > all over, still more relaxed/smoother. **"How did you feel after the previous treatment?"** Previous treatment session: *"Very intense".* "(Felt) Really, really smooth, similar like after a meditation." Arm: remained good. "Highly recognised how the last treatment`s effect continued." Urine ↑↑; Stool ↑↑ **"How do you feel today (current state)?"** "Sad but not too sad." (positively associated by him).
02 Oct. 2018	• Shenshu Bl 23 + • Neiguan • Zusanli + • Taichong –	**Pulses:** Sp > slightly empty; Ht > Xi Mai/wispy Lv > still much more relaxed all over, compared to previous treatments. **"How did you feel after the previous treatment?"** "Originally good after the Previous treatment session." Last weekend: That 'Feeling alone-Feeling' did occur; "depressive in some days, 'ok' in others." "Originally, quite ok." **"How do you feel today (current state)?"** "Today: pretty fidget, and 'underutilised'." Appetite: ravenous.
04 Oct. 2018	• Baihui + • Shenmen – Le • Neiguan + Ri • Qihai + • Fenglong N • Zusanli + • Taichong –	**Pulses:** Sp > soft at the surface, and weak/ Ruo Mai in depth. Ht > tighten in the middle position; raw in depth. Lv > slightly tighten at the surface; Ruo Mai/weak in depth. **"How did you feel after the previous treatment?"** "Good, but wobbly – quite good, *with* a sufficient amount of 'movement', but without worries and circling thoughts." "Steady, but a certain sadness and fear of a recurrently occurring sluggishness." "Everything is there, to a certain degree." "Possibly associated with (his) ex-partner, or with financial worries." "But accompanied with confidence." Ravenous appetite: Increasing, but still disciplined.

		The last acupuncture session (in prone position) did not feel that good to him. **"How do you feel today (current state)?"** "A certain restlessness occurs" (in him).
09 Oct. 2018	• Baihui + • Neiguan + • Qihai + • Zusanli + • Taichong –	**Pulses:** Sp > soft, but nott Hua Mai at the surface, as well as in the middle position; Slightly weak in depth. Ht > wispy in the middle position; weak in depth. Lv > Ru Mai/smooth at the surface; hollow in the middle; and wispy/ thin in depth. **"How did you feel after the previous treatment?"** Went swimming after the last treatment, felt good. **"How do you feel today (current state)?"** Very choppy – quite depressive; worries (money, future) are quite present; Triggered by associations with friends he had met; a kind of sadness is pre-dominant; feelings of powerlessness...; Ravenous appetite: "Occurs from time to time."
11 Oct. 2018	• Baihui + • Shenmen – Le • Neiguan + Ri • Qihai + • Zusanli + • Taichong –	**Pulses:** Sp > a bit tighten at the surface (patient just had eaten something); healthy in depth. Ht > empty/weak at the surface, hollow in the middle position, a bit empty/weak in depth. Lv > raw at the surface, weak in middle position and depth. **"How did you feel after the previous treatment?"** Felt quite good after last treatment. **"How do you feel today (current state)?"** "Financial worries changed for better. Thus, all over, more relaxed." "Originally, at present, it's ok." Ravenous appetite: At present, less disciplined behaviour (but still manageable).
16 Oct. 2018	• Baihui + • Neiguan + Le • Shenmen – Ri • Qihai + • Fenglong N • Taichong –	**Pulses:** Sp > a bit tense at the surface; Huai Mai in the middle; a bit weak in depth Ht > a bit speedy at the surface; Xu/empty in depth. Lv > slightly wiry at the surface; stronger both middle, and in depth. **"How did you feel after the previous treatment?"** Felt good, and eloquent after last treatment. **"How do you feel today (current state)?"** Changeability. 'Old patterns' regarding his ex'. Feeling lonely. Tendentially a 'positive chaos'. Feels more vivid (e.g enjoys music more...)
18. Oct. 2018	• Baihui + • Neiguan + • Qihai + • Zusanli + • Taichong –	**Pulses:** Sp > a bit speedy at the surface/in the middle position; Slightly weaker (more empty) in depth. Ht > Hollow at the surface/in the middle position. Lv > a bit speedy at the surface/ in the middle position. **"How did you feel after the previous treatment?"**

		After last treatment: "Originally, good." Sports/swimming. "Happiness about being alive". **"How do you feel today (current state)?"** "Originally, good." "Positive stress."
23 Oct. 2018	• Shenshu Bl 23 + • Qihai + • Neiguan + Le • Zusanli + • Taichong N –	**Pulses:** Sp > tighten at the surface/in the middle pos.; healthy in depth. Ht > tighten at the surface; raw in the middle position; a bit weak in depth. Lv > quite healthy at the surface; empty in the middle, and in depth position. **"How did you feel after the previous treatment?"** "All over relaxed." **"How do you feel today (current state)?"** "So so." "Positive stress." Partially sad/depressive; "Originally, quite ok."
25 Oct. 2018	• Baihui N • Shnmen Ht 7 - • Qihai Ren 6 + • Zusanli + • Taichong N	**Pulses:** Sp > tighten at the surface; slippery in the middle position; (still) slightly empty in depth. Ht > thin-wiry at the surface; raw in the middle position; heathy in depth. Lv > thin at the surface; slightly weak/empty in both middle position and in depth. **"How did you feel after the previous treatment?"** High workload, but relaxed, nevertheless. **"How do you feel today (current state)?"** Stress ↑
30 Oct. 2018	• Baihui + • Shenman Ht 7 – Le • Neiguan Pc 6 + Ri • Qihai + • Fenglong N • Zusanli + • Taichong –	**Pulses:** Sp > Healthy at the surface; Hua Mai/ slippery in the middle position; Healthy in depth. He > wispy at the surface; Hollow in the middle position; Slightly weak in depth. Lv > wispy at the surface; a bit empty in both middle position and in depth. **"How did you feel after the previous treatment?"** After last treatment: No concrete memories. Financial worries: were quite serious, now way better. Trouble with his ex-partner. **"How do you feel today (current state)?"** "Originally, good – although experiencing relational stress" "Originally good – nevertheless."

Appendix VI: The Self-perceived Stress Rating Scale (PSS)

Self-perceived Stress Rating Scale

The following questions ask about your feelings and thoughts during THE PAST TWO WEEKS. In each question, you will be asked HOW OFTEN you felt or thought a certain way. Although some of the questions are similar, there are small differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. Try not to calculate the exact number of times you felt a particular way, but give a general estimate that seems most accurate.

For each statement, please indicate if you have had these thoughts or feelings: never, almost never, sometimes, fairly often, or very often. (Read all answer choices each time)

Date: _____

	Never	Almost Never	Sometimes	Fairly Often	Very Often
B.1. In the past month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
B.2. In the past month, how often have you felt unable to control the important things in your life?	0	1	2	3	4
B.3. In the past month, how often have you felt nervous or stressed?	0	1	2	3	4
B.4. In the past month, how often have you felt confident about your ability to handle personal problems?	0	1	2	3	4
B.5. In the past month, how often have you felt that things were going your way?	0	1	2	3	4
B.6. In the past month, how often have you found that you could not cope with all the things you had to do?	0	1	2	3	4
B.7. In the past month, how often have you been able to control irritations in your life?	0	1	2	3	4
B.8. In the past month, how often have you felt that you were on top of things?	0	1	2	3	4
B.9. In the past month, how often have you been angry because of things that happened that were outside of your control?	0	1	2	3	4
B.10. In the past month, how often have you felt that difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Perceived Stress Scale Scoring

Each item is rated on a 5-point scale ranging from never (0) to nearly always (4). Positively worded items are reverse scored, and the ratings are summed, with higher scores indicating more perceived stress.

PSS-10 scores are obtained by reversing the scores on the four positive items: For example, 0=4, 1=3, 2=2, etc. and then summing across all 10 items. Items 4, 5, 7, and 8 are the positively stated items.

Your Perceived Stress Level was _____ .

Scores around 13 are considered average. Previous research has found that high stress groups usually have a stress score of around 20 points. Scores of 20 or higher are considered high stress, and if you are in this range, you might consider learning new stress reduction techniques as well as increasing physical exercise to at least three times a week. High psychological stress is associated with high blood pressure, higher BMI, larger waist to hip ratio, shorter telomere length, higher cortisol levels, suppressed immune function, decreased sleep, and increased alcohol consumption. These are all important risk factors for cardiovascular disease.

References: Cohen, S., Kamarck, T. & Mermelstein, R. (1983) A Global Measure of Perceived Stress. *Journal of Health and Social Behavior*, 24(4), 385 - 396.

Appendix VII: The Current Symptom Scale Self-Report Form (CSS)

Current Symptom Scale Self-Report Form

Name: *Anonymised* Date: _____

Instructions: Please circle the number next to each item that best describes your behavior during the last two/three weeks.

Item:	Never or Rarely	Sometimes	Often	Very often
1. Fail to give close attention to details or make careless mistakes in my work.	0	1	2	3
2. Fidget with hands or feet or squirm in seat.	0	1	2	3
3. Have difficulty sustaining my attention in tasks or fun activities.	0	1	2	3
4. Leave my seat in situations while seating is expected.	0	1	2	3
5. Don`t listen when spoken to directly.	0	1	2	3
6. Feel restless.	0	1	2	3
7. Don`t follow through on instructions and fail to finish work.	0	1	2	3
8. Have difficulty engaging in leisure activities or doing fun things quietly.	0	1	2	3
9. Have difficulty organizing tasks and activities.	0	1	2	3
10. Feel 'on the Go' and 'driven by a motor'.	0	1	2	3
11. Avoid, dislike, or am reluctant to engage in work that requires sustained mental effort.	0	1	2	3
12. Talk excessively.	0	1	2	3
13. Lose things necessary for tasks or activities.	0	1	2	3
14. Blurt out answers before questions have been completed.	0	1	2	3
15. Am easily distracted.	0	1	2	3
16. Have difficulty awaiting turn.	0	1	2	3
17. Am forgetful during daily activities.	0	1	2	3
18. Interrupt or intrude on others.	0	1	2	3

- How old were you when these problems with attention, impulsiveness, or hyperactivity first began to occur? ____ years old.

To what extent do the problems that you may have circled on the previous page interfere with your ability to function in each of these areas of life activities?

Areas:	Never or Rarely	Sometimes	Often	Very often
In my home life with my immediate family.	0	1	2	3
In my work or occupation.	0	1	2	3
In my social interactions with others.	0	1	2	3
In my activities or dealings in the community.	0	1	2	3
In my educational activities.	0	1	2	3
In my dating or marital relationship.	0	1	2	3
In my management of my money.	0	1	2	3
In my driving of my motor vehicle.	0	1	2	3
In my leisure or recreational activities.	0	1	2	3
In my management of my daily responsibilities.	0	1	2	3

Instructions: Again, please circle the number next to each item that best describes your behavior during the last two/three weeks.

Items:	Never or Rarely	Sometimes	Often	Very often
1. Lose temper.	0	1	2	3
2. Argue.	0	1	2	3
3. Actively defy or refuse to comply with requests or rules.	0	1	2	3
4. Deliberately annoy people.	0	1	2	3
5. Blame others for my mistakes or misbehavior.	0	1	2	3
6. Am touchy or easily annoyed by others.	0	1	2	3
7. Am angry or resentful.	0	1	2	3
8. Am spiteful or vindictive.	0	1	2	3

Thank you very much for your participation!

References: Barkley, R.A. and Murphy, K.R. (1998). *Attention Deficit Hyperactivity Disorder: A Clinical Workbook (2nd ed.)*. New York: Guilford Press.

Appendix VIII: The Interviews (schedules)

Semi-structured interview during the regular Atomoxetine-intake-phase (resp. pre-interventional)

Moin Mr./ Mrs. ...,

I am pleased to welcome you here today. As an adult diagnosed with ADHD, you are participating in an ADHD-single case study.
ADHD is defined by the core symptoms of attention-deficiency and hyperactivity/impulsivity. Affected persons often perceive an immense degree of stress.
You are regularly taking Atomoxetine, a medication specifically prescribed for the treatment of ADHD.
Today I would like to ask you some questions regarding ADHD core symptomatology, your perception of stress and the effects of Atomoxetine intake.
Please answer these questions as honestly as possible. You do not need to worry whether your response may be the one the interviewer would like to hear.

1. Please introduce yourself and explain when you were diagnosed with (adult) ADHD.

2. How does your ADHD symptomatology currently look like?
Would you say that you are primarily affected by attention-deficiency, hyperactivity, or a combination of both?

2.1 Which aspect of your ADHD currently affects you the most?

2.2 How has the weighing/balance of those different components changed over the course of your life?

3. How would you describe your vulnerability to stress? (e.g. frequency, intensity, affliction, handling)

3.1 fac.: How do you feel about your vulnerability to stress? (e.g. perceived as an acceptable part of your personality or, contrastingly, required to be treated)

4. Please describe your perception of stress in more detail. Outline the formative factors – e.g. restlessness, inner tension?

4.1 Please describe how these factors manifest themselves.

4.2 How often do these factors occur?

4.3 To what degree do those factors feel like a burden to you?

4.4 Have those perceptions/modalities changed during the course of Atomoxetine in-take?

4.5 fac.: Did any feelings of inner tension change under the intake of Atomoxetine?

5. Earlier (2.1), you mentioned that XY affects you in particular. To what degree has the treatment with Atomoxetine impacted this?

Thank you very much for participating in this interview!

Semi-structured interview to be held during the intervention phase

Moin Mr./ Mrs. ...,

I am pleased to welcome you here today. As an adult diagnosed with ADHD, you are participating in an ADHD-single case study.
ADHD is defined by the core symptoms of attention-deficiency and hyperactivity/impulsivity. Affected persons often perceive an immense degree of stress.
You are regularly taking Atomoxetine, a medication specifically prescribed for the treatment of ADHD.
In the course of our study, you have already completed the intervention phase. In addition to your regular pharmacotherapy, you received acupuncture treatments according to Chinese Medicine. The comparison of the combined therapy to the pharmacological therapy alone is the main subject of the present investigation.
I would therefor like to ask you a few questions.
Please answer these questions as honestly as possible. You do not need to worry about whether your response may be the one the interviewer would like to hear.

1. How is your health today?

2. How does your ADHD symptomatology currently look like?
Would you say that you are primarily affected by attention deficiency, hyperactivity, or a combination of both of them?

2.1 Which aspect of your ADHD currently affects you the most?

3. In the context of the study you're participating in, you were – in addition to your regular Atomoxetine-treatment – treated with acupuncture. To what degree did that treatment affect your inner tension?

3.1 What were the manifestations of that changed conditions (e.g. frequency, duration, homogeneity along distinct treatment sessions)?

4. To what degree did the acupuncture affect your body-awareness? Please outline those changes (e.g.frequency, duration or continuity of changes).

5. Next, I'd like you to comment on the extent to which the additional acupuncture treatment affected the modalities of your stress-perception (e.g. frequency, intensity, duration, your handling with stress).

5.1 When did those changes occur, and how long did they last?

5.2 How often did changes occur? (e.g. just after one treatment, after a few treatments, or regularly)

6. How did you perceive the combined treatment (Atomoxetine plus acupuncture) compared to treatment with Atomoxetine alone?

7. Earlier (2.1), you mentioned that XY affects you in particular. To what degree has the acupuncture treatment impacted this?

8. Is there anything else that appears important to you and that you would like to share regarding the study or the received acupuncture treatments?

Thank you very much for participating in this interview.