Cultural activities and health

Singer, patient, and healthcare staff perspectives. From feelings to biology

CHRISTINA GRAPE VIDING
Abstract

Objectives. The aim of this thesis was to explore and illuminate possible associations between various cultural activities and assessments of well-being, health, stress and emotions in a didactic setting and healthcare settings for singers, patients, and healthcare staff.

Material and methods. Paper I describes an empirical intervention study with repeated measures from a small cohort of singers, before, during and after a singing lesson. Physiological and endocrinological measures, as well as self-ratings were used. A two-way analysis of variance (ANOVA), as well as non-parametric tests were used. Paper II describes a randomised controlled trial for women with exhaustion symptoms participating in an intervention called the “culture palette”, consisting of six different cultural activities. Exhaustion, alexithymia, sense of coherence and self-rated health with standardised scales were assessed. A Linear Mixed Models were used. Paper III describes a study using a phenomenological hermeneutical method in analysing focus group interviews with women with burnout symptoms and cultural producers and separate interviews with health care managers to elucidate the experiences of participating in the culture palette. Paper IV describes a study with a phenomenological hermeneutical method analysing focus group interviews with healthcare staff members about their experiences of participating in self-chosen cultural activities.

Results. The analysis of paper I showed increased wellbeing and joy in amateur singers. The professional singers showed better cardio-physiological fitness during singing. Both groups experienced more energy and relaxation after the singing lesson. The analysis of paper II showed decreased symptoms of exhaustion, alexithymia and increased self-rated health in the women after participation in the cultural activities. However, there was no significant differences between intervention and control groups regarding sense of coherence (SOC). Paper III describes the analysis of the interviews and shows three themes, where the culture palette impacted on the level of the body, group and indirectly on the managers and healthcare organisation. Paper IV describes the analysis of the interviews and shows three themes where cultural activities had a positive impact on the physical/psychological level, and enhanced work relations. Challenges in implementing cultural activities in the healthcare organisation were illuminated.

Conclusion. The cultural activities included in these studies show beneficial effects on health for individuals and groups, as well as for healthcare organisations. The multimodal components integrated in cultural activities exhibit possibilities of enhancing health, wellbeing and preventing and managing stress reactions. Cultural activities can enable the development of a more sustainable healthcare and eventually a more sustainable society.

Keywords: arts, burnout, cultural activities, focus groups, health, healthcare staff, joy, singers, stress, wellbeing, women

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To my family for loving support and encouragement
List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.


III. Grape Viding, C., Osika, W., Bojner Horwitz, E. (2017). "You Can’t Feel Healthier than Your Caregiver": The Ripple Effect of Trust and Empathy for Patients and Health Care Staff, Cultivated through Cultural Activities. *In manuscript.*


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### Abbreviations and explanations

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<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>Formant</td>
<td>Vocal tract resonance with frequency controlled by vocal tract shape</td>
</tr>
<tr>
<td>Timbre</td>
<td>Perceived voice quality other than pitch and loudness</td>
</tr>
<tr>
<td>Pitch</td>
<td>Perceived quality that can be ordered along a scale from low to high tone</td>
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<tr>
<td>Voice organ</td>
<td>Lungs, larynx, pharynx, mouth, nose</td>
</tr>
<tr>
<td>Amplitude</td>
<td>Tone property perceived along a scale from soft to loud</td>
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<tr>
<td>Partials</td>
<td>Simultaneously sounding sine waves with frequencies forming a multiplication table</td>
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<tr>
<td>Adduction</td>
<td>Vocal fold approximation</td>
</tr>
<tr>
<td>VAS</td>
<td>Visual Analog Scale</td>
</tr>
<tr>
<td>KEDS</td>
<td>Karolinska Exhaustion Disorder Scale</td>
</tr>
<tr>
<td>TAS</td>
<td>Toronto Alexithymia Scale</td>
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<tr>
<td>SOC</td>
<td>Sense of Coherence</td>
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<tr>
<td>SRH</td>
<td>Self-Rated Health</td>
</tr>
<tr>
<td>HRV</td>
<td>Heart Rate variability</td>
</tr>
<tr>
<td>Tot-pow</td>
<td>Total power</td>
</tr>
<tr>
<td>LF-pow</td>
<td>Low frequency power</td>
</tr>
<tr>
<td>HF-pow</td>
<td>High frequency power</td>
</tr>
<tr>
<td>LF/HF</td>
<td>Ratio between Low and High frequency power</td>
</tr>
<tr>
<td>IBS</td>
<td>Irritable Bowel Syndrome, functional problems</td>
</tr>
<tr>
<td>Testosterone</td>
<td>Sex hormone, anabolic steroid</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td>A blood coagulation protein</td>
</tr>
<tr>
<td>VEGF</td>
<td>Vascular Endothelial Growth Factor</td>
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<tr>
<td>Motilin</td>
<td>A peptide, gastrointestinal hormone</td>
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During my master education in public health, I also attended singing lessons with an opera singer. I discovered that singing gave me positive feelings such as happiness and vitality. Therefore, I wanted to investigate if these feelings could be measured in blood, and this was the beginning of my research journey.

I have my educational background in medicine and anthropology. I have worked as a nurse at different workplaces and specialities such as urology, surgery, and now primary healthcare with focus on asthma/COPD/allergy. The medical perspective of what makes us sick has prevailed at my workplaces. However, after considering experiences of being a patient and working as a nurse, it seems that a more holistic perspective would be fruitful for potential recovery. This means including what promotes health and integrating the perspective of the whole person. Cultural activities may have an important role in healthcare and health promotion, embracing a more holistic/salutogenic approach.
Cultural activities such as singing, dancing, painting, writing and more, can affect humans in different ways (Fancourt & Finn, 2019; Bonde & Theorell, 2018; Clift & Camic, 2016; Bojner Horwitz et al., 2015a; Bojner Horwitz et al., 2015b; Theorell, 2014) and may have an important role in managing stress related problems and promoting health. Cultural activities can also be relatively easy to distribute. However, cultural activities have not been established as treatment routines in Swedish healthcare and often depend on single dedicated persons administering them. This is a problem in other European countries as well, although music therapy for patients is more established in Denmark and Norway, than in Sweden (Bonde & Theorell, 2018). In addition, a culture-centred music therapy has been developed in Norway with an ecological perspective, i.e., a “whole system perspective” where the individual, the collective and surroundings continuously interact reciprocally (Stige, 2016). Here, culture-centred music therapy communicates via music (sound and movement) which enables immediate interactive participation in a relationship with other humans. In communication with others, we can further develop tools for creative thinking and acting. It is claimed that participation in relationships is central to human development (Stige, 2016). Repeated or chronic stress can impinge on health severely with permanent effects on the brain (Lupien et al., 2009), and early exposure to adversity can increase sensitivity to stress, affecting mental and physical health (Boyce et al., 2021; Lupien et al., 2009). In Sweden and internationally, stress related problems such as exhaustion and burnout can affect not only patients (Grossi et al., 2015), but also healthcare staff, resulting in the decision to leave the profession (Arnsten & Shanafelt, 2021; Rudman et al., 2014). In primary healthcare there are considerable challenges caused by stress-related problems derived from increased workload and decreasing staff levels (Heponiemi et al., 2013). Improved care of staff can result in improved care for patients (Bodenheimer & Sinsky, 2014). Combining interdisciplinary science and cultural activities can render rewarding results, which may give innovative solutions and new discoveries (Sohn, 2018). The work in this thesis aims to study the effects of cultural activities on singers, patients, and caregivers, and how these activities can be integrated with medical care. Quantitative and qualitative methods are chosen to capture the results in a more comprehensive, holistic way.
Background

Presenting cultural activities

In English literature and articles, several concepts related to cultural activities are used such as creative arts, arts-based activities, art, fine arts, recreational arts and more (Leavy, 2019; Fancourt & Finn, 2019). I will use cultural activities since this expression is a direct translation from the Swedish word “kulturella aktiviteter” and is a broader concept where activities such as baking, meditation and sports can also be included. Arts and its similarities will also be used frequently since most English literature uses these words but has a narrower meaning and may implicate only the “fine arts”. The cultural activities in this thesis concern wide-ranging activities such as singing, dancing, theatre, panting, mindfulness training, food sculpturing, and chocolate and cheese tasting, yoga, line dance and Qigong. I do not include sports in general in this thesis. The effects of sports and arts may sometimes overlap, but generally the purposes differ. Some studies include athletics and sports in the concept of culture (Cuypers et al., 2012). Sports are usually more prone to competition, specialisation, and rules. But the concepts do not need to be dichotomized.

The concept of culture and art

The Swedish word “kultur” means art and culture and is originally from the French word culture, which in turn is derived from Latin (cultu´ra) and means processing, cultivation and education (Nationalencyklopedin, 2021c). Throughout history, culture has also been related to cultivation and growth of the soul and intellect (Nationalencyklopedin, 2021b, 2021c). The concept of culture is complex, and some researchers argue that culture can include all sorts of aesthetic expressions, personal education and anthropological customs (Pripp, 2005).

Art (in other words knowledge and skill) usually refers to the conscious cultural expression which requires special knowledge and ability to master, with personal control of and individual adjustment to situations and intentions (Nationalencyklopedin, 2021b). In a wider sense, art can refer to skills of some kind, and in a more limited sense art refers to aesthetic activity. The arts are
considered to be aesthetic objects, environments or experiences which can be shared with others (Encyclopaedia Britannica, 2021). In health research it has been argued that engagement with the arts takes place in five categories: performing arts (e.g., singing and dancing), visual arts, design and crafts (e.g., painting and photography), literature (e.g., writing and reading), culture (e.g., going to museums and concerts) and online digital and electronic arts (e.g., animations and film-making). The engagement can be both receptive, active and flexible, allowing new art forms to develop (Fancourt & Finn, 2019).

Interesting philosophical discussions about “what is art” have existed for some time (Emt & Hermerén, 1990, pp. 14-17). There are several theories that can be applied concerning the definition of art. For instance, Plato’s theory of mimesis emphasises the similarity between the art object and the imitated object. Others emphasise the artistic emotional expression (expressionistic theories of romantic tradition/romance), whereas aesthetic attitude theories assert that art has a certain unselfish/disinterested attitude which artworks claim to invite the viewer into. Formalistic theories are concerned with the significant form as the hallmark of art. Dickies criticised institutional theory (Dickie, 1973) stated that the artworld decides what a work of art is (Emt & Hermerén, 1990, p. 18). Other theories claim that art is an open concept (Emt & Hermerén, 1990). Aesthetics has often been connected to art, but this has its problems since the aesthetic concept can be limiting and complex, meaning different things in relation to different persons’ preferences. Emt and Hermerén (1990) argue that the art concept can be an umbrella concept, where several concepts are included. It has been argued that interpretation is a necessary tool for the existence of a work of art. “Art can externalise a way of viewing the world and expresses the interior of a cultural period” (Danto, 1974). Further, art has been said to stimulate the intellect of the audience, expand the horizon of fantasy and deepen emotional experiences (Khatchadourian, 1974). There have been several discussions about what the definition of art is or should be, and this is an ongoing debate. These questions may never be united in one uniform answer since there are as many opinions as there are people (Lorand, 2002; Jeffers, 1999), and this do not constitute the aims of this thesis.

Cultural activities in human history

Cultural activities and art have been part of human daily life since the earliest phases of the history of mankind (Fancourt, 2017; Theorell, 2014). Basically, cultural activities have been suggested to be important for our survival. Special ceremonies and rituals were performed, with singing, dancing, music, body panting and making handicrafts. According to some researchers, these ceremonies were important for “boosting and loading”, artefacts and objects with “good energy”, leading to success in hunting, reproduction, and defence.
The ceremonies also served as a comfort in uncertain times and later as a reminder that the group could cope with uncertainty. This created social bonds, support and cooperation in the group and therefore made life more manageable and society more vital (Fancourt, 2017; Theorell, 2014; Dissanayake, 1995). It has also been suggested that our ancestors used the voice, rhythms and moves (dancing) in their communication. Archaeologists have found music objects in tombs supporting this theory (Mithen, 2009). Recently discovered cave paintings suggest a storytelling ability in human minds, similar to modern minds, existing more than 44 000 years ago (Price, 2019). Art has also been assigned with the potential to heal, where shamans, among others, played an important role as spiritual leaders (Clift & Camic, 2016). The shamans involved dance, music, acting, and image making to induce altered states of consciousness in his/her patients, thus promoting psychological self-healing. Further, Greek philosophers, such as Aristotle had great influence on how people in the West think about art and wellbeing. Greek poetry, which includes dramatic tragedy, comedy, and poetry, has always been connected to healing and the restoration of health. In a small passage in his work Poetics, Aristotle mentions dramatic catharsis as a sort of purification (although how this is to be done is not clear). The interpretations of catharsis differ, but one interpretation suggests that a theatre performance can give the audience an opportunity to release emotional strain, i.e., a beneficial mental discharge that promotes healing. The native Americans have also had a strong history of art, the singing voice being important in healing and ritual practices. The Egyptians, during the eras of the Pharaohs, showed reliance on the healing power of words. In the Judeo-Christian bible, connections of poetry and healing are displayed as well. Reading (bibliotherapy) and writing have also been considered to promote a cathartic process followed by beneficial health impacts (Clift & Camic, 2016).

Research areas with cultural activities

A significant body of research regarding cultural activities for different groups of participants, patients, and disciplines exists. WHO (Fancourt & Finn, 2019) has recently compiled a report showing the vast area and value of the arts in contributing to health, health promotion, preventing onset of mental illness and physical decline in old age, as well as how arts can support the treatment and managing of mental and physical illnesses and end-of-life care. Cultural activities can be multimodal interventions due to their combination of different health promoting components such as sensory activation, emotion evocation, cognitive stimulation, physical activity, social interaction and more (Fancourt & Finn, 2019). Further, a recent research article compiles studies about arts engagement and implications for mental and social wellbeing in England (Tymoszuk et al., 2021). It was found that more engagement in arts
(such as reading, music listening) was associated with higher levels of social connectedness, less social loneliness, and higher levels of wellbeing. However, for those who engaged frequently in almost all arts activities, depression and intense emotional loneliness were apparent. The authors explain this in terms of arts being a means for emotional regulation and soothing used by people who experience emotional loneliness. They further state that cultural activities can be divided into receptive engagement (for example created art which becomes experienced by an audience) and participatory engagement (creating and participating in the arts) (Tymoszuk et al., 2021).

In the following passages some highlights from this research area will be displayed.

Public health
During the 20th century, population studies of longevity, health, and quality of life, have suggested that regular participation in cultural activities is associated with prolonged life expectancy and increased quality of life (Bygren et al., 2009; Konlaan et al., 2000; Bygren et al., 1996). Research has also shown that engagement in cultural activities can reduce the risk of death by external cause (violence, accidents, suicide) in full-time employees, which can be associated with better overall survival (Väänänen et al., 2009). In 2000, the National Public Health committee in Sweden stated that cultural activities and art should have a more prominent position in society and that they could be one important factor in promoting health economic savings for society (Nationella Folkhälsokommittén, 2000). Other studies in public health suggest that music & singing, dancing and sports can have a positive impact on wellbeing and mental health (Daykin et al., 2018; Duberg et al., 2016; Hansen et al., 2015; Hinshaw et al., 2015). In the Nordic book on music and public health (Bonde & Theorell, 2018) research about music and public health is displayed. This is an interdisciplinary research field where scientists and practitioners from several professions present knowledge about the focused application of music experiences and activities from a public health point of view. Conferences, concepts, and collaborations have also come into existence in the aftermath of these researchers’ work. For instance, health musicking is a concept highlighted at the Nordic conference on music and public health in 2011 and suggests that participation in musical activities and sharing these experiences with other persons can have a positive impact on health. It has also been suggested that health musicking contributes to resilience, coping and recovery (Bonde & Theorell, 2018, pp. 16-17), development of identity, community development and values, support and help for individuals and sharing as well as the creation of musically designed environments. Earlier studies have shown that women tend to report better self-related health if they participate in musicking compared to women who do not engage in musicking (Ekholm et al., 2016).
Surgical work environment

One thing to consider is the duration of the cultural activities. Most interventions last for weeks or months. How about shorter interventions, lasting three to five days? Artists stationed at a medical-surgical care unit provided visual art, art installations, music, and concerts to the patients for about 40 hours per week, in a study by Sonke (Sonke et al., 2017). The nurses on the unit perceived the patients to be happier and less stressed, possibly by being distracted from pain and disease. Work climate, nursing practice and quality of care were also beneficially affected. However, some nurses found the music to be a distraction when talking on the phone or distributing medicine (Sonke et al., 2017; Sonke et al., 2015). In this study, the artists were seen as a vital part of patient care and included in the interprofessional care team. Surgeons can also benefit from listening to music in operating rooms, as it can increase their accuracy and speed in different tasks (Moris & Linos, 2013), and many surgeons prefer drawing when displaying and explaining procedures to colleges and patients (Kearns, 2019). Drawing is a simple, quick, and dynamic representation of reality. Studies on music and intra/postoperative pain, preoperative anxiety, recovery after surgery and surgical performance have also shown beneficial results with decreased pain and anxiety, increased oxytocin levels and enhanced performance of the surgeon, although anaesthesiologists may find it harder to communicate (Vetter et al., 2015; Bradt et al., 2013; Moris & Linos, 2013; Vaajoki et al., 2012; Allred et al., 2010; Nilsson, 2009; Nilsson et al., 2003).

Workplace environment

Workplace environments can have a considerable impact on psychological and physiological health, especially when taking employee and organisational factors into account, due to complex organisational factors (Gray et al., 2019). WHO states that work-related problems can mean losses of 4-6 % of GDP for most countries and that workplace initiatives can reduce sick leave absenteeism by 27% and healthcare costs by 26% (WHO, 2021). During the Covid-19 pandemic, the impact on working life was and is noticeable. Healthcare staff experienced a heavy workload, other groups of employees had the possibility to work at home, and yet other employees lost their jobs causing severe effects, not only on the economy, but on mental health (Giorgi et al., 2020). Implementation of resilience training programmes, among other things, is suggested to mitigate these effects. Research has suggested that workplaces that provide cultural activities for the employees are associated with lower degrees of emotional burnout symptoms (Theorell et al., 2013). An earlier study supporting this showed that working subjects who participated in different cultural activities had a reduced prevalence of burnout symptoms (Bittman et al., 2003). A randomised controlled trial observed improved mental health and
self-esteem in both managers and employees, as a likely result of a new leadership programme with cultural activities. No such effects were observed among managers and their employees in the control group whose managers attended a programme with lectures and discussions about leadership (Romanowska et al., 2011). Medical care staff can gain improved physical health, vitality and social function with cultural activities as well (Bygren et al., 2009). In addition, when attitudes of healthcare staff to arts interventions are explored, potential beneficial effects such as decreased stress and improved wellbeing are frequently mentioned (Wilson et al., 2016).

However, working as a professional musician can be stressful and health-risk behaviours have been observed, especially with men over 45, whereas amateur musicians are less likely to engage in health-risk behaviours (Bonde & Theorell, 2018, pp. 21-22, 28-29). Another important issue to address is envy. When performing a study with cultural activities in a workplace, it is important to offer cultural activities to all employees, without exception. This might otherwise counteract cohesiveness and could result in conflicts (Theorell et al., 2009). Other considerations are mental health. Depressive feelings can inhibit participation in cultural activities at work (Theorell & Nyberg, 2019), but participation can also protect employees from worsening depressive feelings.

**Gerontology**

Active participation in musical activities, museum object-handling and social activation programmes can enhance quality of life, wellbeing, autonomy, social affirmation and give positive psycho-endocrine and metabolic effects (Lamont et al., 2018; Thomson & Chatterjee, 2016; Li et al., 2015; Skingley et al., 2014; Creech et al., 2013; Johnson et al., 2013; Arnetz et al., 1983). However, music therapy may need to be long-term, since short-term therapy may not improve cognitive function (Li et al., 2015). The research results can also be affected by the randomising process, where people may become disappointed by not being randomised to the singing group, and hence report less wellbeing as a result of the disappointment (Skingley et al., 2014). This can be minimised with an opportunity for the control group to participate in singing after the study. Earlier research has shown that professionally conducted cultural programmes can have a positive impact on health, reduce loneliness, doctor visits and medication use (Cohen et al., 2006). Imaging and art therapy have shown beneficial results regarding speed of recovery and looking at and discussing pictures can improve psychological and physical parameters in older women (Theorell, 1998; Wikström et al., 1993).
Recent research suggests that arts on prescription for older people may be a rewarding tool to enhance mental wellbeing and enable personal growth (Poulos et al., 2019). Art on prescription was prescribed to empower people. This created meaningful relationships, meeting the needs for health and well-being.

Education
In nurse education art-based interventions have affected the learning environment positively with improved nursing skills. Another consequence is that the students have shown improved readiness in caring situations (Nease & Haney, 2018; Wikström, 2001). Exposing students to visual arts meant, imagination, emotional and conceptual thinking about ethics and clinical experience were facilitated (Delany & Gaunt, 2018). This promoted access to feelings and facilitated moral imagination, in addition to logical thinking, thus enriching the sense and understanding of ethical dimensions in clinical nursing and care. Research has also shown that creative art, as an educational tool, can promote a humanistic medical practice with personal growth and reflectiveness in medical students (Jones et al., 2017). The students reflected on the human dimensions of illness and medical care, enhancing their awareness, and understanding of what it is like to be ill. Further, arts-based activities are usually considered as amusing and fun and can facilitate learning (Ludke et al., 2014). Here, listen-and-repeat learning conditions were tested when learning a foreign language. The singing conditions were shown to be more effective as a learning condition compared to speaking and rhythmical speaking conditions.

The brain and cultural activities
Cultural activities can affect the brain which in turn influences body and emotions. Research concerning these effects is therefore relevant to discuss. Cultural activities which are offered to people, who would not normally have chosen to participate in such activities, can enhance already existing pathways in the brain and enable deeper inner behavioural changes (Lumley, 2004; LeDoux, 1998; Pennebaker, 1997). Furthermore, there is evidence that multimodal cultural activities have stronger effects than unimodal activities. In a research study concomitant visual and auditive stimulation gave stronger activation of visual and auditive centres in the brain, compared to separate visual or auditive stimulation on separate occasions (Baumgartner et al., 2006). Different areas of the brain can be activated by cultural activities (Särkämö et al., 2014; Baumgartner et al., 2006), and memory and mental health can be improved when participating in cultural activities (Sihvonen et al., 2017; LeDoux, 2014; LeDoux, 1998).
Neurobiology

It has been argued that music can affect the nervous system. Musical training can, for example, improve perception of speech in noise, which is a key skill to support classroom learning and the development of academic skills such as reading (Kraus & White-Schwoch, 2017). Sound processing and cognition are mutually reinforced in a feedback cycle. This is gated by the reward system which is highly activated by music. However, it may take time to change the brain. It is suggested that active engagement during learning and a prolonged period of repetition is important to affect neuroplasticity (Kraus & White-Schwoch, 2017). Studies of twins and music practice (de Manzano & Ullén, 2018) revealed that there were differences in the auditory-motor network in the brain when comparing the playing with the nonplaying twin. The playing twin had thicker cortical brain tissue in the left network and more developed white matter microstructure in both hemispheres and corpus callosum. The volume of grey matter was also larger in the playing group. Thus, different musical training can result in neuroanatomical differences. Another study displayed that engaging in the production of visual art can improve effective interaction between brain regions, particularly frontal, posterior, and temporal areas. This can also be associated with improved psychological resilience (i.e. stress resistance) (Bolwerk et al., 2014). These findings can be useful in managing chronic diseases in older adults.

One foundation for moral and social behaviour is the ability to empathise with another person’s psychological and physical circumstances. Social emotions, such as admiration and compassion in a context, engage homeostatic regulatory mechanisms in the brain using verbal account with audio/video/still images of social pain, bodily injury, skill, and virtuous acts as a method (Immordino-Yang et al., 2009). One explanation why music can have such an impact on humans is the activation of the dopaminergic system, where dopamine is released by pleasurable experiences. Music can be a potent pleasurable stimulus and research shows that intense pleasure in response to listening to, and anticipating, personalised music can lead to dopamine release in areas of the brain (Salimpoor et al., 2015; Salimpoor et al., 2011). Further, the brain is neuroplastic, which means that new connections can be made during the whole life span as a response to new, persistent stimuli or lesion. New pathways can also be activated, and secondary roads can be revealed. Music has been shown to affect neuroplasticity positively (Demarin et al., 2016), which is crucial for the rehabilitation of patients after brain injury.

Diseases and injury of the brain

When the brain tissue (white matter) deteriorates, as in dementia, different functions, bodily and cognitive, are affected severely with, among other things, cognitive impairment (Hase et al., 2018). There is today no cure for
dementia but social dancing, for example, has been shown to improve retaining abilities, to be supportive and give meaning to both patients and their careers (Palo-Bengtsson & Ekman, 2002; Palo-Bengtsson et al., 1998). In dementia care cultural activities, such as singing, music, drawing/painting and group dancing can affect patients positively with increased calmness, reduced anxiety, and diminished aggressiveness. The patients could even remember parts of their youth and improve their communication, with the activation of different modes of expression (Humphrey et al., 2017; Windle et al., 2017; Nyström & Lauritzen, 2005; Götell et al., 2000). These results may partly be explained by effects on the plasticity of the brain.

Different techniques can help recovery if the brain is injured externally and/or internally. Research has shown that listening to music after stroke enhances behavioural recovery and also stimulates fine-grained neuroanatomic changes in the brain (Särkämö et al., 2014). It has been shown that environmental enrichment (EE), especially a multisensory programme including music, is an important aspect of the recovery environment for structural brain plasticity after stroke. Music can be a multilateral stimulus for the brain (Särkämö et al., 2014). EE can provide sensory, emotional, and social stimulation. Cellular, and molecular neuroplastic effects have also been observed which are associated with improved cognitive or motor recovery. Attention, learning, language skills and memory can be improved with regular music activities. A decrease in depression, fatigue, and forgetfulness has also been observed (Särkämö et al., 2014). Furthermore, results from studies on artistic training indicate that attention and cognition are enhanced. Painters affected by stroke can perform differently after stroke. Painting may not deteriorate, rather become different. It all depends on what side the lesion occurred (Demarin et al., 2016).

Research concerning the included studies

The voice

The organs for speaking and singing is frequently used by humans and an account of the anatomy and function of the vocal apparatus is warranted for.

The vocal apparatus

The voice organ consists of the respiratory apparatus, the larynx, the pharynx, the nose and the mouth (Sundberg, 1977). When producing sounds, a complicated process is activated. The lungs produce an excess of air pressure, generating an airstream which passes through the glottis, the space between the two vocal folds at the base of the larynx. There are also the ventricular or “false” vocal folds above the vocal folds, engaging for instance when someone holds his/her breath with an overpressure of air in the lungs. The larynx is tube-
shaped and fits into the wider pharynx cavity that leads also to the oesophagus. The velum, or soft palate, in the roof of the pharynx is the valve to the nasal cavity. When producing non-nasalized vowels, the velum is raised, thus closing the passage to the nose such that the sound can propagate only through the mouth.

The vocal tract functions as a resonant chamber (like the body of a violin) and its shape are controlled by the positions of the articulatory organs, the lips, jaw, tongue, tip of the tongue and larynx. The vocal tract length can be increased by protruding the lips or lowering the larynx which increases the length. It can be constricted or dilated by the tongue, and by the jaw and the lip opening. The vocal tract has 4-5 important resonances called formants. When we speak or sing the articulatory organs move, changing the formants’ frequencies to produce vowels and consonants. Singing teachers in the classical tradition typically instruct their pupils to “yawn” to lower the larynx and expand the deep pharynx. This is to accomplish the effect of making the singing voice “darker” or deeper, thus affecting the quality of vowels in a desirable way. In classically trained male singers this can produce an extra spectrum envelope peak producing “the singers formant cluster”, which is needed for the singer’s voice to be heard when accompanied by a loud orchestra. Widening the jaw opening can also increase the amplitude of the sound produced without straining the voice. Another recommendation, commonly used for high-pitched singing is to smile, which shortens the vocal tract (Sundberg, 1977).
Fig. 1. The vocal apparatus

The anatomy of the vocal apparatus from nasal cavity to trachea.

Speaking and singing

As previously described, the voice is produced by these small parts of the human anatomy. The vocal folds are brought to vibration by the sub-glottal pressure, which in turn generates a pulsating air flow, called the voice source. It contains harmonics or partials, the frequencies of which form a multiplication table. These partials are filtered by the formants, i.e., the resonances of the vocal tract. The form of the vocal tract determines the frequencies of these formants (Zangger Borch, 2008).

The respiratory apparatus consists of the lungs, the chest muscles, and the abdominal and diaphragm muscles. The lungs have a maximum vital capacity of five to six litres in young adult men and four to five litres in young women. The chest muscles widen and narrow the rib cage. Contraction of the diaphragm lowers the floor in the rib cage and expands the abdominal wall, contraction of which pushes the diaphragm back into the rib cage. Thus, these muscles cooperate during normal breathing, speaking, and singing.
The larynx consists of cartilage, muscles, and mucous membrane. The vocal folds are attached posteriorly to the arytenoid cartilages and anteriorly to the thyroid cartilage. The vocal fold vibrations create a pulsating glottal airflow, a raw material for the voice, needed for voiced sounds in both speaking and singing and contributing to the voice timbre. The vocal tract resonator processes this signal by filtering it such that vowels and consonants, as well as personal voice timbre are produced. Different song styles use different physiological and timbral characteristics, and different singing teachers apply different techniques and pedagogies to optimise the student’s voice (Zangger Borch, 2008).

**Singers and non-singers**

Research has shown that singers and non-singers differ in their use of the voice (Borch & Sundberg, 2011; Borch et al., 2004). The differences are quite important and concern both vocal fold function and breathing technique (Sundberg, 1990). The phonatory function of the breathing apparatus supplies an excess pressure (the subglottal pressure) of air suitable for sound production with the target loudness. High subglottal pressure renders loud sound and high pitches need higher pressures than low pitches. Therefore, singers must have a precise control of subglottal pressure, and need to tune it for every note. The cricothyroid and the vocalis muscles control pitch and are thus crucial for intonation/staying in tune. Thus, the fact that a rise in subglottal pressure causes a rise in frequency is a complicating factor. A singer must have independent control over the phonatory parameters’ loudness and pitch. At high pitches non-singers often exaggerate glottal adduction, thus producing pressed phonation. Classically trained singers, by contrast, typically strive to keep the same phonation type throughout their pitch and loudness range. In speech, pitch and loudness are typically correlated and the subglottal pressure is varied mainly for control of prosody.

The singer’s formant cluster has been found to be an important acoustic characteristic of classically trained male singers (Sundberg, 1990). It is produced by an adjustment of the cavities in the low pharynx. For singing at high pitches other important articulatory tools are also important, such as jaw and lip opening, which can be widened to avoid the pitch frequency becoming higher than the first formant frequency; the wider the jaw opening the higher first formant. Singers are often required to sing high pitches and at high degrees of vocal loudness. Both these conditions are typically associated with vocal abuse in terms of exaggerated glottal adduction/pressed voice/and/or exaggerated subglottal pressures. The singing teacher’s task is to help the student to avoid these risks. Their goal is economising vocal effort, precisely controlling pitch, loudness and voice quality, and in so doing avoid straining the voice (Sundberg, 1990).
Solo singing

Music is argued to be universal, existing in all studied cultures, and similar songs are used in similar contexts worldwide (Fitch & Popescu, 2019). There are diverse forms of singing (e.g., everyday singing, karaoke singing, singing education, solo or group) and different singing styles (e.g., classic, rock, pop and more), and they take place in different settings. There are numerous health and wellbeing benefits suggested to be connected to singing. These include enhanced lung capacity, cardiological fitness, elevated emotional states, neural impact, biochemical effects, and personal & social benefits (Kang et al., 2018; Theorell, 2014; Bojner Horwitz, 2011; Valentine & Evans, 2001). However, there are few studies comparing solo singing to group singing and choir singing. Our own study with amateur- and professional singers showed that private singing lessons increased oxytocin, wellbeing, and joy especially for amateur singers (Grape et al., 2003). Professional singers, due to the element of performance with high demands on the vocal apparatus, may have difficulty experiencing the health effects of singing in the same way non-professionals (amateurs) do and the voice is a delicate instrument affected by practically all body systems (Sandgren, 2002; Sataloff, 2000). Indeed, respiratory problems can occur frequently in professional singers and some professional singers use alcohol excessively (men more frequently than women) with the accompanying health problems (Santos et al., 2019).

Choir singing

The official number of choir singers were about 600 000 to 700 000 in Sweden (SOM-institutet, 2000) before the Covid-19 pandemic. There were choirs consisting of 300 persons to small choirs with just a few people. Several forms existed such as church, gospel or pop choirs. However, since there is no register of all singing communities in Sweden, it is most likely that there were more choirs and choir singers than accounted for. As mentioned earlier, most research on singing concerns choir and group singing. After the outbreak of the Covid-19 pandemic research about choir singing and how far particles can spread has been performed and shows higher emission of particles during singing compared to speaking. This suggests that there can be a risk of transmitting airborne virus particles (Mürbe et al., 2020). The covid-19 pandemic has severely affected choir singing in Sweden, and this is probably the case in choir communities all over the world. As we have seen earlier, the physiological effects of singing are significant, as are the psychological experiences as well, affecting wellbeing and health. Singing in a choir can give improved mood, enhanced quality of life, greater happiness and stress reduction (Clift et al., 2010). Usually, women show higher scores (WHOQOL-BREF questionnaire) compared to men. Further, singing involves focused concentration, which can distract from worries and grant oblivion for a moment. Feelings of
isolation and loneliness can also be counteracted with choral singing, where you make friends and gain a sense of belonging. Cognitive functions can be improved, activation of the mind through learning and education (learning new words, concentration) (Clift et al., 2010). Research has also shown that women singing in a choir experience this as a “salutogenic” activity, supporting wellbeing and health (Batt-Rawden & Andersen, 2020). Choir singing can affect mood states and modulate immune components as well (Fancourt et al., 2016; Archie et al., 2013; Gale et al., 2012; Stanczyk, 2011). Research has also shown that the immune system can be boosted by choir singing (Kreutz et al., 2004).

A trend towards reduction of psychological distress after choir singing has been seen in patients with aphasia from stroke (Tamplin et al., 2013). After stroke communication skills can be severely damaged, and patients often feel disconnected from family and community. This can be reversed greatly when participating in choir singing. Gaining self-confidence and social skills to facilitate increased independence were two of the effects reported in this study. Frustration when verbalisation failed was also mentioned, although there was overall enjoyment despite this during the time of participation.

Looking at respiratory health, research has shown beneficial results for patients with respiratory problems such as COPD (chronic obstructive pulmonary disease), asthma, cystic fibrosis, Parkinson and more (Goldenberg, 2018). The patients took part in different singing lessons, after which breath control was enhanced with deeper (diaphragmic) breathing mode and enhanced mental/social health as well. Improvement could also be seen in anxiety, health (SF-36) and self-esteem. Improvements in FEV1 (forced expiratory volume in 1 second) and FEV (forced expiratory vital capacity) along with benefits in physical/psychological health and social wellbeing were also reported. Singing can also help training inspiratory and expiratory muscles and help patients cope with having a chronic illness, giving hope and optimism.

**Covid-19 and singing**

The outburst of the pandemic 2019/2020 caused by the virus named SARS-CoV-2 has affected society severely and especially the singing community. As mentioned before, one way for the virus to spread is by aerosols, which are produced when speaking and singing (Bahl et al., 2020; Echternach et al., 2020; Mürbe et al., 2020). Choir singing was consequently stopped in many countries. Severe infection with Covid-19 can give long-lasting problems with, for example, fatigue, dyspnoea, and pulmonary fibrosis, which can stiffen the lungs (Helding et al., 2020). For an average person who gets mild to moderate pulmonary function impairment, the consequences may not be as devastating as for all singers who can experience the end of their career and
life as they know it (Helding et al., 2020). Recommendations exist for safer singing (rehearse outside, use face masks, good hygiene routines and more), although these recommendations do not eliminate all risk (Naunheim et al., 2020). In Scandinavia, choir singers experienced the loss of social interaction as being the most deplorable (Theorell et al., 2020). Professional choir singers also expressed a deprivation of the physical aspects, aesthetic experience and flow when not being able to perform in the choir. Finally, performing arts professionals experienced financial hardship due to the reduction of work, which may have caused loneliness, depression, and diminished wellbeing (Spiro et al., 2020).

Dance/movement
Moving the body, such as in dancing, can give responses which can be measured and observed. Research has shown that positive changes in stress-related hormones can occur in fibromyalgia patients during dance/movement therapy (Bojner Horwitz et al., 2003b). After long-term illness, personalised music and art interventions can affect self-awareness, transform grief, anger, and pain, inducing moving/dancing and increasing wellbeing. This field shows promising results concerning neurological recovery with better balance, mobility and mood (Sihvonen et al., 2017; Batt-Rawden & Tellnes, 2011). Further, people dedicated to tango Argentino seem to have more physical fitness, social interaction and emotional reward when engaging in tango as a primary leisure activity (Kreutz, 2008). Salsa dancing may slow down age related decline, enhancing executive functions; planning ability, generating actions and verbal fluency (Noguera et al., 2020). The results in this study suggest that dancing increases the state of alertness to respond faster, especially for men, or to respond more accurately to stimulus appearing in the visual filed, especially for women. Preferably, the dance intervention should continue for an extended time for sustainable results. Practicing dance for three months or more can have positive effects on elderly people, such as improved quality of life, balance, agility, and cognitive performance (Santos et al., 2020). To promote health and recovery, dance seems to be a beneficial non-pharmacological intervention. Research has also shown that healthcare staff and older patients in weekly music and movement sessions can give valuable insights on effects (Bungay & Jacobs, 2020). In this study, taking part in dancing at the ward promoted person-centred care and enhanced staff-patient relationships.

Theatre, movie, musical show
Applied theatre, where the audience can be co-creator as well as act in the story, has been shown to be a useful instrument for dealing with life events and communication problems, power imbalance and hierarchical taboos (Bogue et al., 2017). Dealing with challenging situations in healthcare in this
inclusive and reflective way can be rewarding, giving an opportunity to examine how shifts in using voice, body and space can influence and/or minimise conflicts.

Theatre *Vildenvei* in Norway is part of a rehabilitation programme for mental health service users and applies narrative inquiry as a method, focusing on collaborative theatre-making to produce positive change in the participants’ lives (Torrissen & Stickley, 2018). The theatre belongs to the tradition at least as old as the ancient Greek rituals including the theory of dramatic catharsis from Aristotle. The tradition emphases the processes of creativity, playing and acting as a necessity for maintaining wellbeing for individuals and society as well. The theatre can enable emotional release which in turn can change the individual’s self-image, their situations and how they relate to others. The individual can change a negative identity to a positive one (Torrissen & Stickley, 2018). Further, using theatre in healthcare education has proven fruitful, enabling students to gain self-reflection, empathy, and professional skills in a confident setting (Baker et al., 2019; Gao et al., 2019). Film can also stimulate nurse students’ reflections and help them engage in practicing therapeutic communication skills, as well as learn the values of nursing and respect the patient’s experiences (Moosvi & Garbutt, 2020; Ogston-Tuck et al., 2016). New approaches in healthcare education and teaching can use films to gain knowledge in different medical areas (Gonçalves & Aversi-Ferreira, 2020).

**Painting**

Research has suggested that distraction-focused interventions, including mandala painting, can indicate stress reduction in nursing students with decreased anxiety in everyday school situations (Gebhart et al., 2020). This can prevent dropout or delay in nurse education. Older women have been shown to have improved mental wellbeing and increased social activity when participating in cultural activities such as painting pictures. Those who stopped participating experienced a decline in mental health and social activity (Liddle et al., 2012). Not expressing emotions can be a heavy burden, which oncology care frequently highlights, where speech and gestures may fail to accurately express what we feel, thus counteracting healing (Rakici & Karaman, 2019). This study showed that painting can help healthcare staff to understand the patients, and patients can retrieve hope and trust, thus improving the healing process. Further, in a piece of artwork, the state of the artist can be ascertained. The objects, colours (such as in paintings by Van Gogh), phenomenon and symbols in the paintings can render insight into the physical and mental condition of the artist (Dahan & Shoenfeld, 2017). The persons on the canvas can also display different diseases, enabling historians to capture the medical problems of long-gone inhabitants in history.
Stillness: Mindfulness, yoga, Qigong

Mindfulness has its roots in Eastern contemplative traditions, and is the heart of, e.g. Buddhist meditation (Shapiro et al., 2006). It is a state of consciousness where one focuses on one’s moment-to-moment experiences, intentionally with openness and non-judgemental awareness. With training, a shift in perspective can occur as a natural step in the developmental process, enabling us to dis-identify from diminishing and controlling thoughts, emotions, and body sensations. This can ultimately lead to emotional balance, wellbeing and health. Mindfulness has been described to increase our “degrees of freedom” and enhance coping skills as well as cognitive, emotional, and behavioural flexibility (Shapiro et al., 2006; Åsberg, 2006). Healthcare personnel have been shown to benefit from a mindfulness-programme, with reduced perceived stress, increased self-compassion, greater satisfaction with life and decreased burnout (Åsberg, 2006; Shapiro et al., 2006). Guided mindfulness can reduce anxiety and increase oxytocin in students, which in turn can facilitate empathy (Bellosta-Batalla et al., 2020). Mindfulness-based stress reduction interventions have been shown to positively affect people suffering from stress, anxiety, and depression symptoms (Juul et al., 2020). Alternations in brain and immune functions may also occur after a short program in mindfulness meditation (Davidson et al., 2003). The therapeutic potential of mindfulness based programs has been extensively researched. The Swedish National Board of Health and Welfare has suggested a mindfulness based approach to prevent for example depressive relapse in adults (Socialstyrelsen, 2021).

Yoga originates from India, with focus on mind and body, has many variations where Ashtanga is a gentle form, and aims to unite the human spirit and the divine (Grensman, 2020). Yoga comprises the physical, mental, emotional, and spiritual parts of the individual. Generally, in the West we usually apply different physical movements and postures, breathing exercises and mental practices like meditation when “doing yoga”. The beneficial effects of yoga can be explained by the way the exercises are performed. Calm breathing facilitates oxygen uptake which is crucial in the metabolism processes and affect the activity of the autonomic nervous system. Especially by prolonged exhalation the parasympathetic nervous system is activated, mitigating the stress response (Magnon et al., 2021; Russo et al., 2017). The gentle movements also increase blood circulation and induce muscle relaxation (Grensman, 2020). Research has shown that yoga can have a positive effect on health in the workplace, especially in reducing stress (Puerto Valencia et al., 2019). Physiological and psychological risk factors for cardiovascular disease can be reduced with yoga, in middle-aged people perceiving moderate to high stress (Daukantaite et al., 2018). An intervention with yoga lowered severity of depression and increased concentration of neuroplastic markers in adults with
major depressive disorder (Tolahunase et al., 2018). Yoga and Qigong are examples of mind-body practices used by healthcare personnel, which have been observed as having beneficial effects on reducing stress (Bischoff et al., 2019). Yoga can also help the healing process for women with complex trauma histories (Rhodes, 2015). The women experienced yoga as enabling a peaceful embodiment, with improved sense of ownership and control over body and thoughts as a result, giving a greater sense of wellbeing and wholeness.

Qigong originates from China, again with focus on body and mind, and applies slow methodical physical movements incorporating breathing, balance, coordination, and mind exercises to enhance health (Griffith et al., 2008). The movements are supposed to stimulate key acupuncture points of meridians and are synchronised with specific breathing patterns. Qigong can affect inflammatory components in the blood, with reduced inflammatory gene expression and intensified anti-inflammatory gene expression after only four days of training (Półrola et al., 2018). Further, Qigong may be one non-pharmacological intervention which can reduce the risk of developing cardiovascular disease (Martin Ruiz et al., 2018). Chronic back pain and functional disability in office workers can decrease after Qigong training for six weeks (Phattharasupharerk et al., 2019).

Self-chosen cultural activities – the senses
Baking, sculpturing with fruit & vegetables and food tasting (chocolate, cheese), why are these activities included in cultural activities? These activities involve the senses of taste, touch, smell and visual inputs. Considering smell and taste, recent research shows that aromatherapy, which is the use of highly concentrated essential oils from aromatic plants, can have beneficial effects on immune functions in both humans, livestock, and fish (Peterfalvi et al., 2019). Consumption of aromatic fresh herbs can also be beneficial for memory and blood sugar levels (Agatonovic-Kustrin et al., 2019). In combination with aromatherapy the effect can be enhanced. Malodours have been shown to elicit emotional and physiological stress related responses (Hirasawa et al., 2019).
One of the reasons to participate in cultural activities may be the notion of improved health and wellbeing. The English word “health” is derived from Old English (hǣlþ) meaning “whole”, as something complete in itself and refers to such things as soundness of body, healing and wellbeing (Oxford English Dictionary, 2021). In Swedish, happiness (lycka) is also included, a word related to being whole (Nationalencyklopedin, 2021a). The concept of health can be discussed and expressed in different ways though it has many dimensions and levels. WHO first declared that health is “a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity” (WHO, 1948). This definition was questioned as being too narrow and an ideal state that may be unobtainable (Hafen, 2016). WHO later revised the health concept to also include coping with the environment (WHO, 1986), “health is seen as a resource for everyday life and not the object of living” and it was argued that there are four groups of health definitions. The first is represented by the WHO definition. The second one states that health is equal to physical and mental fitness to manage socialised daily tasks. The third group deals with health as a commodity that can be commercialised. The fourth group corresponds to theories stating that health is a personal strength or ability (Hafen, 2016). A formulation of health has been proposed to be “the ability to adapt and self-manage” (Huber et al., 2011). Others have found earlier definitions to be inadequate and proposed health to be “a structural, functional and emotional state that is compatible with effective life as an individual and as a member of society” (McCartney et al., 2019). This definition attempts to achieve a shared understanding for researchers, policymakers, and practitioners. Another claim is that there are no positive symptoms of health, just the absence of health impairment. Others claim that positive emotions, like wellbeing, are positive symptoms of health. The discussion continues with modification of Antonovsky’s health metaphor (Antonovsky, 1996), which will be discussed more extensively below, arguing that health is a social construction and “health is a constantly renewed construction, realised by different observers (e.g. individuals or health professionals) and influenced by their cultural context or the time they live in” (Hafen, 2016).

One can also of course discuss the concept of health from a holistic perspective, considering the perceived condition. Or an objective perspective where
medical or sociological methods decide what is sick or healthy. But usually “health” is dichotomized to “disease” and “ill health”. The concept disease is often used in medical literature which reflects the disease focus (Brüssow, 2013). The medical model looks at health through the lens of healthcare, thus medicalising problems and excluding other points of view (Guidotti, 2015), and with focus on providing services and restoring health. The focus of sustainability is to preserve, protect and enhance health. Generally, research usually focuses on risks for disease. The salutogenic theory ‘sense of coherence’ (SOC) introduced by the medical sociologist Aaron Antonovsky, claims that public health should aim at increased salutogenesis, not on diminished pathogenesis. That is, research should also focus on what makes us healthy and not only on what makes us sick (Lindstrom & Eriksson, 2006). Health is dependent on sense of coherence (SOC) and generalised resistance resources (GRRs), i.e., material, ego identity (sense of self/identity) and social support. According to this reasoning health promotion should be a combination of research and development, focusing on multi-disciplinary actions in which equity, participation and empowerment are the core values. Certain ways in which people view their life can have a positive influence on their health, for instance in managing stress (Eriksson & Lindstrom, 2008). Research about exploring the salutogenic relationship between work and health for healthcare staff can have divergent patterns of responses (Bringsén et al., 2012). Some staff associated stability with positive health, and others referred to flexibility.

**Wellbeing**

The concept of subjective wellbeing (SWB) has been argued to include a diversity of phenomena ranging from optimism to work satisfaction (Diener & Chan, 2011). SWB is suggested to influence health and longevity in healthy populations. For instance, there can be a smaller stress response of fibrinogen in happier individuals. It also includes how individuals evaluate or appraise their own lives (Diener et al., 2017). So far, with some degree of certainty one can connect life satisfaction, positive effect, and low negative effect to health. Individuals with high SWB usually perform healthier behaviours. The PERMA model (Seligman, 2018) goes on to suggest that wellbeing consists of Positive emotions, Engagement, Relationships, Meaning and Accomplishment.

**Stress**

When health is discussed, stress as a threat to health almost always follows this discussion. Stress can be adverse circumstances that disturb the normal physiological or psychological functions of an individual, in other words straining bodily organs or mental power (Oxford English Dictionary, 2021),
as well as the adjustments in the body triggered by these strains (Nationalencyklopedin, 2021d). There are several theories/concepts about stress, where some focuses on physical reactions and responses and others focus on psychological reactions and coping. In the medical paradigm Dr Hans Selye has a prominent role in stress medicine. Selye’s theory first defined stress as “the non-specific neuroendocrine response of the body” (Selye, 1956). He further terms the response to stress as the General-Adaption-Syndrome (GAS) and states that diseases of adaptation exist as a response to long-lasting stress (Rochette & Vergely, 2017). However, Selye’s theory fails to address such things as coping mechanisms. Lazarus (Lazarus, 1993), another influential researcher, takes this into account and views stress as a relationship between the individual and his/her environment (Krohne, 2002). Other theories focus on resources to preserve wellbeing in stressful encounters, where social support, sense of coherence and optimism are important constructs (Krohne, 2002). Feminist theories call for attention to accurate appraisal of women’s coping abilities (otherwise usually conceived as less able copers) (Banyard & Graham-Bermann, 1993). The embodied theory of stress (ETS) emphasises that perceived stressful events present physiological activity (Francis, 2018), thus connecting psychological and physiological processes.

Biological aspects of stress

According to the medical stress model, stress is the energy mobilisation of the body, preparing itself for fight or flight (Theorell, 2016). The bodily stress response is orchestrated by the HPA (Hypothalamic Pituitary Adrenocortical) axis. This axis extends from the hypothalamus in the brain to the adrenal cortex. Very briefly, when the HPA axis is triggered, this results in the release of corticosteroids in the blood. This in turn stimulates the release of “fuel” (free fatty acids, carbohydrates) in the blood which is necessary for actions that require energy. When discussing stress, the autonomous nervous system is in focus. It is divided in the sympathetic and parasympathetic nervous system.

Generally, these two systems are involved in these reactions:

<table>
<thead>
<tr>
<th>Sympathetic reactions</th>
<th>Parasympathetic reactions</th>
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<tbody>
<tr>
<td>Dilated pupils</td>
<td>Contraction of the pupils</td>
</tr>
<tr>
<td>Inhibition of saliva secretion</td>
<td>Secretion of saliva</td>
</tr>
<tr>
<td>Increased heartbeat</td>
<td>Decreased heartbeat</td>
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<tr>
<td>Increased blood pressure</td>
<td>Decreased blood pressure</td>
</tr>
<tr>
<td>Widening of the lungs</td>
<td>Contraction of lungs</td>
</tr>
<tr>
<td>Inhibition of digestion</td>
<td>Stimulation of digestion</td>
</tr>
<tr>
<td>Secretion of stress hormones</td>
<td>-</td>
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<tr>
<td>Contraction of urine bladder and anal sphincter</td>
<td>Relaxation of urine bladder and anal sphincter</td>
</tr>
<tr>
<td>Stimuli to orgasm</td>
<td>Stimulation to sexual arousal</td>
</tr>
</tbody>
</table>
These reactions and responses to acute stress make the body prepared to uphold health during a limited amount of time (Lundberg & Wentz, 2004). This was particularly useful for our ancestors, mobilising energy to flee or fight, but today these reactions are less useful in our daily lives. The body may release energy which is not used and therefore wasted. This may contribute to frustration and could increase the risk of development of metabolic syndrome. The metabolic syndrome (MetS) was first defined as the presence of insulin resistance with at least two of the risk factors of obesity, hyperlipidaemia and hypertension being central. The association between MetS and diabetes and cardiovascular disease is strong (Rochlani et al., 2017).

Generally during acute stress, energy to the muscles and brain is prioritised. Hence, the body’s anabolic system (rebuilding) is down prioritised. Stress is not harmful, but long-term stress without the possibility to recover puts a strain on the body. Long-lasting inflammatory reactions with increased activity in proinflammatory cytokines may arise which can result in cardiovascular, psychiatric and other diseases (Theorell, 2016). Stress over a prolonged time can impair the function of the hippocampus (a central area in the brain, pivotal role in for example learning, regulation of emotion and stress), resulting in cognitive impairment and impaired formations of hippocampus-dependent memories due to sleep deprivation (Bartsch & Wulff, 2015; Tsigos et al., 2000). The impairment is particularly alarming since it is during deep sleep that renewal of cells should occur (Theorell, 2000). However, cognitive activation, physical activity, learning and life style factors has been emphasised (Bartsch & Wulff, 2015). An early life exposure to stress, may cause a lifelong sensitivity to stress and stressors, as well as inhibit social interactive behaviours due to an enhanced activity in the HPA axis (Uvnäs-Moberg et al., 2014).

Hypothalamo Pituitary Gonadal axis

However, there exists a balancing “anti-stress system” as well. The Hypothalamo Pituitary Gonadal (HPG) axis, reaching from the hypothalamus to the gonadal glands (female ovaries and male testes). The HPG axis represents the regenerative/anabolic part of metabolism. These two axes (HPA -HPG) balance each other, adjusting their activity. Mostly, when one has high activity the other has low activity and vice versa. As in all systems, balance is needed (Theorell, 2016). The maintenance of the cells in the body – repairing or replacement – is negatively affected by the impact of long-term stress. Muscles, tendons, white blood cells, brain cells etc. all need maintenance. Otherwise they are inhibited to function as they should, resulting in injuries, infections, memory loss and more (Theorell, 2016).
Fig. 2. The brain
The large brain's outer layer consists mainly of nerve cells in a grey colour (the grey matter). Underneath this is a white tissue, the marrow (the white matter), consisting of nerve fibres covered in a white isolation material (myelin). In the centre of the brain, important structures for cognition, memory and stress regulation are situated.

Stress research in medicine
To counteract modern society’s numerous stress-factors which can cause both physiological and psychological problems, musical sounds have been used to prevent and reduce signs and symptoms of stress. The method is labelled “musical neurofeedback”. This is based on the amplitude of the narrow-frequency part of the EEG which has been shown to be significant for the patient and directly transformed into music-like signals (Fedotchev et al., 2017). In another study, the recovery process was examined. Two music conditions (sedative and stimulation) were compared to a non-music control group during an exhaustive cycle ergometer exercise (Karageorghis et al., 2017). Sedative music resulted in the largest decline in affective arousal, especially for women. Hence, sedative music was considered to hasten the recovery after this exercise. One experimental study pointed out that a combination of regularly occurring music interventions including movement could reduce the activation
of genes regulating stress levels (Bittman et al., 2005). Another experimental study showed that assembly of a complex puzzle could induce stress, resulting in genomic expression changes in a variety of molecular pathways (Bittman et al., 2013). Interestingly, recreational music making was shown to be more effective regarding stress reduction in cardiovascular patients, compared to a programme of quiet reading.

Results from another study included monozygotic twins who were “piano-discordant”. This means that one of the twins in each pair had played an instrument or had been singing extensively from childhood to adult years. Results from ECG recordings performed during conversation revealed that the non-playing twin displayed more cardiovascular arousal when he/she talked about why he/she did not become interested in practicing music (Theorell et al., 2018). The nonplaying twin spent more time trying to describe why he/she stopped playing in childhood, compared to the twin who continued playing. This suggests that merely talking about emotionally loaded topics can display measurable signs of arousal/stress.

**Psychosocial aspects of stress**

Psychological management of stress - i.e., coping - from threats or critical events in our life is different for each individual, depending on earlier experiences and genes (Theorell et al., 2005). Coping strategies involve locus of control, corresponding to the individual’s attitude to her/his own possibility to exert control over her/his environment. To have an external locus of control means that the individual expects the environment to solve the problem. Correspondingly an internal locus of control means the individual feels that she/he can solve the problem her/himself. Coping patterns can change after every experience, and studies have shown that these patterns can also be influenced by the environment which in turn can have biological consequences (Theorell et al., 2005). When there is no hope to solve the problem, the individual can react by avoiding the problem. A mal-functioning work environment and avoidance can contribute to psycho-endocrine processes which can lead to disturbed energy regulation and inhibited regeneration in the body (Theorell et al., 2005). Covert coping means that the person does not show the “aggressor” (the person who inflicted this) her/his feelings of being treated unfairly. These suppressed feelings/tensions can result in psychological reactions outside work (at home) or in psychosocial tensions that may induce illness, for instance cardiovascular problems (high blood pressure). In some cases bouts of anger have been shown to precede myocardial infarction onset (Theorell et al., 2005). According to the demand-control model (Karasek et al., 1981) an employee who experiences high demands (high strain) at work and has low decision latitude (control), has an elevated risk of coronary heart disease and premature death. Earlier research has also shown that there is an association
between a stressful work environment and mental strain symptoms such as sleeping problems, depression and exhaustion (Karasek, 1979). Further, uncertainty is argued to be the core of stress (Peters et al., 2017). If we anticipate unexpected outcomes which are unavoidable, we feel uncertain. Hence, the concept of the “selfish brain – where the brain needs extra bodily energy in times of uncertainty (Peters et al., 2017). If the brain experiences deficient energy, in failing to reduce uncertainty, this can contribute to brain and systemic malfunction such as impaired memory and cerebrovascular events. Thus, coping with internal and external environmental changes is important.

Different diagnoses related to stress: burnout, exhaustion

As stated above, long-term stress without adequate recovery can cause illnesses, and in the literature several overlapping constructs, such as burnout and vital exhaustion are used to describe patients with stress-related exhaustion (Melamed et al., 2006). “Burnout” is a generic word which partly overlaps with exhaustion, although these are not synonyms (Åsberg et al., 2010), and burnout can be a precursor to exhaustion syndrome, although that is not always the case. Early research characterised burnout as a feeling of emotional detachment/exhaustion, reduced work productivity and depersonalisation and cynicism. Initially it was stated to be an individual experience, specific to the work context (Maslach et al., 2001). In an overview article with research on stress-related exhaustion disorder (ED) (Grossi et al., 2015), burnout was defined as the chronic drain of individual energy resources due to chronic stress. Three dimensions were identified: physical fatigue, emotional exhaustion, and cognitive weariness. A long-term exposure to an emotionally demanding situation can also cause ED (Grossi et al., 2015). It is common that patients state that they have longstanding fatigue, sleep disturbance and cognitive (memory and concentration) impairment. Poor sleep may be a risk factor for burnout and ED. There are high rates of sick leave in Sweden due to ED and other stress related psychological ill health, especially for women. Alterations in several physiological parameters as well as different somatic disorder have been associated with burnout and other states of fatigue. Research on neurobiological mechanisms indicates that structural endocrinological and neurobiological changes occur that may explain these impairments (Savic et al., 2018). In the International Classification of Diseases, ED is classified as a state of vital exhaustion (Grossi et al., 2015). The Swedish Board of Health and Welfare (Socialstyrelsen, 2003), has introduced ED (F43.8A) into the Swedish version of the 10th revision of the International Classification of Diseases (Socialstyrelsen, 2010).
Clinical burnout has been seen as a unanimous disorder but studies have shown that sub-types exist (Bauernhofer et al., 2018), the exhausted, the exhausted/cynical and the burned-out subtype. These subtypes might represent different developmental stages during the burnout cycle. In this study the patients with the exhausted subtype had milder symptoms and were the least depressed. Those with the burned-out subtype had the highest level of depression. There have been intense discussions about the overlap between depression and burnout. Severe burnout cases may exhibit high depression scores but do not show total overlap with clinical depression. In addition, the burned-out, and the exhausted and cynical subtype had worse recovery balance and worse resources-stress balance than the other subtypes (Bauernhofer et al., 2018). Positive coping and wellbeing are negatively associated with depression and burnout. There can also exist a phenotypic association to the proneness to have physiological flow, i.e., persons who experience flow. This refers to intense focus on the present, a sense of control and a rewarding feeling, and often means experiencing fewer depressive symptoms and less emotional exhaustion. This indicates that flow proneness can have a moderate protective influence on burnout and depression due to a combination of genetics and environmental influences (Mosing et al., 2017). ED is more common among women and accordingly when this health problem affects healthcare staff, it tends to be more of a female than a male problem since there are usually more women working in healthcare. The consequences of burnout can be significant on staff but solutions have been identified and can be launched if political, economic and social institutions prioritised and acted on these problems (Agarwal et al., 2020).
Personality

Alexithymia

Alexithymia (meaning “no words for feelings”) has been a personality trait with poor capacity for symbolic thoughts, weak fantasy, and difficulties in identifying, verbalising and experiencing emotions. There seems to be a lack of capacity for mental representation of emotions. This may be the cause of inability to regulate emotions and affects. This inability may contribute to psychological difficulties and somatic disease (Mattila et al., 2007). Getting in contact with your emotions and body can also affect the cardiovascular system and work. An important discovery from another study showed that long-term decrease in alexithymia can be connected to lowered blood pressure and decreased sick leave (Jorgensen & Houston, 1988). High blood pressure and the stress of being on long-term sick leave may increase the risk for CVD, and since CVD is one of the major risks for premature mortality, counteracting alexithymia is most likely to affect public health positively.

It has been suggested that burnout syndrome is associated with alexithymia due to the range of individual difficulties in coping with stress and dealing with interpersonal social situations. This may partly be mediated by depressive symptoms. Further arguments state that alexithymia may predispose to depression but that the opposite may not be true – that depression predisposes to alexithymia (Mattila et al., 2007). Affect regulation processes have been shown to be important (Ziadni et al., 2017). When it comes to regulation of affects, defence mechanisms (automatic or unconscious and relatively stable) are the cognitive styles of dealing with emotional conflicts or impulses. These mechanisms are considered as a continuum of maturity and adaptation. The use of mature defences like intellectualisation and isolation of affect are associated with better mental health. A high degree of alexithymia has been associated with immature (“primitive”, projection, acting out against self or others) defences and lower ego strength (maturity) and vice versa. Persons with high alexithymia scores have less complex and integrated sense of self and others which may contribute to relationship difficulties. People with a greater capacity for complexity and integration can be aware and regulate their emotions and use more mature, i.e., adaptive defences. As a result, they have less risk of developing depression and experience more psychological wellbeing (Ziadni et al., 2017).
Research with twins associates lower levels of alexithymia with both musical achievement and musical practice (Theorell et al., 2014). Alexithymia and musical training appear to be genetically mediated. Achievement in writing and music, contributed to a low alexithymia score in both men and women. Achievement in visual arts contributed to a low alexithymia score in men and achievement in theatre contributed to a low alexithymia score in women (Lennartsson et al., 2016). In addition, the area in the brain – called corpus callosum, the bridge of white matter holding the brain halves together, has been shown to increase with musical training (Habibi et al., 2018; Steele et al., 2013). This area is of importance for the coordination between muscle functions on the right and left side, and even for emotional capacity/processing and social competence. In a study with monozygotic twins, the playing twin displayed a larger frontal corpus callosum compared to the non-playing twin. This can have implications for alexithymic persons, as participation and/or performing in cultural activities affects the corpus callosum and enhances emotional processing (de Manzano & Ullén, 2018).

**Emotional Competence**

**Emotional intelligence**

The traits of our inner capacity to interact with ourselves and others can be labelled emotional intelligence (EI), emotional skills or emotional competence (EC). These concepts all refer to the ability to identify one’s own feelings and other person’s feelings, express them in a socially acceptable way, understand their causes and consequences, regulate them and use them for enhancing thoughts and actions (Mikolajczak et al., 2015). Emotional competence has been found to be associated with higher job performance and superior academic achievement. For example, a nurse with a high EC is less likely to suffer burnout, compared to a nurse with low EC. EC has also been shown to have a positive impact on cortisol secretion in stressful situations, which in turn can affect inflammation, somatic health states and decrease risky behaviours. Health is directly and indirectly influenced by EC and it can be trained (Mikolajczak et al., 2015).

**Empathy**

To further discuss important traits necessary for human interaction, empathy has a major role since it concerns the capacity to share feelings with others. This is very important, for instance, in patient care. Empathy is considered to be a natural competency, in some theories, to create and maintain the social bonds necessary for surviving, reproducing and maintaining wellbeing
One could also say that empathy is a communication competence in medicine. However, some argue that this may not be sufficient or necessary to guarantee good medicine. Empathy has four components: affective sharing (the capacity to be affectively aroused by the intensity of others’ emotions), empathic understanding (conscious awareness of others’ emotional state), empathic concern (motivation to care for others’ welfare) and cognitive empathy (the ability to imagine what others think/feel). These abilities are processed by various parts of the brain, neural pathways, and neuroendocrine mechanisms. The neuropeptide oxytocin plays a general role in these social interactions by reducing anxiety and stress among other things (Decety & Fotopoulou, 2015; Uvnäs-Moberg, 1998). Furthermore, clinical empathy is an important element in good healthcare as it entails the attempt to understand the patients’ feelings or just communicate their concern in a verbal or non-verbal way. Research has shown that physicians who display a warm and reassuring manner are more effective than those who keep consultations formal, without offering reassurance. Interventions which are mindfulness-based can enhance communication skills, empathy and improve physicians’ emotional stability as well (Decety & Fotopoulou, 2015). Finally, empathy is one important factor for mental and physical health and disease due to its capacity to facilitate treatment effectiveness (Decety & Fotopoulou, 2015).

Compassion

Compassion is a feeling of concern, care and warmth for others and a wish to improve/help others’ wellbeing. Compassion is feeling for, not with, others (Singer & Klimecki, 2014). This distinction can be useful for healthcare staff, to prevent an excessive sharing of suffering which may lead to distress. People who feel compassion may in each situation, more often be helpful than people who suffer from empathic distress (negative feelings, withdrawal). Training (with meditation-related techniques) can influence the capacity to feel for others and activate neural networks usually connected to positive emotions. This in turn can increase positive effects and resilience, which can lead to better coping in stressful situations (Singer & Klimecki, 2014). Improved self-compassion and reduced stress has also been suggested after compassion training via a smartphone application (Andersson et al., 2021).

Humanising

In the pursuit of humanising the patient-client interaction in healthcare, leaving the approach of treating the symptom rather than the person, to more integrative treatment strategies, a whole person perspective represents the main reason for integrating human-centred strategies in healthcare practices in modern healing approaches (Harvey, 2009). Research has identified themes and
key elements of humanising, concerning areas such as relational, organisational and structural, with elements of adequate working conditions, holistic approach and relationship bonding (Busch et al., 2019) In order to improve health and wellbeing among healthcare staff, whole-system recommendations can be applied (Brand et al., 2017) where the staff are involved in the choosing of the activities.

Creativity

Art is considered a product of human creativity (Heilman & Acosta, 2013). When discussing cultural activities or arts, creativity is often connected to accomplishment of great works of art and it has been said that a creative mind is one of the pillars for achieving success and remarkable progress in personal, professional and social life (Khalil et al., 2019). Further, the creative contributions from artists, scientists and others allegedly express the foundations of their culture and provide breakthroughs influencing cultural development and progress, in other words, creativity is needed for human progress (Khalil et al., 2019). Creativity is also dependent on factors such as associative thinking, a balance between spontaneous and controlled processes, neuromodulatory systems (dopaminergic) and mood states. For instance, happiness can activate creativity. Acute and more long-lasting stress can impair creative thinking which in turn may have a negative impact on ideas with high originality (Wang et al., 2019).

The brain is considered to be the origin of creativity, i.e., creativity is “produced” in different parts of the brain (Khalil et al., 2019). A simplified theory of creativity states that creativity depends on the cerebral hemisphere dominance, meaning that creative individuals have less marked hemispheric dominance and vice versa (Demarin et al., 2016). The right hemisphere handles metaphoric thinking, playfulness, solution finding and synthesising. It is also the centre of visualisation, imagination, and conceptualisation. The left hemisphere is needed for balance by partly suppressing creative states of the right hemisphere but also executes a creative process. When it comes to musical perception, both hemispheres are needed for a complete music experience. The frontal cortex is important for rhythm and melody perception. Many cortical areas are activated during music listening, which can explain the impact of listening to music has on emotions, cognitive, motor processes, timing and language (Demarin et al., 2016). Finally, creativity has an important role in healthcare. Using creative learning techniques can boost nurse/student critical thinking and creative problem-solving skills, leading to a lifetime of creative thinking which may have positive outcomes for patients (Drafahl, 2020).
Theoretical considerations

The emotional brain

According to research by the neuroscientist Joseph LeDoux (LeDoux, 1998), “the emotional mind seems to be particularly susceptible to stimuli that its conscious counterpart does not have access to” (p. 61). That is, we can become emotionally affected without knowing why when influences are unaware to us. From this, attitudes can also be activated without awareness. This in turn can influence individuals’ thinking patterns and actions in social situations (p. 62). The emotions can thus be “immune” to reasoning, questioning, and controlling (p. 63). Much of the emotional activity in the brain exists in unconsciousness (p.64). Through our senses the stimuli first reach the thalamus, which serves as an communication centre. From the thalamus the stimuli spread to other parts of the brain and to the amygdala in the forebrain, which is important for emotional behaviour and regulates anxious, depressed and fear reactions. The amygdala triggers reactions and modulates the storage and strength of memories.

LeDoux suggests that emotional learning can be mediated through two pathways: the “low road” and the “high road”. External stimuli (a sound, a sight) reach the amygdala via the fast” low” road (the thalamic road), stimulating emotionally (and physically) motivated actions (e.g., fighting or fleeing). That is, the stimuli “hits” the brain and makes us react. At the same time, the stimuli travel more slowly via the” high” road to the brain’s sensory cortex (the cortical road) where the information is analysed cognitively. “The high road” takes more time compared to the “low road” but gives a more detailed and accurate image of the external world. The thalamic road gives reactions based upon rapidly transferred but crude non-specific pieces of information (p.164-65). Evolution has made our brain especially attentive to unknow sounds and things that resemble dangerous animals, i.e., to detect danger. The cortical road shows up in cognitive analyses and may result in correction of the emotional reactions induced by the emotional brain when this information arrives back in the amygdala. In other words, a stress reaction that has already started without the individual’s awareness could then be slowed down. Interestingly, the opposite could also occur – that the emotional reaction in the more” primitive” parts of the brain alert the cognitive brain, resulting in “surprise effects”.

Other research suggest that the brain is a prediction machine, where incoming sensory inputs are matched with expectations or predictions (Clark, 2013). The brain’s more passive processes are complemented with constantly active hierarchical action-oriented predictive processes. This keeps prediction errors within cortical processing to the minimum. It is also hypothesised that the brain uses past experiences as a guide to multiple simulations with physical action plans, implementing one of them to construct meaning, and also emotions (Barrett, 2017).

Considering the “surprise effects”, these are important reasons why non-verbal art experiences could influence cognitive processes, for instance in rehabilitation (Theorell, 1998). Persons with alexithymia, who lack the ability to describe emotions, can develop psychosomatic problems. The non-verbal therapies like arts-based therapies, can contribute to create connections between bodily reactions and life situations. An arts-based experience can affect us when we are “off-guard”. Something in a picture or a piece of music can awaken associations of earlier experiences. This in turn can open a door to important earlier events and as a result enhance emotional experience, differentiation, and interpretation of feelings, resulting in reduced bodily symptoms. Research has shown that a re-orientation in life can start due to a strong musical experience, a surprise effect that could not have happened in a pure cognitive conversation (Gabrielsson, 2013). This may explain why music therapy, art therapy, psychodrama and dance therapy could add something important to other kinds of therapy (Theorell, 2014). We can be affected by stimuli without analysing them or assembling the stimuli trying to understand “why” and hereby possibly losing part of the experience.

The mirror neuron

“Mirror neurons” are the neurons that become active when observing a meaningful action (i.e. grasping for food) (Rizzolatti et al., 1996). It has been suggested that mirror neurons internally represent an action and play a role in the understanding of motor events. By “understanding”, it means matching the observed action with the motor activity which occurs when the individual performs the same action, and is not a result of the emotions the observed action evokes (Rizzolatti et al., 1996). The sophisticated capacity of the movement analysis by the mirror cells seems to be the basis of the main communication channel in higher primates and humans (Rizzolatti et al., 1996). The mirror neurons discharge both when performing a motor action and observing another person’s actions with a similar goal. This mechanism is suggested to be a basic principle of brain functioning (Rizzolatti & Sinigaglia, 2016). For example, the richer a person’s motor expertise is, the greater the sensitivity of their mirror mechanism to other actions, and the better their ability to identify
what the outcomes of these actions will be. The ability to judge the outcomes of these actions can be improved by practising the action, and this can even be done blindfolded (Rizzolatti & Sinigaglia, 2016). Mirror mechanisms also play a key part in processing, recognising, and understanding the emotions of others. This can be a way of knowing or understanding others, depending on one’s own motor and visceromotor processes and representations. This suggests that the way you experience your own actions and emotions shared by others. For example, experiencing one’s own disgust, observing others disgust and imagining being disgusted, activates a common area in the anterior part of the insula. Similar activations occur when you see someone laughing or displaying mirth (Rizzolatti & Sinigaglia, 2016). Seeing someone dance can activate the same areas for motor actions connected to movement or dancing in the viewer’s brain, thus evoking emotions connected to these dance movements. This in turn enables us to “feel” and experience the dancing, even when not dancing ourselves. This is probably why we can be affected, “moved to tears”, when seeing someone performing a dance of our liking.

Other theories

Embodiment

Our body experiences sensations and receives impressions from the world around us. Discussions about embodiment in the field of sociological theory are varied (Engman, 2019). One influence comes from the French philosopher Michel Foucault (Foucault, 2003) and his discussions about the “medicalised body” and how bodies are subject to the biomedical discourse. Earlier influences derive from another French phenomenological philosopher, Maurice Merleau-Ponty (Merleau-Ponty, 2000), who focused on perception, arguing that the body is our anchorage in the world, providing the position to make autonomous and/or creative decision-making possible. The body is both biological (object) and “lived body” (subject) and is intertwined as body and soul. This approach which sees the human body as mediating the experiences of everyday life is quite different from medical education where the body is often regarded as an object (Kelly et al., 2019). Embodiment theory states that the body is a contested concept, not a fixed material entity. Historical, philosophical, political, and social frames shaped by gender among other things affect the body as well as the concept. The concepts of Merleau-Ponty, e.g. perception, intentionality and embodiment, have much to offer nursing (Thomas, 2005). Learning to listen to patients, through the lenses of their lived experiences in a socio-cultural context, acknowledges the sacredness of the body.
Gender

In healthcare the topic of gender is always current, considering the existing hierarchy and since healthcare workplaces, and indeed the contributors to this thesis, are predominantly women. Gender refers to social, cultural, symbolic and psychological constructions of femininity and masculinity in societies (Östlin et al., 2001, p. 2). The gender system displays the male norm, a hierarchical system where men are considered the standard for what is normal and valid (Östlin, 2001). In gender research, multiple perspectives and theories are included to give research results that are as ‘true’ as possible. The analysing of gender means that power relationships are investigated, and the construction of differences between men and women as well as the process which creates these differences is investigated (Östlin, 2001). Gender research in healthcare has shown that medical diagnosis is not objective or a biological fact due to the layers of existing knowledge and expectations of the physician. A gender perspective considers that men and women have different biological and genetic constitutions, as well as different socio/cultural circumstances (Östlin, 2001). It is important to recognise that gender has a considerable effect on health behaviours, access to healthcare, as well as health system responses (Hawkes & Buse, 2013). In some settings, women use healthcare more than men. Whereas in other settings women have limited access to care due to gender norms restricting their autonomy. Women and girls are almost universally less privileged, less powerful, have fewer opportunities and experience more gendered violence than men. Women suffer more ill health in some settings compared to men, who have a higher burden of disease globally and generally live about 5 years less than women (Theobald et al., 2017; Hawkes & Buse, 2013). Further, gender considerations are scarce or missing in medical research when designing and reporting studies, as well as in education, curricula and training programmes (Rojek & Jenkins, 2016; Miller et al., 2013). It is suggested that all disciplines in healthcare should have a gender perspective in education and training. Action to sustain knowledge and awareness of gender is also recommended to be incorporated in organisations. Embedding sex and gender concepts into medical curricula is stated to be imperative to ensure high quality individualised healthcare (Miller et al., 2013).
Aims

General aim
The aim of this thesis was to explore and illuminate possible associations between various cultural activities and assessments of wellbeing, health, stress and emotions in a didactic setting and healthcare settings for singers, patients, and healthcare staff.

Specific aim paper I
To explore possible associations between a single cultural activity and heart rate variability, selected biochemical markers concerning arousal, wellbeing, emotions, and perceived experiences for professional- and amateur singers.

Specific aim paper II
To explore possible associations between long-term cultural activities and degrees of exhaustion, sense of coherence, alexithymia, and self-rated health for women with symptoms of exhaustion.

Specific aim paper III
To elucidate the experiences of participating in long-term specific cultural activities for women with symptoms of exhaustion, cultural producers and nurse managers.

Specific aim paper IV
To elucidate the experiences of participation in long-term self-chosen cultural activities for healthcare staff.
Methods

This thesis is based on four papers, based on three different populations. The first paper concerns a study in which professional- and amateur singers participated in one individual singing lesson. The second and third papers are based on a study of women with symptoms of exhaustion and cultural producers who participated in different cultural activities, and the fourth paper is based on a study of healthcare staff participating in different self-chosen cultural activities.

Study population

Participants

Paper I

Six singing teachers asked 21 of their professional or amateur singers to participate in the study. The inclusion criteria were age 25-55 years and having attended singing lessons with their specific teacher for at least 6 months. For women an exclusion criterion was on-going pregnancy. Professional singers were defined as a singer who earned > 25% of his/her yearly income from singing. Amateur singers were defined as those who had been attending singing lessons in a non-professional way during their leisure time and did not earn money from singing.

Of the 21 students who were asked to participate, five declined, leaving sixteen students in the study population: eight professional singers (mean age 36.4 years, range 26-49 years, 4 females and 4 males), and eight amateur singers (mean age 40.2 years, range 28-53 years, 6 females and 2 males).

The participating professional singers comprised two full-time opera singers, one radio choir singer and singing teacher, two final year opera singer students, two classical singers and logopaedics and one classical singer and church musician.

The amateur group comprised one bank clerk, one organisation consultant, one computer analyst, one high school teacher, one development consultant, one physiotherapist, one psychologist and one university student.
Paper II
Fifty-five eligible women with symptoms of exhaustion were consecutively asked if they would like to participate by physicians and social workers at four healthcare centres in Stockholm County. To establish the diagnosis of exhaustion, a physician performed a clinical examination that consisted of a thorough examination * and assessment using the Karolinska Exhaustion Disorder Scale (KEDS). The physicians had received the inclusion and exclusion criteria beforehand and interviewed the women according to these criteria. The inclusion criteria were: age > 18, exhaustion symptoms such as severe fatigue, cognitive problems and sleep disturbances and a score > 2 for each separate question on the KEDS. Exclusion criteria were difficulty in speaking and understanding Swedish, alcohol or drug abuse, severe depression, psychiatric borderline diagnosis, and severe somatic diseases (such as serious angina pectoris or stroke). Forty-eight women were included in the study aged between 41-70 years.

*The examinations included: medical history, auscultation of heart and lungs, blood pressure measurement, palpation of stomach and lymph nodes, neurological status, and blood samples (albumin, blood cell count, calcium, glucose, cobalamin, creatinine, and thyroid test as T4 and TSH).

Paper III
Out of 55 eligible women with symptoms of exhaustion and interested in a clinical treatment approach, 22 women were strategically selected and approved to participate in focus group discussions. The six cultural producers from paper II also participated in the interviews: one female musician and PhD student, one male psychologist, one female pianist and performance artist, one female dance therapist and dancer, one female PhD and mindfulness instructor and one female actor. Separate interviews were made with the four female nurse managers at the healthcare centres. The interviews took place at a physiotherapy clinic in Stockholm. A researcher acted as the group leader and started the focus group discussions by means of an open-ended question (how did you experience participation in the cultural activities?). This was asked all participants, who were aged between 41-70 years.

Paper IV
A total of 21 healthcare staff members from three healthcare centres northwest of Stockholm and cultural producers participated after attending self-chosen cultural activities. They were divided into three separate focus group discussions, with seven participants per group. Two female researchers (E.B & E.R) conducted the focus group discussions. The interviews took place at the participant’s ordinary workplaces (healthcare centres). Unit 1 (group 1) consisted of seven physiotherapists with one male and six females. Unit 2 consisted of
three physiotherapists, two occupational therapists, one receptionist and one dietician. All females. Unit 3 consisted of three assistant nurses, two administrative staff, one physician and one line dance instructor. All females. Age was not asked for.

Study design and procedures
Paper I
This study was an empirical intervention study, with an explorative approach.

Inclusion procedure
Singing teachers* selected potential participants (singers) according to the inclusion- and exclusion criteria and a letter with brief information about the study was distributed. Full information was presented by the researcher after contact with the participants and written consent was obtained.

*Nine singing teachers were approached but three declined, leaving six teachers contributing to this study. The reason for declining were lack of time and not having students within the inclusion criteria. One teacher recommended a colleague. The singing teachers had a classical education and they had all been active as licensed singing teachers for at least 5 years. The singing teachers had also been or were still active singers.

Procedure
Before the singing lesson started, an electrocardiogram monitoring equipment (portable ECG recorder, Sherpa 2) was applied on the chest of each participant. This remained on the participant during the whole study session (two hours). Venous blood sampling followed this. Emotions (such as sad or joyful) were assessed by the participants with the use of five visual analogue scales (VAS). Subsequently, the 45-min singing lesson started**.

When the singing lesson was completed, a second VAS was assessed and the semi-structured interview (30 minutes) started, beginning with assessment of demographic information (person identity, medication, education, duration of singing education). After the interview a second blood sample was assessed. All interviews were recorded, transcribed verbatim and analysed according to an illustrative method (Patel & Tebelius, 1987).

**The singing teachers conducted the singing lessons which took place in a studio in the singing teacher’s home, except for three participants whose singing lessons took place at the Royal College of Music (one amateur singer) and the opera college (two professional singers) in Stockholm. Each lesson started
with a “warm up” in the form of breathing exercises and sounding of letters and/or rhymes and singing scales. This was followed by singing songs or melodies. The singing lessons started at different times from 9 a.m. to 7 p.m. However, there were four amateur singers who had lessons at 7 p.m., whereas no professional singer had lessons in the evening.

Paper II

This study was an intervention study with a randomised controlled trial (RCT) design.

Inclusion procedure

Physicians and social workers at four healthcare centres distributed information about the study to women diagnosed with symptoms of exhaustion. The included women gave their written consent to participate in the study. The women were then randomised to the intervention group and the control group. The randomisation process applied a 3:1 (36:12 women) allocation to intervention or control groups. A stratified randomisation by healthcare centre was conducted. Individual envelopes were distributed to the healthcare centres in which the group allocations were revealed. These were blinded to the site staff. Physicians and social workers drew the envelopes in a consecutive order regarding the recruitment of participants at each healthcare centre. The healthcare centres were selected regarding socio-economic diversity and employment status in the area.

Procedure

The study started with the participating women filling out questionnaires with standardised scales*. They performed this individually. After this, the women (in separate groups) participated in “the culture palette” once a week. The culture palette consisted of six different cultural activities** which were presented at each of the four different healthcare centres on two consecutive occasions. A new programme was introduced after two weeks. For three months, each participant was offered 12 cultural programmes or packages. The cultural activities were performed by culture producers. During the monitoring period there was no cultural activity (between month three and month six). After completion of the study, at month three, the participants filled out the standardised scales which they did again at follow-up after six months.

Both intervention and control group received standard care including physiotherapy such as relaxation and physical light training.
The control group
The participants in the control group were monitored with the same methods as the participants in the intervention group in parallel during the entire period at baseline, three and six months while they were receiving standard care.

*Karolinska Exhaustion Disorder Scale (KEDS), Toronto Alexithymia Scale (TAS), Sense of Coherence (SOC) and Self-rated Health (SRH).

** interactive theatre, movie, vocal improvisation and drawing, dance, mindfulness training and musical show.

Paper III
This study had a qualitative study design with focus group discussions and a phenomenological hermeneutic method inspired by Paul Ricoeur (Ricoeur, 1976).

Inclusion procedure
The researcher called all women in alphabetic order from the culture palette and asked if they were interested in participating in a focus group discussion on specific dates. Twenty-two women accepted. The cultural producers and healthcare managers were also invited and accepted participation in the discussions.

Procedure
A total of nine focus group discussions were conducted with women who had participated in the culture palette, the cultural producers, and the managers at each healthcare centre. As a result, there were four focus group discussions with 22 women (with four, five, six and seven participants in the groups respectively), one focus group discussion with six cultural producers and four separate interviews with each one of the four healthcare managers. The discussions lasted for about 40 minutes each.

Semi-structured discussions were performed with the participants (women and cultural producers). There were questions about the expectations and experiences of participation in each of the cultural activities, the experiences of being in the group, the selection of cultural activities, the room where they had had the cultural activities, the contemplation afterwards, as well as the time and frequency of the cultural activities.

The healthcare managers were asked questions about what they thought about the “culture palette” and the cultural producers, research about cultural activ-
ities and exhaustion, resources for conflict handling, taking care of staff, attractive and safe working environment and how much energy was required to institute the “culture palette” at the healthcare centre.

All interviews were recorded and later transcribed verbatim and analysed thematically strictly according to a phenomenological hermeneutic method (Lindseth & Norberg, 2004; Bojner Horwitz et al., 2003a).

**Paper IV**

This study also had a qualitative study design with focus group discussions, applying the phenomenological hermeneutic method inspired by Ricoeur (Ricoeur, 1976).

**Inclusion procedure**

After a course held by researcher EBH at Jakobsberg’s Academic primary healthcare centre about the “culture palette-concept”, recruitment of study participants was made from advertising in the network organised by Jakobsberg’s Academic primary care centre, in the northwest of region of Stockholm County. A total of 35 primary care centres were invited. Three primary care centres agreed to participate with in total 93 healthcare staff. The staff participated in self-chosen cultural activities* for 10 weeks (once a week, 60 minutes per session).

**Procedure**

From these 93 staff, 21 were recruited by the manager and head of each healthcare centre to participate in a total of three focus group discussions (one per group). The cultural producers in charge of the cultural activities in this study also participated. The discussions involved semi-structured questions concerning the staffs’ physical and emotional experiences of the cultural activities, the intervention at their workplace, duration and frequency of the activities, range of activities and their work climate during and after the intervention. The discussions lasted for about 30 minutes each. All interviews were recorded and later transcribed verbatim and analysed thematically strictly according to a phenomenological hermeneutic method (Lindseth & Norberg, 2004; Bojner Horwitz et al., 2003a).

* Qigong, yoga, line-dance, baking, painting with a non-dominant hand, sculpturing with fruit- and vegetables, cheese- and chocolate tasting.
Measurements and study variables

Quantitative measurements

In paper I data were collected from Electrocardiographic recording, VAS, and blood samples.

Heart Rate Variability (HRV)

A portable ECG-recorder, attached to the thorax, was used to capture the Heart Rate Variability (HRV). The balance between sympathetic and parasympathetic influences is reflected by HRV, the fluctuation of instantaneous heart period over time. HRV can be used to display the relations between psychological and physiological processes, which changes with age, disease, physiological conditions and breathing (Schuit et al., 1999; Berntson et al., 1997; Bigger et al., 1992).

HRV was analysed with a fully automated computerized method (Storck et al., 2001). The computer program makes spectral analyses of the variations of the HRV and the relative power of different wavelengths in the variations is determined. Calculations were made of standard measures of total power (Tot-pow), high frequency power (HF-pow), low frequency power (LF-pow) and LF/HF ratio (LF/HF) in HRV. The heart rate shows variations with different cycles mixed with one another. For example, one reflects the respiratory cycle in which the heart rate slows down during expiration and gets faster during inspiration. LF-power can be said to correspond to a mixture of sympathetic and parasympathetic activity in the nervous system and HF-power corresponds mainly to parasympathetic activity only. LF/HF is believed to reflect the relative balance between sympathetic and vagal control (parasympathetic). Tot-power mirrors the total HRV, the summary of all the different rhythms and variations. Reduced HRV may reflect a “scarred” or “ageing” electrical conductance system or a shift in sympathetic or parasympathetic balance to the sympathetic side (Malik et al., 1996). Briefly, one can say that the more total power a heart can display, then the more the heart can adapt its rhythm in a flexible way based on needs, and the healthier the person is (i.e. greater cardio-vascular fitness) (Schuit et al., 1999).

Visual analogue scale (VAS)

The VAS -scales were designed for this study and were intended to reflect different emotional states possibly related to the singing lesson and singing in general. The choice of effects and emotions was derived from discussions in the research group, my own experiences of singing lessons and literature (Gabrielsson, 2013). However, the design is standard and validated for pain for instance (Thong et al., 2018; Wigers, 1996) with horizontal, ungraded and
anchored at both ends by vertical lines labelled in this study with; sad-joyful, anxious-calm, worried-elated, listless-energetic and tense-relaxed.

**Blood samples**

The contents of the blood samples collected were analysed with the intention of measuring and mirroring the different emotions and effects that were hypothesised to occur in conjunction with the singing lesson. Plasma and serum were used.

**Cortisol**

Arousal can be reflected in serum cortisol. Cortisol usually increases in situations demanding energy mobilisation (Theorell, 2000; Frankenhaeuser & Johansson, 1986). There can also be sex differences in cognitive and/or emotional responses to psychological stress, which may influence cortisol secretion (Kirschbaum et al., 1992). Every form of stress, such as fever, injury or psychic strain, which burdens the body will, via activity in the hypothalamus, lead to an increased secretion of cortisol (Dedovic et al., 2009). The main effect of cortisol is to increase the turnover and circulation of glucose in the blood, withhold fluid and natrium salt in the blood, inhibit inflammation and stimulate alertness and arousal in the central nervous system (Theorell, 2011; Theorell, 2000). During normal conditions the cortisol excretion increases during arousal. Long term adaptation to stress on the other hand, can cause damage to the HPA axis and further cell damage. This can be reflected in high cortisol levels meaning depression or low levels of cortisol, in other words, exhaustion syndrome. Extreme stress exposure such as war, can also multiply the cortisol receptors and they become more sensitive. This can result in persons becoming aroused in every day events or experiences from very small levels of cortisol (Theorell, 2011).

**Prolactin**

Serum prolactin, a hormone connected to the stimulation of lactogenesis, is also involved in various brain functions such as cognition, memory, maternal behaviour and neuroprotection against excitotoxicity and neurogenesis (Cabrera-Reyes et al., 2017). Prolactin may be a vital part of neuro-regenerative therapies. However, high concentrations of prolactin can lead to several problems such as impotence and decreased libido in men and amenorrhea and infertility in women (Bonert, 2020). Prolactin also has metabolic effects, is stimulated in general anabolism, and especially in the immune system. Prolactin has an important role in the regulation of blood pressure - high levels can result in high blood pressure, especially in women (Theorell, 2000). Research has shown that prolactin increases in stressful situations characterised by powerlessness (Theorell, 1992). This also reflects the person’s coping attitude in a situation of crisis. High levels can reflect a passive withdrawal of coping and some forms of depression can also be paralleled by high levels of
prolactin. Low levels can reflect an active coping in which a person participates in his/her own therapy/care. In “hopeless” situations stress avoidance increases. High levels of prolactin in a “hopeless” situation can be interpreted as a protective physiological reaction (Theorell, 1992).

**Tumour Necrosis Factor**

Tumour Necrosis Factor (TNF-alfa) is a cytokine, i.e. a hormone-like mediator of information from an area of tissue damage to the liver and brain (Beers & Berkow, 1999). TNF also has a defending role in immune system reactions and a palliative effect on some cancer diseases in pharmacologic dosages. Cytokines react to psychological stress and can be involved in the processes affecting the risks for cardiovascular disease. High levels can reflect strong cardiological stress reactions (Steptoe et al., 2001). Chronic psychological stress can also result in a sustained inflammation process in the peripheral immune system and central nervous system (CNS), common hallmarks and symptoms of depression (Ménard et al., 2017). There are interconnections between stress-sensitive regions of the brain which may induce a chain reaction due to a local chronic neuroimmune response, resulting in stress-related disorders. However, research has shown that women newly diagnosed with breast cancer can benefit from a mindfulness-based stress reduction programme, lowering the levels of circulating TNF-alpha (Witek et al., 2019).

**Oxytocin**

Oxytocin, a neuropeptide produced in the hypothalamus and released from the posterior part of the hypophysis, stimulates birth and breast feeding and tends to strengthen the bond between mother and child (Uvnäs-Moberg, 1998). Oxytocin also promotes sexual and social behaviour. Levels of oxytocin increase during pleasant situations with or without tactile stimuli. Oxytocin is considered to be a “peace- and calm hormone “, contributing to health promoting effects (Uvnäs Möberg et al., 2019; Uvnäs-Moberg, 1998), and may have different effects in the body, both physiologically and endocrinologically. These include lowering blood pressure, promotion of digestion, anabolic effects, lowering of cortisol levels and inducing behavioural calmness. Oxytocin is argued to be a neuromodulator in the brain areas involved in stress-related disorders (Ménard et al., 2017). Oxytocin can evoke empathy and altruism. Further, HPA-axis activation and release of pro-inflammatory cytokines are also reduced by oxytocin and as oxytocin is involved in immune functions, it may promote resilience.

Finally, oxytocin has great diversity in its actions and is an important neurotransmitter in the brain, reaching several important areas in the central nervous system (CSN), exerting some of its actions by modulating the function of other signalling systems. Therefore, oxytocin may induce wellbeing, increase social
interaction, decrease anxiety, decrease stress reactions, and decrease pain sensitivity. The release of oxytocin can give contradictory effects as well, inducing aggressive and powerful protective effects when released by unfamiliar environments and threatening situations (Zhang et al., 2019; Uvnäs-Moberg et al., 2014). Food intake can release oxytocin, due to the activation of sensory nerves from the oral mucosa and gastrointestinal tract and may as a result be overused by some individuals to feel well and relaxed. Further, an individual’s insecure or secure attachment can affect the oxytocinergic system, and oxytocin may be released as the result of a positive human relationship, good sex life and interaction with animals. Pharmacological administration of oxytocin is not recommended in the long run since research in mice has shown down-regulation of oxytocin receptors and impairments in behavioural development (Uvnäs-Moberg et al., 2014). However, ongoing discussions have occurred about oxytocin’s anti-inflammatory and immune-regulation effects for the treatment of covid-19 patients, as this shortens recovery periods and has even been used in treating cardiovascular injuries (Wang & Wang, 2021; Buemann et al., 2020).

**Standardised scales**

In paper II, three different standardised scales, and self-rated health, as well as a self-figure drawing (not reported in this thesis), were used.

**Karolinska Exhaustion Disorder Scale (KEDS)**

KEDS, (Besèr et al., 2014) may be useful in assessing symptoms of Exhaustion Disorder (ED) and consists of nine questions about ability to concentrate, memory, physical stamina or fatigue, mental stamina or endurance, recovery, sleep, sensory impressions or hypersensitivity to sensory input, experience of demands or requirements and irritation & anger. Each KEDS item has seven unipolar response alternatives, ranging from 0-6. The higher the value the more severe the symptoms. The total KEDS score ranges from 0 to 54. Higher scores indicate worse condition or disease and activity or performance. A cut-off score of 19 has been observed separating patients with ED and healthy persons. In this study a mean score of 2 and above per item was considered sufficient to participate in the intervention.

**Toronto Alexithymia Scale (TAS-20)**

TAS-20, (Lumley et al., 2007; Bagby et al., 1994a; Bagby et al., 1994b; Bagby et al., 1988) is a self-report measure of alexithymia, i.e., it estimates the ability to recognise and interpret feelings in oneself and others. TAS contains 20 questions with five response alternatives, with three sub scores; inability to handle emotions due to emotions being poorly recognised (difficulty recognising), inability to describe feelings (difficulty describing), and mismatch between coping and emotions (externally oriented thinking). In this study full-scale score was used, i.e., the summary of the three sub scores. Higher scores
indicate more alexithymic traits. The TAS-20 has been proven to be a valid instrument in assessing alexithymia in earlier research (Borsci et al., 2009; Moriguchi et al., 2006).

**Sense of coherence (SOC)**
SOC, (Antonovsky, 1993; Langius et al., 1992) is a scale consisting of 29 five-facet items on a seven-point semantic differential scale with two anchoring phrases (never or very often). The items concern one’s own perception of meaningfulness (how meaningful one’s life is), and comprehensibility (how comprehensive one’s existence is), manageability (one’s possibilities to influence). SOC is strongly connected to perceived wellbeing and health. Higher scores indicate stronger SOC and is likely to express a better ability to cope with stressful life events. The scores range from 29 to 203 points. The average for healthy persons is about 140 points. A score above 160 indicates that the person has a strong sense of coherence while scores below 120 indicate a week sense of coherence. Points above 190 and below 70 are assumed to be due to misinterpreted instructions or lack of honesty in answering the questions.

**Self-rated health (SRH)**
SRH consist of a single item measure - where the participant indicates his/her estimated health on an ungraded scale or line. SRH has been used in research for a long time and in different areas. It can for instance be a good predictor of increased risk of death for elderly (Mossey & Shapiro, 1982) as well as measure SRH among elderly internet users (Falk Erhag et al., 2019). SRH has also been found to be directly associated with sick-leave and mortality in men and women (Halford, 2010).

Qualitative method and steps of analysis

**Paper I**
In paper I, the semi structured interview was designed to supplement the quantitative data with quotations regarding the experience of the singing lesson, emotions during the singing lesson, and thoughts about singing in general. Accordingly, a qualitative illustrative method was chosen where single quotations were selected, representing the singers’ experiences of the singing lesson, and illuminating the singers’ emotional state related to the aim and results of the study. The illustrative method intends to display descriptions made from the actual structure and content in statements from persons (Patel & Tebelius, 1987). This is not regular qualitative text analysis and interpretation. The researcher uses verbal information to enlighten one or more aspects about the numerical information. The illustrative method aims to preserve two important characteristics in the information: the information’s word-base and half structured form. That is, the interviewed person’s (the informant’s) choice
of words and expressions are equally important as the overall or abstract meaning derived from the answer and must be preserved as far as possible. The half-structured form of the information also implies that the information as a result of the actual collection of information contains several dimensions. There is usually, but not always, some kind of dimension of order as in “first this and then that”, created by the order of the questions or the answers given by the person. Further, the studied phenomenon is assigned different characteristics, i.e., the phenomenon receives designations or descriptions through other features verbalised by the interviewed person.

First, the texts were transcribed verbatim and read through several times to enable seeing the dimension which seems to pervade, while at the same time identify relevant content connected to the research questions.

**Example. Questions.**

“How was it to sing today” and “how did you feel during singing”?

*It was fun. I think it’s always fun to come here (to the singing lesson). I become happy when singing. If I come (to the lesson) feeling low, I become, yes, it lifts/raises/enhances. Very markedly, I think.*

Amateur singer, woman.

*I was rusty. I was rather frustrated today. When I know what I can do and cannot perform that, I become frustrated. This is more technique. I was not affected by the music I did today in that way, rather its quite cold hearted, operationally/work related.*

Professional singer, man.

Continuing the processing of the text can assume an order-dimension, divided in “before”, “during” and “after” the singing lesson. Hereafter the researcher can sort out and keep the designations in terms of feelings, for example “happy” and “frustrated”, which the persons used in their answers. Further, when the original text is arranged from the information’s own structure and word-base, the researcher can make his or her descriptions to illustrate the experience of, in this case, singing. Focus can be on temporal events and/or descriptions of each event itself. To get a better overview of the text, referral to the overall concepts can be made. In this material most experiences would in order be subsumed under “happiness” and “relaxed” for amateur singers. For professional singers most experiences would in order be subsumed under “frustrated” and “analytical”. The final illustrative descriptions the researcher produces can be over the time-order course of events from the overall con-
cepts. Or, depending on the research question, a description of any other variable can be made. However, it is important to retain the text’s word-base, i.e., use the informant’s own descriptions of the event.

**Paper III**

In paper III all the texts were transcribed verbatim and analysed with a phenomenological hermeneutical method. This method is inspired by the French philosopher Paul Ricoeur (Ricoeur, 1976) and emphasises interpretation as a hallmark. The purpose is to illuminate meanings and “lived experiences” (not the individual him/herself) and deepen the understanding of the phenomenon in focus. The findings should be considered as one possible interpretation. Further, the findings can support reflections of situations we have participated in, and this can change our behaviours in situations yet to come. It is suggested that the reader can decide to take the core findings and take them out of the study’s context (to de-contextualise) and later put the core findings in the current context of the reader (re-contextualise). The transfer of a concept can be used in other contexts than that of the study (Henricson, 2012).

The following levels were included in the analyses:

1) The “Naïve Reading” where all the texts from the interviews are read through several times and a short conclusion is made which is called the naïve reading.

2) The” Structure analyses” which consists of the following steps:

   a) A meaning unit, which is a distinguished phrase or assertion from the texts, uncovered with respect to the research question.

   b) A condensation of a meaning unit, which means a concentration of a meaning unit text.

   c) A sub-theme construct, which is comprised of the condensation.

   d) A theme that can be structured and separated from other themes.

3) The complete interpretation is the result of all the above levels. It comprises the naïve reading, the structure analyses, the researcher’s preunderstanding which is based on the research questions (Lindseth & Norberg, 2004; Bojner Horwitz et al., 2003a).

**Paper IV**

In paper IV all the texts were transcribed verbatim and analysed with a phenomenological hermeneutical method with the following levels of analyses
which includes the “naïve reading”, the” structure analyses” and the complete interpretation as previously described (Lindseth & Norberg, 2004; Bojner Horwitz et al., 2003a).

Data analysis
Statistics

**Paper I**

Two-way analysis of variance (ANOVA) was used for variables with normal or close to normal distribution (skewness between -1.0 and 1.0). This was applied to VAS, ECG, and most blood tests. Wilcoxon signed rank paired test was used for other analyses for the calculation of the statistical significance of changes over time. A p-value of <0.05 was considered significant. All tests are two-tailed. With log transformation (natural logarithms), cortisol and oxytocin which were not normally distributed, were normalised. One subject (male professional) was excluded from the calculations due to an extremely high concentration of oxytocin.

The rationale behind analysis of the ECG power frequency of the second (from 5th to 10th minute) examination period was to avoid the influence of the initial disturbance of the application procedure. The ninth (from 40th to 45th minute) examination period was approximately the end of the singing lesson, with singing melodies, not scale exercises, and considered to reflect immediate electro-cardiological and respiratory effects of the singing lesson. The data from the ECG measurements was calculated in the statistical program Statview Graphics using ANOVA, Mann-Whitney U-test and Wilcoxon signed test.

The second blood samples were collected as late as possible in the session since earlier studies had shown that biochemical and endocrinological changes would occur late (Kirschbaum et al., 1992). As few tubes as possible were chosen so that the number of tubes would not discourage the participants. The analyses were performed at the licensed clinical chemical laboratory at the Karolinska hospital, Stockholm. Serum cortisol and serum prolactin were analysed according to time resolved immunofluoric assays (AutoDelfia PerkinElmer Wallac, Turko, Finland) (Hemmilä et al., 1984). Serum TNF-alpha was collected with enzyme linked immunosorbent assays (ELISA) method (eBioscience,Inc. San Diego, USA) and analysed with the instrument Immulite. (Berthier et al., 1999). Serum Oxytocin was analysed by means of enzyme-linked immunosorbent Assay (ELISA, Peninsula laboratories, San Carlos, California, USA). (Leng & Sabatier, 2016). Data were analysed using Statview Graphics.
The second collection of the VAS scales was performed immediately before the interview to minimise possible emotional reactions connected to the discussion regarding the singing lesson, which could otherwise have influenced the VAS scores in an irrelevant way. Data were once again analysed using Statview Graphics.

**Paper II**

Descriptive statistics were used when presenting all data, i.e., mean, and standard deviation for continuous variables and frequency and percentage for categorical variables. Data were further analysed using the Linear Mixed Models, including group (intervention and control) and time (baseline, 3 months, and 6 months) as fixed factors for all main outcome variables. Regarding the KEDS summary score, the primary outcome efficacy end point was mean change from baseline to three and six months. TAS summary scores and SRH, for secondary outcomes measures were used based upon mean change from baseline to three to six months respectively. Correspondingly, the SOC summary score, the mean change from baseline was used. Results were presented as marginal means, i.e., the estimated mean value adjusted for the factors included in the analysis model. All tests were two-tailed and p<0.05 was regarded as statistically significant. IBM SPSS version 22 was used for statistical calculations.
Material

Singing lessons

The singing lessons in paper I usually took place in the home of the singing teacher to maintain as familiar an environment as possible. However, in two cases the singing teachers choose to perform the lesson at the opera school and at the Royal college of music. The lesson lasted for about 45 minutes. Initially, the voice was warmed up with speech exercises, i.e., sounding out letters like R and S or words (in Swedish: va’bra, va’ bra, va’ bra/how good, how good). After this different scale exercises followed with sounding out Swedish vowels (a-o-a-å-a-o-a-å) or (e-i-e-i-e-i-e-i). The lesson continued with different song exercises and singing melodies. If the student had had a song for homework (amateurs), this was worked through. Professionals mostly worked on different passages in melodies that needed extra attention.

The culture palette

A central role in this thesis is “The culture palette”. The included cultural activities were based on research showing that cultural activities can influence/affect multiple levels or areas in humans, i.e., multimodal stimuli. There was also a concern to give justice to the cultural modalities and give employment to cultural producers. The palette consists of a “package” of six cultural activities where every participant participated two times per package or activity. The palette was invented and designed by Prof. E. Bojner Horwitz. The following activities were included:

1. Interactive theatre:
   Poetical lyrics and poems were performed by an experienced female actor to the participants. The actor then initiated and participated in discussions with the participants regarding their experiences, thoughts and emotions evoked by the texts.

2. Movie:
   After showing the movie “Amelie from Montmartre” to the participants, a male film expert initiated discussions about experiences and thoughts evoked by the film with the participants. Due to the length of the film (2 hours and 9
minutes), this session was divided into two sessions. The participants watched half of the film one time and the rest the next time.

3. Vocal improvisation and drawing:
A vocal improvisation session with an experienced female performance artist and pianist was conducted. The participants then painted a picture representing emotions, thoughts and pictures evoked during the improvisation.

4. Exploring Dance:
Improvised dance movements were conducted, guided by a female dance movement pedagogue and music teacher. The room situation staged the movements, and focus was on bodily awareness. The participants then discussed their experience of the dance session.

5. Mindfulness and contemplation:
Mindfulness together with an experienced female mindfulness instructor was practiced with the participants. Contemplation and attention were on breathing and body awareness. Later the participants reflected on thoughts, feelings, images, sensations, and experiences during and after the contemplation.

6. Musical show:
A musical show, called “food desperate” (“matdesperat” in Swedish), where music, singing and dancing were performed by two female actors for the participants. Focus was on food and bodily awareness. Afterwards the participants discussed thoughts regarding the body.

Every session in each one of the six different cultural packages lasted for 90 minutes. Every session ended with a contemplation where reflection was the focus. All sessions took place in the lunchroom at the healthcare centres.

Healthcare centres
The basis of the Swedish healthcare system is primary healthcare. Primary healthcare is outpatient care given without demarcation considering diseases, age, or groups of patients. Primary healthcare is responsible for medical assessment and treatment, nursing, preventive efforts and rehabilitation, not requiring special medical, technical or competence resources (The Swedish Parliament, 2017). The general goal is good health and providing care on equal terms to the whole population. Healthcare is also obligated to prevent illness. It is stated that regions and municipalities shall participate in financing, planning and implementation of clinical and public health research (chap.18) and cooperate with each other and universities.
There were 1148 healthcare centres at the end of 2018 in Sweden (652 public and 496 private contractors) (Sveriges Kommuner och Regioner, 2020).

In paper II and III there were four healthcare centres included. These were selected considering socio-economic diversity and employment status.

In paper IV three healthcare centres participated. They announced their interest after an advertisement in the network organised by Jakobsbergs Academic primary care centre, in the northwest Stockholm. A total of 35 primary care centres were invited. Three accepted to participate in the study.
Ethics

There is no written ethical approval for paper I. The study was made as part of a master thesis for which no ethical approval was necessary. However, the regional research ethics committee at Karolinska Institutet was approached with this matter but they did not find it necessary to apply for ethical approval. Later, when interesting results occurred, we were anxious to publish this in a scientific paper, the ethical committee could not give their approval afterwards. But the study followed the ethical guidelines formulated by the Swedish Research Council for Humanistic and Societal Sciences (Hermerén, 1986) and the regional research ethics committee. This concerned the written agreement for consent, management of data from questionnaires, interviews and biological material, and data files. It should be pointed out that formal ethical approval for studies and publication was less harsh at this time compared to the present day.

For paper II-IV the Regional Research Ethics Committee of Uppsala has approved the study II-IV (Dnr. 2012/359). Individual research ethics factors as protection of anonymity was considered. Informed consent was retrieved from all participants. The participants was offered the possibility of ventilating any problems the cultural activities might have evoked, as emotional reactions, with the researchers and psychiatrist in the research group.
Results in summary of papers

Paper I

**Does singing promote wellbeing?: An empirical study of professional and amateur singers during a singing lesson**


The results from this study were based on sixteen singing students, during one singing lesson: eight professional singers (mean age 36.4 years, range 26-49 years, 4 females and 4 males), and eight amateur singers (mean age 40.2 years, range 28-53 years, 6 females and 2 males). 21 students were asked to participate, five declined.

The participating professional singers comprised two full-time opera singers, one radio choir singer and singing teacher, two final year opera singer students, two classical singers and logopaedics and one classical singer and church musician. The amateur group comprised one bank clerk, one organisation consultant, one computer analyst, one high school teacher, one development consultant, one physiotherapist, one psychologist and one university student.

Heart Rate Variability (HRV) analyses showed significant changes over time in both groups for total power, and low and high frequency power indicating a greater variation in the HRV. However, suggesting greater cardio-physiological fitness for singing among professional singers. Serum TNF-alpha increased for professionals compared to amateur singers. Serum cortisol and prolactin decreased in women and vice versa for men but was not significant for the total singing groups. Plasma oxytocin increased in both groups, amateur and professional singers. VAS scales showed that amateur singers felt more increase in joy and elatedness after the singing lesson, which the professionals did not. Both groups reported increased energy and relaxation. These observations indicate less arousal and more wellbeing for amateur singers compared to professional singers because of the singing lesson. Finally, the interviews showed that amateurs used the singing lesson as a means of self-actualisation and self-expression to release emotional tensions and experience
joy. Professionals generally attended the singing lesson for practicing singing technique with focus on vocal apparatus and were clearly achievement oriented. Implications for public health are discussed.

Paper II

”The culture palette” - a randomised intervention study for women with burnout symptoms in Sweden”
Christina Grape Viding, Walter Osika, Töres Theorell, Jan Kowalski, Johan Hallqvist, Eva Bojner Horwitz British Journal of Medical Practitioners, June 2015, volume 8, Number 2: a813

The results were based on 48 women (mean age 53.8 years, range 41 to 70 years) participating in six different cultural activities, who met the inclusion criteria (36 women, 9 per group) and the control group (12 women). The women participating in the intervention groups, consisting of six cultural activities called “the culture palette” - showed significant improvement in symptoms of exhaustion, alexithymia, and self-rated health, compared to the control group. There was no significant difference in SOC (Sense of Coherence) between the groups. The healthcare staff at the healthcare centres were positively affected as well, although they did not participate in the cultural activities.

Paper III

“You can’t feel healthier than your caregiver” – The ripple effect of trust and empathy for patients and healthcare staff, cultivated through cultural activities
Christina Grape Viding, Walter Osika, Eva Bojner Horwitz
IN MANUSCRIPT

The analysis from the focus group interviews and separate interviews, with the participants in “The Culture Palette”, display three different main categories with the following themes: The cultural palette having an impact on a bodily level (physical, emotional, and cognitive). The cultural palette having an impact on a group level. The cultural palette having an impact on a healthcare system.

The cultural activities seem to have had a holistic impact on the body, the emotions and of memory functions. The participants expressed becoming vulnerable and at the same time taking one’s place. An openness to new interpretations, enhanced memory and trust occurred in the group. The cultural activities also released new emotions that participants had been previously unaware
of. The activities created a specific type of interaction together, that enabled bringing the 'whole person' into the group. This "whole person effect" was also maintained after the group interaction, changing the everyday life. The identification with a group reinforced both trust, courage and curiosity between the participants, producers, and healthcare management. These effects may have also affected non-participants, for example family. The cultural activities enabled reflections about the healthcare system. The activities increased empathy within the healthcare system reflected from the perspective of the management, which made the structure more flexible and open towards changes. This also affected the staff in the healthcare centres. Feelings and behaviours awaked and revealed deeper relations between people, in a confident and empathic way.

Paper IV

**Arts as an ecological method to enhance quality of work experience of healthcare staff: a phenomenological-hermeneutic study**

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Analysis of the focus group discussions, with healthcare staff participating in self-chosen cultural activities, revealed three main categories with the following themes:

- The physiological impact of arts-based activities.
- Arts-based activities as enhancing relationships in the workplace.
- Challenges in implementing arts-based activities in the context of the healthcare system.

The staff experience of the arts-based activities on body, mind and emotions was characterised by feelings of joy and stimulation, of learning a new skill, and feelings of relaxation and “slowing down”, with some suggestions that these effects could be sustained after the activities had stopped. Some participants practiced the cultural activities at home.

The experience of positive social interaction during participation in cultural activities was characterised by a sense of group coherence and pleasurable interactions among participants. Outside the activities, the staff talked about the activities they had experienced, and this created a sense of community through shared experiences and emotions. The laughter, joy and feelings of trust created between staff during activities continued beyond and into the workplace. The importance of doing cultural activities together was expressed.
The cultural activities seemed to somewhat challenge the formal organisation hierarchies between staff and helped them transform the culture of the workplace: the staff became recognised as individuals to a greater extent. Hence, participants felt less obliged to perform what was perceived to be an artificial identity in front of colleagues. The interviews showed there was a greater interaction at different staff levels. However, finding time to participate was recognised as being a challenge in a health care workplace. The participation rate in the arts-based activities varied slightly due to workload and the time of day that the activities took place. One unit had their sessions after work and two had their session in the morning, during work hours. It was expressed that the stress involved in setting up the programme and maintaining motivation to run it was significant. It was also felt by some staff that being “allowed” to participate in activities like this, during working hours, was seen as an excess or a great luxury. Healthcare staff usually have a long tradition of working and are not accustomed to “playing”.
Discussion

Main findings
This thesis aimed at exploring and illuminating possible associations between various cultural activities and assessments of wellbeing, health, stress, exhaustion, and feelings in a didactic setting for singers and in healthcare settings for patients and healthcare staff.

Paper I
The results from the HRV indicated that professional singers showed more cardio-physiological fitness and better technique during singing, compared to amateur singers. They thus possessed a better balance between strain, effort, and recovery, during and after singing. Amateur singers were less vocally trained, had smaller variation of the HRV and inferior control over bodily functions, as expected. Amateur singers seemed to mobilise more effort during singing. Earlier research has shown that the ability to variate HRV indicates a “healthier heart”, potentially preventing cardiac events (McCraty & Shaffer, 2015; Schuit et al., 1999; Task Force of the European Society of Cardiology & The North American Society of Pacing Electrophysiology, 1996; Bigger et al., 1992). Research has shown that reduced brain-heart connection may come with age which may cause gastrointestinal disorders, inflammation and hypertension (McCraty & Shaffer, 2015).

Concentrations of stress hormones can reflect arousal. Here, those in the amateur group who were displeased with their singing performance, according to the interview material, displayed a tendency to have increased cortisol levels. However, the variations in concentrations of stress hormones generally suggested a tendency to increased arousal for professional singers and less arousal for amateur singers. We expected cortisol to be the main indicator for arousal, although oxytocin displayed a general time effect (before and after singing lessons) for the whole group of singing pupils. Research has shown that oxytocin levels can increase after music listening after surgery (Nilsson, 2009) and with improvised singing (Keeler et al., 2015). Recent research suggests that wellbeing, among other things, can be explained by oxytocin (Ito et al.,
Further, there is ongoing research investigating the possibilities of using exogenous oxytocin as a treatment for stress-related disorders (Matsushita et al., 2019), although the administration of this may be difficult.

The emotions and effects measured with the VAS-scales, showed that amateur singers seemed to experience more joy and happiness. As well as well-being compared to the professional singers. Most of the amateurs were happy and content when they came out from the singing lesson. The professionals were generally indifferent or discontent, although there were exceptions. Joy, happiness and wellbeing may be connected to the state of flow (Csikszentmihalyi, 2000). Flow can be experienced when the means or the opportunity to succeed in a difficult task are fulfilled. Flow is a feeling that one’s ability to manage a task is sufficient for the challenge one faces, giving a sense of control, effortless attention, loss of self-awareness, altered experience of time and enjoyment (Csikszentmihalyi, 1990). Joy and happiness are important feelings that may have links to wellbeing and health, and have been highlighted in research (Steptoe, 2019). Although not yet established facts, discussions suggest that affective wellbeing, one construct of happiness, may mean healthier behaviour and lifestyle, and as a result reduce premature mortality. Happiness may also mediate lower stress and metabolic parameters. Implications for public health have been suggested following these outcomes. Further, both groups of singers estimated themselves to be more energetic and relaxed after the singing lesson. The energy they all experienced during and after the singing lesson was distinguishable. The feeling of fatigue at the beginning of the session vanished during the singing session. This form of increased alertness and at the same time tranquillity can also be seen in other activities, for instance in forest bathing (Yau & Loke, 2020).

The interviews showed that professional singers were more focused on the singing technique. They experienced wellbeing and joy when the singing lesson went well, although this was less compared to the amateurs, due to the demands of singing at high technical levels.

“...It is important that you get to feel that you got it and keep doing it for a while. Sometimes I can feel this, that I succeed with something. But the focus changes directly to something else I haven’t succeeded with. And then I become, not directly sad, but frustrated” (Male, professional).

Professional singers are dependent on their singing ability which means that if singing fails or functions less well, this may result in stress reactions and depression, as shown in earlier research (Sandgren, 2002). The singing lesson provides an “external ear”, i.e., someone who can correct errors. However, the ambition to improve his/her singing technique could also be seen in amateur singers. Some amateur singers took singing lessons for vocal training. This
was also as an aid to release emotional tensions, personal development, and relaxation. The singing lesson also provided an interruption from everyday life.

"I can feel that I am totally focused on reading the notes and singing so I cleanse my brain. It is pure recreation for me...And I believe you need this as a human being. To have an activity, really. Focusing on something completely different rather than everything else". (Female, amateur)

Paper II

The results show decreased levels of exhaustion factors (KEDS) in the intervention group compared to the control group. The same pattern could be seen in TAS (total score) with decreased values in the intervention group. SRH also showed improved rating in the intervention group. However, SOC showed no significant difference between the groups. The interpretation of these results suggests that three months of different (multimodal) cultural activities aided the participants in the intervention groups to improve their ability to differentiate feelings and emotions and become more aware of their bodily sensations. One explanation for this can be the complex communication between psychological, neurological, and social components. Cultural activities can impose emotional effects on us, without us knowing why you suddenly start to for example cry when hearing a familiar song or music. The theory of the emotional brain (LeDoux, 1998), explains this as cultural activities having an unconscious “surprise effect” on the cognitive brain. LeDoux discusses the upper or slower and the lower or faster neural pathway in the brain. Visual and auditory stimuli with emotional loading are transmitted via both types of neural pathways. For example, impulses from music can evoke activities in the emotional brain more rapidly than in the cognitive brain. The impulses then spread secondarily from the emotional to the cognitive brain which in turn can trigger the participants’ awareness of different emotions. As a result of this, a process of emotional differentiation can be initiated which may further lead to behavioural change and even a change in life course. The differentiation process can be amplified if participants tried cultural activities, they would not try otherwise. It seems like cultural activities can create “new pathways” by surpassing automated thinking and as a result change behaviour and increase wellbeing. This may have implications for neurodegenerating diseases of the brain. Activities in one part of the brain can have “spill over” effects on other parts of the brain affecting the plasticity, which may for example reduce the severity of Alzheimer’s disease (Sarkamo, 2018; Sarkamo & Sihvonen, 2018). Results from studies with cultural activities including dancing, visiting museums and painting indicate enhanced learning and memory (among other things) due to increased hippocampal volume and white matter integrity (Fancourt & Finn, 2019).
A mix of different cultural activities has been shown to increase the diversity of stimuli affecting a wider network of emotional counterparts in the brain (Teixeira-Machado et al., 2019; Augustinsson, 2011; Grape et al., 2009; Pennebaker, 1997). In this study, trying new cultural stimuli may have helped the participants to connect to different emotions and change non-beneficial habits. This may also explain why these cultural activities may have affected the exhaustion level positively, maybe also learning what gives and takes energy. Our earlier research has shown that cultural activities, such as singing, can give energy (Grape et al., 2003). Stimulating brain and receiving energy in this form may have helped the exhausted women access memory, releasing emotions which may have affected their recovery.

No significant change could be seen in sense of coherence (SOC). This can be explained because changing patterns of thought and behaviour can be exceedingly difficult. In addition, being part of a study, even as a control group, gives attention. Could it be that the control group found a new sense of coherence just by participating in this study? Answering questions about themselves and receiving attention may have affected their life-world as well. Many of the participants also had a fear of socialising and did not go out spontaneously. Some of them described their existence as “black and white” and did not want to change to routines that would make them feel less safe (Grape Viding et al., 2017). Applying “new alternative” treatments (such as arts) for patients with burnout might encounter scepticism in healthcare. To broaden the minds of healthcare staff, cultural activities can potentially affect thinking and emotions with the mirroring effect or emotional contagion. This theory of the mirror neuron (Rizzolatti & Sinigaglia, 2016; Rizzolatti et al., 1996) suggests that when watching someone dance, for example, the areas in the brain which are connected to dancing, also become activated in the person watching, if you are familiar with the intentions of the actions, thus giving wellbeing effects. The cultural activities in this study helped the women with exhaustion symptoms to reduce their level of exhaustion, increase their ability to identify emotions and reveal what made them curious, more creative, and healthier. The study also showed synergetic effects in healthcare organisations, where patients and staff affect each other reciprocally (Grape Viding et al., 2017).

Paper III

The culture palette used six different cultural activities to stimulate the senses according to Downing’s levels of consciousness or perception (Downing, 1997), the verbal-cognitive level (thoughts), the image or visual level (pictures, included sound images, smell, taste impressions), the emotional level (emotional reactions), the sensational level (bodily sensations such as heat and cold) and the motor level (conscious bodily positions and movements). In this study, the participants experienced stimulation of several senses. As earlier
research has shown, multimodal stimulation can have a greater effect on the brain than one single modality at a time, which means that the activity in the brain increases when we stimulate with several cultural modalities (for example auditory and visual) at the same time. Music and pictures together can have a greater response than just pictures alone (Baumgartner et al., 2006).

The analysis of the interviews is summarised in three themes. The culture palette had a positive impact on the participants: the level of the body, the level of the group and the level of the healthcare system. It is important to acknowledge that burnout can have invasive effects on the cognitive systems, emotions and memory after an extensive time of exhaustion or burnout (Golkar et al., 2014). Participation in cultural activities can counteract this impairment and have “surprise” effects (LeDoux, 1998). This experience can be discerned in the text, participants suddenly start to remember codes and phone numbers, especially after the dance. The importance of the cultural producer’s own contribution, their commitment and ability to engage and inspire change in participants, is also highlighted in the text.

“The dancer. She was one with the movements. I have never been close to a person with this body language. I got to take part of her, and my memory came back. It was magical”.

The effects of cultural activities on various functions of the brain can be explained by previous research. Dancing can induce structural changes in the brain, improving neuroplasticity and enhancing memory (Teixeira-Machado et al., 2019). Likewise, dance activity can enhance dancers’ awareness of emotional processing and ability to interpret the emotions of others, compared to non-dancers (Bojner Horwitz et al., 2015b). This suggests that when the body is activated by the dance, an activation of the brain can occur. Hence, activation of body can give more access to our memory. Further, it has been shown that dancing can create a stress free atmosphere and empower young women (Duberg et al., 2016). In addition, dance or body movements have been shown to resolve cognitive blockages such as writers’ block (Bojner Horwitz et al., 2013). This suggests that cultural activities may have a beneficial impact, not only at a personal level, but could also beneficially affect neurodegenerating diseases such as Alzheimer’s (Sarkamo & Sihvonen, 2018).

Coming together through cultural activities in a group had great value for the participants in this study. The activities created a sense of belonging and equal value among the participants. One explanation for this can be that similarities can be clarified through play and enable feelings of security, trust, empathy and community (Winnicott, 1971). According to Winnicott, playing is therapy and as such enables participants to interact with each other. The text analysis shows that the patient’s role gained different meaning, and tolerance emerged.
In addition, reflections on the meaningfulness of these unconditional meetings occurred after meeting other patients during these cultural activities.

The interviews also showed an interesting side effect. The healthcare staff and management were indirectly positively affected by the culture palette. As previously discussed, the mirroring effect can be responsible for this, when passively interacting with cultural activities (Rizzolatti & Sinigaglia, 2016; Rizzolatti et al., 1996). As seen before, it seems possible that “wellbeing effects” can emerge from merely watching dance or theatre (Bojner Horwitz et al., 2010). In this study, the staff became curious, joyful and had new thoughts.

“The healthcare management have become aware of how culture can be used as a learning process and for future education for caregivers “.

Learning processes can be enhanced when using multimodal stimulations from art. Involving different kinds of cultural producers in this can give the variety of stimuli needed since people prefer different kinds of art, although it is important to remember that there is no universal activity to everyone’s liking. In this study some participants found the voice package to be vexing. The most popular packages were theatre and dance. In addition, introspective processing about culturally shaped social knowledge can be important for arts and education. This can be crucial for the development of social and moral systems, and time, and focusing on one thing has been argued to be important for inducing and experiencing emotions of the psychological situations of others (Immordino-Yang et al., 2009). A greater picture emerges when reflecting on the implications cultural activities can have in a micro and macro perspective. The complete interpretation suggests a new knowledge, incorporating sustainability for both individual and health care organisation. Earlier discussions (Robèrt et al., 1997) argued for a strategic plan to build a sustainable healthcare system. In a sustainable society one of the key ingredients is trust (Missimer et al., 2016a), and as seen in this study the group dynamic is important for trust to emerge.

” You trust each other despite the fact that we don’t know each other, don’t need to know where they come from, trust”.

Building a sustainable healthcare with viable working groups that prevent burnout both for patients and staff is required. The perspective must go beyond cost effectiveness, as generally emerges within healthcare systems. Focus should be on staff experiences and needs. The Covid-19 pandemic should have made it clear to everyone that healthcare is not a “machine” managing endless quantities of patients. Healthcare is based on humans, working at the best of their ability.
In this study, the culture palette affected the management at the healthcare centres, which made them open to change, reflective and self-aware of their mental and physical health. This may have several implications. If managers are willing to recognise the many potentially positive effects of cultural activities and incorporate these activities at the healthcare centres, improved resilience to stressors may be the outcome for the staff. This is an important issue to come to terms with since burnout and sick leave are common and increasing problems in healthcare (Agarwal et al., 2020; Försäkringskassan [Swedish Social Insurance Agency], 2020, 2016). Individuals who experience impaired health cannot provide optimal care to patients (due to loss of empathy, memory loss and more). “How can you be able to take care of patients if you can’t take care of yourself.” This may further impact on patient security. The employer has the obligation to follow work environment laws to counteract this.

In this study we saw that several patients with burnout went back to work after three months of completing the palette. How do we know that they would not have gone back to work anyway, within the same period? The result from this study shows that participating in the palette gave them more than time alone could have done, to help them recover after burnout. In addition, results from the SLOSH study (Theorell et al., 2013) show that cultural activities at work can buffer against development of burnout and depressive states two years later. Cultural activities in and around the workplace have been shown to give synergies for workers’ health (Theorell et al., 2013). The activities do not have to be active, also passive consumption of culture can affect our buffer against burnout (Bojner Horwitz, 2011).

Work environment and health are mainly comprised of how you get along with one another (Daniels et al., 2017; Aronsson et al., 2017; Theorell et al., 2013; Theorell, 2011). If cultural activities gain admittance in healthcare on a regular basis, they can enable conditions for new meetings behind professional roles. The work environment also often has very “good” conditions for burnout with a lack of resources, lack of control and heavy workload (Theorell, 2019; Theorell et al., 2015; SBU, 2014; Åsberg et al., 2010). The difficulties (funding, policy etc.) of implementing complex interventions, such as arts, is recognized but should not be succumbed to. The results of this study underscore the importance of seeing the healthcare system “as a whole”, where healthcare staff and patients affect and mirror each other. When we as researchers begin to calculate the long-term potential profit for society of cultural activities for healthcare personnel, we notice that several work employers become positive and interested in implementing palettes in their workplace, and positive emotions matter.
Paper IV

The aim of this study was to elucidate, in a holistic way, self-chosen recreational cultural activities at healthcare centres with healthcare staff. Focus was on how these activities could help to alleviate stress when different senses were engaged. The focus was also on fun, rather than on stress. A so-called ecological approach was taken to the data. That is, in what way the effects of the activities could go beyond the individual to the social and organisational contexts.

In this study, the text analysis showed three themes: the physiological impact of arts-based activities, arts-based activities enhancing relationships in the workplace, and challenges in implementing arts-based activities in the context of the health care system. Concerning the physiological impact, including body, mind, and emotions, once again, we can see the beneficial effects participation in cultural activities can display. Emotional benefits such as joy, vitality and relaxation were experienced, thus enhancing health through a sense of slowing down and being in the “here and now”. “Quickly wind down and achieve an inner calmness”. The findings in this study are similar to research previously discussed in this thesis. This shows that cultural activities reduce stress, improve mood and may facilitate the creation of new neurological pathways between emotional and cognitive areas of the brain (Duberg et al., 2020; Clift & Camic, 2016; Bojner Horwitz, 2011; Baumgartner et al., 2006; LeDoux, 1998). Improved effects seem to stem from the multimodality of arts-based activities (Pennebaker, 2017; Bell & Robbins, 2007). In this study the concept of cultural activities was expanded to include activities such as qigong, yoga, sculpturing with vegetables, chocolate/cheese tasting, baking and line dancing. These activities are not specifically designed to reduce stress. Instead, the state of “flow” can once more be applied here (Csikszentmihalyi, 1990), since arts-based activities can offer the “ingredients” of flow: an integration of relaxation, pleasure, and learning emerging from an alert, mindful state of concentration.

Social relationships were improved at the workplaces due to the cultural activities. The explanation for this can be that the shared experience of the activities created an opportunity for the staff to see each other as individuals, not professionals. “Became an individual and not a labelled professional”. This is important to remember since working in healthcare you wear a “uniform”, which makes everyone look alike. This may obstruct the possibility for coworkers to be seen as individuals. The work itself also does not give room for much individuality either. This implies that you can work a lifetime with your colleagues, not actually knowing the whole person. Seeing a different side to your colleagues can give surprising results. In this study the formal hierarchical relations broke down and the work environment was humanised. The
dynamic shifted in staff interactions when emotions and behaviours that would not normally have been seen (like playfulness, joy or vitality) were brought into the workplace.

”...You do something together for fun. Laughing together and joking, not talking work. Instead, just releasing work talk so to say. As equals. As individuals without the label of work colleagues and profession”.

This shift of focus changed the atmosphere at the workplace. These emotions and behaviours are not completely absent otherwise, but normally to a much lesser extent and sometimes not at all. Healthcare professionals follow a degree of formal structure to perform effectively to fulfil their results-oriented roles. Sometimes this is warranted for. But another consideration can be nurses “breaking the rules” to provide good care. A common problem in rigid healthcare organisations, is that this indirectly “forces” healthcare staff and patients to compensate for flaws in the organisation, thus unintentionally concealing the problems (Strandas et al., 2019). Organisations such as healthcare are usually hierarchical and inflexible, making involvement from “outside” and change hard (Forss et al., 2021). Working through challenges, where an organisation collaborates with other actors involving citizens, can promote health work. Empowering citizens can also make interventions more sustainable. Arts-based activities can affect organisation’ work culture and climate in non-challenging and non-judgmental ways. The chains of command need not be challenged directly, and thus no “threat” is posed. The activities may have an impact on another level, creating social change. The transformative role of art is well documented (Huss & Samson, 2018; Foster, 2007; Butler, 2001).

As with previous studies, this study had significant challenges in implementing the arts-based activities. Finding a way to set up and run the programme required time and energy from staff. The existing hierarchy, work focus, and results-oriented culture of healthcare, as well as habituated patterns of stress behaviour are probably reasons for this. The work environment in healthcare is affected by distressed patients, lack of time and constant reduction in public funds which can result in overwork (Strandas et al., 2019; Grant & Kinman, 2014). Further, the arts-based activities are usually regarded as “fun” and “play” and this may be perceived as less significant and deemed not serious. It seems like the beneficial effects of arts-based activities have not yet gained legitimacy in healthcare. Otherwise, the implementation of these activities would not have caused difficulties in creating space for them with regard to time and energy. There is also a general standard in healthcare of not expecting anything for free from the employer. “Luxury receiving this (cultural activities) on worktime....”.

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General discussion

The cultural activities included in this thesis showed beneficial effects for individuals, groups, and managers in healthcare organisations. Performing and engaging in cultural activities at an amateur level seemed to have more pronounced benefits for wellbeing and joy compared to engaging on a professional level, although the professional singers had more cardio-physiological fitness. The positive impact cultural activities can have on group coherence and exhaustion symptoms were also shown. The activities contributed to empower the women, giving them tools to handle their exhaustion. The cultural activities also displayed a “contagion-effect” to the work climate and organisation. The staff, who did not participate in the activities, became curious and wanted to participate. Healthcare staff who participated in self-chosen arts-based activities experienced a “surprise-effect” and stress reducing effects of the activities. A positive impact on work climate and work role emerged, where the climate seemed to be more “humanised”, seeing the person behind the professional role. However, implementing arts-based activities within a healthcare organisation can be challenging. Organisational hierarchy, lack of time and the burden of being responsible for the activities seem to be main issues. The activities also need to be sanctioned by the management and incorporated during ordinary work hours to be successful. The activities must be optional, not mandatory, to retain the curiosity and desire to explore these activities.

Cultural activities can evoke different feelings. For instance, positive emotions. It has been argued that positive emotions are linked to activity engagement, making individuals approach and explore new situations, persons or objects (Fredrickson, 2004). Fredrickson’s broaden-and-build theory states that positive emotions can make people “broaden their momentary thought-action repertoire and build their enduring personal resources”. Following this theory, joy may create an urge to play, expand the limits of thinking or ideas, and be creative. Positive emotions can broaden habitual modes of thinking or acting through cycles of playing, exploring, or savouring and integration. Broadened mindsets may also have adaptive benefits, building sustainable personal resources, from physical and social, to intellectual and psychological. One example of what a broadening on the cognitive level can mediate at the physical level is: negative emotions or states can induce physical reactivity, leading to negative cardio-vascular effects. Positive emotions can undo or speed recovery from these negative effects. Positive emotions can also render flexibility and psychological resilience to adversity and increase the likelihood of future experiences of feeling good which in turn may result in longer lives. However, there have been discussions that mortality per se may not have a clear linkage to happiness or unhappiness (Liu et al., 2016), although the subject of health
and happiness have the magnitude of importance of being discussed in World Happiness Reports, connecting this to sustainability (Helliwell et al., 2021).

One important direction this thesis took was towards the notion of sustainability. The objective of sustainability is, regardless of area, to design entities (buildings, society, organisations etc.) for indefinite continuance. This ensures future generations do not have to pay for our exploitation of physical and social resources. Our health and prosperity depend on nature’s capacity to balance waste and resources which a sustainable society acknowledges and aims at (Robèrt et al., 1997). However, it is not only the physical environment that is important. For a society to be socially sustainable, people need to be involved and able to work together. In other words, individual humans are dependent on the ecological and social systems to meet their own needs (Missimer et al., 2016b, 2016a). The concept of sustainability concerns the basic conditions that are necessary for social and ecological systems to prevent degeneration.

Five aspects have been identified as necessary for the adaptive capacity and sustainability of social systems; diversity - leads to more variety in knowledge and strategies for resilient solutions to problems, learning- learning from past and present to adapt to different situations, self-organisation - no need for centralised control, small organisations/individuals can organise themselves and then act quickly in response to sudden changes, trust - the main variable in social capital which binds society together and allows for collective adaptation to constant change, and finally common meaning - social capital, the purpose and meaning individuals use to make sense of their experience (Missimer et al., 2016a). The cultural activities in this thesis offered a possibility to create trust and trust is argued to be a key for healthy social systems (Missimer et al., 2016b). In addition, if a person feels significant, competent, and liked in a group, the level of trust is high. Hence, the group performs well in stressful situations. Rules and norms are designed by public institutions, and this governs individual behaviour, thus fostering trust or mistrust in a society. As a consequence, a concrete expression of that would be respect for the individual to uphold health at all levels; physically, mentally and emotionally (Missimer et al., 2016b). In a socially sustainable society, people are not held back from gaining or maintaining health. The cultivation of empathy, to gain insight in another person’s situation or life, is also a vital part of a socially sustainable society (Missimer et al., 2016b).

Humour is also an important part of health, and it has been shown that watching a comedy can render mirthful laughter which can have a beneficial impact on vascular function such as vasodilatation and arterial stiffness (Sugawara et al., 2010). In paper IV the participants laughed and enjoyed their time together, thus benefitting from all the health benefits these positive emotions
can bring. Following this reasoning if more people started to engage in cultural activities this could have implications for public health. Worldwide, the most common cause of death is cardiovascular disease (CVD) (Townsend et al., 2016). If, for instance, regular singing can improve cardiological fitness this activity may have implications for CVD treatment. Also, if HRV can be optimised, the brain-heart connection with regulatory capacity of physiological system in the body may be strengthened or enhanced. Considering the professional-amateur approach of singing, performing focused singing regularly on a more amateur level may have positive effects on wellbeing, joy, and health. Earlier, we have shown that regular singing may also have beneficial effects for patients with functional bowel problems. The results from “Cardias” (“magmunnarna”) showed effects in IBS-patients after participating in choir singing or discussions. Choir singers showed a positive development for pain, saliva testosterone and plasma fibrinogen (Grape et al., 2010; Grape et al., 2009). This may indicate a “regeneration” process and reduced stress. These effects (testosterone) may have further implications for preventing or enhancing resilience against conditions associated with physiological and psychosocial strain, such as exhaustion.

The women suffering from exhaustion, who participated in the culture palette, seemed to experience an awakening or “revitalisation” effect from the cultural activities (paper II+ III). The palette triggered, in the participants, a new consciousness about health awareness. In the individual (bodily) meeting with the cultural activities, feelings and behaviours emerged that would not otherwise arise in the participants. The palette lifted a healthy link between one’s own body and the group where new unprejudiced meetings occurred. In the unprejudiced space or room you can become someone more than your symptoms. A new kind of visibility of oneself emerges behind different defences, where you dare to show yourself and at the same time can be in your vulnerability. The palette created a link between the individual (person) and the group. This also affected the staff in the healthcare centres. Feelings and behaviours awakened and revealed deeper relations between people, in a confident and empathic way. This may also bring a social change element into the culture palette activity that goes beyond individual and group level, to a community level. The activities encouraged reflections about the healthcare system. The activities increased empathy within the healthcare system regarding the management. This can make the structure more flexible and open towards change. If culture activities would be part of everyday working life, the staff could more easily participate regularly, and a circle of reciprocity might emerge.

Today many patients are dissatisfied with the narrow paradigm predominant in primary healthcare and desire a more holistic and psychosomatic approach to their problems and it has been argued that an ethics profile needs to be applied to evidence-based medicine (Nordemar et al., 2008; Carlsson &
Falkenberg, 2007), thus including a stronger emphasis on clinical experience traded in good deeds. Exploring the effects of cultural activities can provide knowledge about interventions aiming at meeting these needs for a more holistic healthcare.

Implementing cultural activities, for both patients and staff, in healthcare and establishing this in a sustainable way – is this possible? The ground for working towards sustainability is already at hand in a framework for strategic sustainable development. Healthcare management and organisations need to cooperate, educate, and coordinate efforts to promote preventive healthcare factors, such as arts, and distribute to the whole caregiving system (Broman & Robèrt, 2017). Cultural activities can evoke positive emotions, important for health and the foundation for empathy and trust which are key ingredients in sustainability (Missimer et al., 2016b, 2016a; Missimer et al., 2010; Robèrt, 2000). Thus, in strategically building a sustainable healthcare, arts-based activities can contribute beneficially. Remembering that small details matter, i.e., “fun” and “play” may have a great transformative power.

It should be empathized that when implementing interventions at workplaces, thought must be given to the employees, involving them in the decision-making process of an intervention, to gain success (De Angelis et al., 2020). If employees can influence and shape an intervention, then they are more likely to participate (Nielsen et al., 2007). Good quality intervention is considered an important factor when evaluating the effectiveness of an intervention. Any evaluation of intervention quality during an intervention should also consider views on sustainability, and the impact of the intervention.

The importance of arts has prevailed in this thesis. One of the reasons for this is also to counteract the budget decisions of governments and schools cutting down arts funding. This may affect the ability for a society’s success in economic development (LaMore et al., 2013). It is suggested that having skills in arts and crafts may have important consequences for a country’s ability to produce innovative scientists and engineers who invent patentable products and found new companies.

Learning new skills thru arts can be rewarding. In educating healthcare staff such as nurses, educators can have a prominent role. Using creative learning techniques may boost students critical thinking as well as creative problem-solving skills. Burnout in the nursing faculty affects creativity negatively when motivation and engagement in the workplace decrease. Student engagement declines which negatively affects the development of a creative foundation in nursing students. A creative foundation can lead to a lifetime of creative thinking which may render positive outcomes for patients (Drafahl, 2020). An important ingredient in care is compassion, and nurses should be equipped
with this skill (Adam & Taylor, 2014). Mindful nurse education can empower students to become compassionate nurses. This skill is important to remember later, studying or working as a nurse, when compassion fatigue can occur (Shahar et al., 2019; Sabo, 2011). This in turn can affect nurse wellbeing, quality of care and lead to nurses leaving the workplace.

Participating in cultural activities can prevent staff sickness and this may also further provide better care for patients. These activities are also usually less costly and more accessible than other stress-reduction interventions. The implementation of whole-system healthy workplace interventions to improve health and wellbeing for healthcare staff can be rewarding (Brand et al., 2017). Caring for others is a hallmark in health care, but equally important is caring for yourself. For this, expressive arts-interventions can be useful in reducing psychosocial stress among healthcare staff (Phillips & Becker, 2019). The healthcare sector is not the only sector to benefit from cultural activities. As discussed earlier, the positive effects in the workplace and for employees in a company have been presented from a leadership programme with arts (Theorell, 2016; Romanowska et al., 2011).

It has not only been Covid-19 that has affected human lives substantially over the last few years. The earth has also been exposed to stress. Environmental changes such as draughts and floods have been severe, and it has been suggested that our senses have become numbed by technology, and an over-stimulating environment (van Boeckel, 2009). Although some technological programs can improve empathic consultation skills, patient surveys point towards a dissatisfaction when technology replaces valued face-to-face interactions (Pealing et al., 2018). Numbness has been suggested as moving us further away from nature, thus putting humans in a climate crisis. Arts-based activities can reverse the numbness and encourage us to be involved in the solutions needed to create sustainable societies (Galafassi et al., 2018). Arts-based practices can support participants’ imaginative and learning potential, building trust and sense of purpose. This empowers participants to shape a better future. Thus, a collaboration between scientists and artists is important.

Finally, in healthcare institutions a vast number of different people pass through. These are not only staff and patients, but relatives, care takers, food distributors etc. These all affect one another in some way. It is important to recognise that healthcare, hospitals, and primary healthcare centres etc. are not anonymous “machines”, but “eco-systems” depending on the individuals working and visiting there under the conditions given by decision makers and individuals (i.e., you). The results from the included studies may offer new knowledge about cultural activities and health and may open pathways between medical sciences and humanities.
Strengths

This thesis contributes to the body of research concerning arts-based activities with a medical perspective. The humanities and medicine can cross-fertilize each other, and science and arts need not to be opposed to one another (Chinn, 1994). Different study populations and a qualitative and quantitative approach was applied to give a broad comprehension of the results. This is in line with earlier calls for multimodal research methods (Clift & Camic, 2016) and building bridges between different actors in society contributing to healthcare (Carlsson & Falkenberg, 2007). Previous discussions have highlighted that this type of research is needed due to the increasing amount of work taking place with art and that public costs should be justified by evidence concerning the beneficial health effects of arts participation, and art-based public health interventions (Clift & Camic, 2016). Qualitative methods can be used when we want to explore a research problem which needs a complex and detailed understanding. When the researcher wants to understand the participants’ setting or context, and write in a literary and flexible style, a qualitative method is also appropriate. This method generally follows the patterns of scientific research and takes time. The researcher’s pre-understanding is acknowledged. Qualitative methods encounter questions about validity and evaluation. Creswell (Creswell, 2007) states that there are several perspectives concerning qualitative validation. Validation can be an attempt to assess the accuracy of the findings. The strategies for validation include several steps, such as peer review, member checking and rich, thick descriptions. Further, there are several concepts in validating the results, such as credibility, authenticity and more. However, what concept is used is less important compared to conveying the credibility of the finding or account (Creswell & Miller, 2000). It is suggested that validity procedures go beyond specific procedures and instead acknowledge the paradigm assumptions of the researchers and “lens” employed in the study.

In addition, in discussing further the implications cultural activities can have, not only for individuals, but for groups and organisations, this thesis displays the significant impact arts can have on the level of public health and sustainability. After over 30 years of working in healthcare, I have authentic knowledge and experience of the healthcare organisation and the conditions patients and staff must abide and work under.
That is; working inside the system can probably ease the action to change the system, knowing where to put the efforts.

The strength of study I is, to my knowledge, the uniqueness of the study and it has been cited many times. Indeed, the finding of the oxytocin pattern was surprising and commendable.

Study II is also a unique study with an RCT design. The culture palette has not been performed before. This study has contributed to more palettes, art programmes and books in Sweden (see the Culture Health Box/ “Kulturhälsoboxen”).

Study III and IV has illuminated the possibilities arts-based activities can have for individuals, groups, and healthcare organisations. The study also displays the difficulties in implementing these activities. The importance of viewing healthcare as a whole system., where staff, patients and others affect each other was highlighted.
Limitations

Study I

The results are to be considered tentative since the number of participants was small. A larger number of participants would have been preferable. However, the sampling of tests and the time available for each singing teacher and their pupils are probable obstacles. It is also possible that the results could have been affected by the different singing teachers. They were all different in character, although all had classical training, so this may not be of major concern. In addition, this study was completed many years ago and some statistical calculations may have been completed with logarithms. However, more recent recalculations still showed that the results presented are statistically significant.

The music genre in this study is Western classical singing. There are many other singing genres and styles which may have given similar results, but this is only a speculation.

Another variable which may have affected the results was the time of day that the study was conducted. However, this was taken into consideration in the statistical calculations. The time between blood sampling and freezing was also noted. The blood samples were never left more than 4 hours until freezing by the laboratory personnel. During our discussions about study design, we discussed if emotions such as joy could be measured and seen in thrombocytes or other blood cells. One can always discuss if the instruments, samples and analysis procedures are too crude and imprecise to capture the effects aimed for. This is being discussed by other researchers, who also have new equipment in progress (Ito et al., 2019).

The semi structured interview may also have affected the psycho physiological results. But we deemed that the questions involved were not of a psychologically sensitive character. The questions concerned “how was it to sing today”, “how did it feel to sing today” and “what meaning has singing in your life”. Also, the attention the students got from the researcher may have affected the physiological and psychological results. The long time in rest could have affected the HRV and the stress markers in blood. But at this time, avail-
able research showed that cortisol may display changes in the plasma concentration after about 30 minutes (Kirschbaum et al., 1992). Most of the professional singers as well as most men did show increased cortisol levels (arousal) after the singing lesson. There were more women in the group of amateur singers, but the main effect for gender was non-significant (T =0.41). However, there was a significant gender/before-after interaction effect for both cortisol and prolactin. Interestingly, the female participants showed less proof of endocrinological arousal compared to the male participants after the singing lesson. A speculation is that the men mobilised more energy (cortisol) and felt more powerless (prolactin) in connection to the singing lesson, than the females did. Gender differences in, for instance, cortisol may occur, but there are references (Kirschbaum et al., 1992) indicating that any clinical relevance of gender differences is relatively unknown in humans. It is not likely that treatment with oestrogen has affect cortisol concentrations in this study. However, patients with major depressive disorder can exhibit gender differences in serum cortisol (Matsuzaka et al., 2013). None of the singers displayed this disorder. Further, the age difference between the groups is unlikely to explain the results since this was not significant either. This is also the case comparing the age difference between women and men which is non-significant (p=0.09).

At the time of this study, HRV/ECG-recording was more invasive than it is today. For those who remember the portable music machine freestyle, this was the size and weight of the recorder. Two of the pupils felt discomfort wearing the ECG-device. Singing students were also aware of the presence of the researcher outside the room where the singing lesson took place. However, all but one participant had been informed about the study design in advance.

When considering the sample of professional singers, half of them also worked for example as a voice coach. They were thus not full-time singers. However, to engage a larger sample of professional singers working 100% as singers turned out to be unfeasible. The possibility also exists that some amateur singers were in between the groups due to their advanced singing technique. But again, the assessment by the singing teacher was the primary tool for grouping and was not questioned.

Concerning dropouts, all engaged singers participated. Except for one professional singer who cancelled right before the booked study session due to illness. Another singing pupil was able to fill the vacant spot. But the results from this student may not be representative since no time to prepare mentally and receive information about the study in advance was given. Maybe this is why this singer had a somewhat dismissive attitude. Interestingly, this male singer had very high levels of oxytocin after the singing lesson and was later excluded from the statistical calculations. The researcher later contacted him and urged him to make an appointment with his GP for further examination of
the high levels of oxytocin. Finally, we did not have a control group in this study. It would have been interesting to compare singing students with, for example, discussion or forest bathing. However, this was a small study for my master’s thesis and was not doable.

Study II
The study was limited to women with exhaustion symptoms and therefore further research on implementation of cultural activities within different groups of participants and genders is needed before we can generalise the results to other groups of participants. Further, this study involved only indoor activities. We did not compare these activities with outside activities, such as walking in nature.

Study III
The focus group interviews may have inhibited the participants to express themselves freely. However, if this was the case the individual scoring of the scales should have indicated this, which they did not. The atmosphere in the group was open, and they knew each other rather well after participation in the interventions. Everyone was encouraged to express themselves freely. The researchers were keen on everyone expressing themselves. Could there be more, or different experiences expressed if having separate interviews with each one of the women? Of this we do not know. However, this was not possible at this moment.

Study IV
Again, one can wonder if the participants were inhibited by each other to express themselves freely? They all knew each other and did not seem to mind the group as such. There were also two researchers and some of the staff (who had the role of cultural producers) in the focus group interviews. One consideration could be that the participants may have expressed only what the researcher or cultural producer wanted to hear. But this is not considered likely since there seemed to be a conducive climate during the interviews. Also, the interviews focused on the cultural activities and not the organisation itself.

One of the groups did not get the possibility of choosing the arts-based activities. This decision was made by the management of the healthcare centre. This was not the intention of the researchers. The staff were displeased and
would very much have liked to have had the possibility to choose among different arts-based activities. The reason for the management to make this choice is unclear, but it seems like they thought it was “more fitting” for physiotherapists to engage in Qigong. The physiotherapists appreciated the activity, but it was clear that they missed the opportunity to engage in the other cultural activities as well.
Concluding remarks

The results of this thesis suggest that the included cultural activities had effects on the participants, physically, psychologically, on the work environment and management. The assessments for joy, exhaustion, alexithymia, self-rated health, and stress were beneficial. There were difficulties in implementing the cultural intervention at the healthcare centres. Organisational hierarchy, lack of time and stress were probable causes for this. However, positive ripple effects could be seen in staff and management at the healthcare centres. Further, the study results also suggest that cultural activities have the potential for sustainability. The importance of creating a sustainable work environment for healthcare staff should be clear to the public and decision makers. The Covid-19 pandemic should have been an “eye opener”. Generally speaking, poor staff conditions have “spill-over” effects on patients. Preventing staff from becoming patients due to burnout, for example, can surely be considered a good economy, and something a sustainable healthcare will incorporate.

The importance of improving the infrastructure of workplaces has been stressed before. This could mean providing protective material, implementing resilience training programmes, and addressing the vulnerability for mental health problems and illness (Giorgi et al., 2020). During lockdown, many workplaces were almost empty when people worked at home which some prefer, and others do not. Social isolation affects us differently - some individuals are comfortable being alone and others may experience loneliness, anxiety leading to physical illness (Banerjee & Rai, 2020). A preparedness of transforming loneliness to solitude may be a way forward during pandemics like this. Solitude contains tranquillity and peace which may give birth to great works of literature, philosophy, and arts. Also, the importance of recovery at work has recently been discussed and can be performed with little effort (Ejlertsson, 2021). Activities which include variation, reflection and strong social relationships are highlighted as important for recovery. These can be some of the outcomes from cultural activities.

Finally, during this severe crisis with the Covid-19 pandemic, loss of life, loss of jobs and limited social life and personal sphere, have forced new habits into our lives. Digital solutions to participate in cultural activities have emerged,
creating opportunities for isolated, old, and impaired citizens. Cultural activities can promote diversity, trust, and joy. All necessary ingredients for a sustainable society. My ambition is that this thesis will inspire and continue the dissemination of knowledge – and foremost - action - in this area of research to stimulate a more salutogenic and sustainable healthcare. Healthcare consists of people and people have feelings. Feelings can affect biology and vice versa. As shown in this thesis, cultural activities can have effects from feelings to biology.
This research journey began several years ago. Since then, many things have evolved. In a previous study I searched for patients at large hospitals and was met with ridicule from some physicians. Interest in society in cultural activities is now increasing. I believe that changing attitudes towards the use of cultural activities in healthcare should begin in medical training, because it is here that many attitudes and traditions are founded. Courses in cultural activities and health should be integrated in educational programmes for nurses, doctors, and every other person caring for patients. An interesting observation is that many physicians and other healthcare workers sing, play an instrument and paint in their spare time.

By researching about cultural activities, I have reflected on the possible wider implications of their implementation. If cultural activities can be implemented on a regular basis in society’s different arenas, can this lead to more labour, making more individuals able to work and eventually improve the GDP? Can cultural activities generally lower sick leave rates? Can cultural activities make us work more effectively, as a result from more creativeness? Will fewer conflicts between humans emerge, since arts can make us open to new solutions or ideas, and enhance acceptance of differences and create possibilities to meet unconditionally, where trust can emerge? Can a more dynamic and sustainable society evolve through arts? Cultural activities can make us more “inclusive”, i.e., more prone to accepting other fellow human beings. Stress usually makes us “exclusive, not seeing other fellow humans as equals. I am suggesting action through the knowledge of the beneficial effects of arts – to a more extended and regular use in a sector that has a great need for this – healthcare.

“art is not something that stands in opposition to science; it is part of science—indeed, it is part of all human experience” (Chinn, 1994).
Future Directions and considerations

Literature from medical science calls for larger studies and preferably with an RCT design when aiming for “unquestionable proof” of cultural activities’ effects on health and usefulness in healthcare. This can be considered an adequate design to follow. However, this is not always possible. Other options for research models may also be called for. Different paradigms have different approaches and can inspire each other with new thoughts and solutions for research. When researching about the effects from cultural activities, do we have the right instruments or equipment? Or are there more discoveries yet to be found when more substances and new instruments are discovered? Further, as recent researchers point out, the right words, phrases, sentences and concepts must be used when conducting, for example, a survey (Tymoszuk et al., 2021). Differences in definitions of culture and arts and inconsistent analytical approaches can render inconsistent representations, and thus produce “false” results.

Regarding gender, women made up most participants in this thesis. There were five female singing teachers and one male singing teacher. They were all trained classical singers, but it is possible that their gender affected their teaching. It is also possible that a singing session can be experienced differently with a male teacher and a female student, and vice versa. We cannot be sure whether a same gender session would be more (or less) “relaxed”. Further, what gender did the physician have, setting the diagnosis for the women with exhaustion symptoms? Are male physicians more prone to give female patients the diagnosis of exhaustion? Finally, the manager at the healthcare centres were all females. Are females more open to apply or engage in arts-based activities?

Another concern is the duration of studies with cultural activities. We have seen in research that short term interventions can have effects. But how long do these effects last? There are only a few long-term studies, but as our own study shows, the number of dropouts can be large. Keeping motivation high to participate can be a challenge (Grape et al., 2010; Grape et al., 2009). How do we motivate study subjects to remain in the study for over a year? Usually there is not enough funding to spend on the subjects in the form of bus passes,
loss of salary etc. to make it attractive for the subject to come to the intervention place. One way to overcome this may be digital solutions. Many digital solutions have emerged during this pandemic, allowing cultural activities to come into our homes. We can therefore launch long term studies in people’s homes or workplaces and in so doing “bypass” difficulties in attendance. During the pandemic, singing from a balcony, as recently seen in Italy, seemed to help against loneliness and increase a sense of cohesion when using singing as a coping strategy during lock down (Corvo & De Caro, 2020). Museums can have digital exhibitions; concerts can be performed digitally, and people can meet digitally to sing or dance, to mention just a few examples, and more solutions to enjoy arts are sure to be invented as time goes by. The significant influence that the media can have on individuals (Salimpoor et al., 2015; Salimpoor et al., 2011) is also important to consider when using music in rituals, marketing, or film to manipulate hedonic states. How about, social interaction? Generally, we are social creatures, needing social interaction. Can this be overcome with a digital interaction with cultural activities? There are both benefits and disadvantages with digital solutions. Digital technology can affect the brain and behaviour (Hohe & Thibaut, 2020). My hypothesis is that, as always, there must be a balance.

Following the results/discussions in this thesis, cultural activities may have the means to make the healthcare organisation more open to changes. Cultural activities can provide a “playground” of unpretentiousness were trust and empathy can emerge, which are key ingredients in a sustainable society or organisation. We have the knowledge to launch opportunities for a sustainable healthcare organisation, caring for staff and patients. This work calls for a much higher priority. As we have seen, exhaustion among healthcare staff is high and the costs in terms of personal suffering and economic loss for society and individuals are too high and need to be counteracted as far as possible. Cultural activities may help prevent exhaustion. Generally, healthcare staff are under time and demand pressure, with no control to ease this. There is no time to “play”. We saw in paper IV - only three primary healthcare centres participated out of the many who were invited. It can be hard work to change the healthcare system. But preventing staff from becoming patients due to burnout should be prioritised.

Another troublesome development is the diminished space for aesthetics in the teacher training programme (Bojner Horwitz et al., 2015a) p 180. Music training and singing are not prioritised. To have access to one’s voice early in life can be essential for development of personality, social community and may later amplify public health. Internationally large funds have been assigned to schools for music interventions. Sweden would do well in prioritisation funding to cultural activities.
Incorporating cultural activities with surgery has not been the focus of this thesis but could be interesting to consider in the future. In the original plan for this thesis a “surgical palette” was planned. Patients who had been operated for colon cancer were intended to participate in dancing, singing, and panting after surgery. However, there were few patients undergoing cancer surgery during this period at this hospital and the study was never conducted. This could be interesting to study considering recovery after surgery in the future.

During this pandemic many cultural producers lost their income due to cancelled performances. A readiness for taking care of our cultural producers, should be at hand since we may likely experience situations like this again during our lifetime. Creating opportunities for cultural activities to come out of their ordinary arenas and into healthcare, should be made possible on regular basis. There exists “play therapy” or special care therapy at hospitals working with children and their families in managing the hospital visit and homecoming. These therapists are usually a preschool teacher or special educator or pedagogue. There are also clowns and musicians who come to hospitals about two times per week. The clowns come from the initiative of the “cultural hospital”, which has its base in some cities in Sweden. These encounters seem to be very much appreciated by the children and their parents. Could this be applicable to adults? Seeing someone playing and dancing can activate the same neurons in the spectator’s brain. This in turn may affect the plasticity of the brain and make our mind more vivid. I hypothesise that this may enhance resilience to the stress of being ill and being a patient. Hence, cultural producers may have a natural place in our future healthcare.
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Kulturella aktiviteter och hälsa. Perspektiv från sångare, patienter och hälso- och sjukvårdspersonal. Från känslor till biologi.

Kulturella aktiviteter har funnits med mänskligheten sedan urminnes tider. Aktiviteterna har fungerat som ”kraftgivare”, där jakt- och helande föremål ”laddades” med goda egenskaper för sina ändamål samt fungerat som en man-hållande länk i samhällsbygget. Forskning idag visar att kultur kan ge signifikanta fysiologiska och psykologiska välgerande effekter för människors hälsa vilket därmed kan stimulera arbetsklimatet. Implikationer för hälsa och ohälsa kommer att diskuteras i denna avhandling.


Resultaten i studie I baseras på tvåvägs variansanalys (ANOVA), och icke-parametrisk statistik, och visade på ökat välfårenande och glädje hos amatör-sångare. Som förväntat upptäckte professionella sångare bättre hjärtfysiologisk lämplighet för sång. Båda grupperna upplevde mer energi och avslappning efter sånglektionen.
Resultaten i studie II baseras på linjär mixed models och visar minskade symtom på utmattning, minskad grad av alexitymi och ökad självlivskottad hälsa i jämförelse med kontrollgruppen. Dock upprivas ingen signifikant skillnad i känsla av sammanhang (KASAM).

Studie III beskriver upplevelserna av deltagande i kulturpaletten för patienter, kulturproduccenter och vårdcentralchefer. Analysen visar på tre olika teman där kulturpaletten hade effekt på kroppsvis nivå, gruppnivå och indirekt på cheferna/hälso- och sjukvårdssystemets organisation.

Studie IV beskriver hur hälso- och sjukvårdpersonal på tre vårdcentraler upplevde deltagande i självvalda kulturella aktiviteter. Analysen visar på tre teman där kulturaktiviteterna hade en positiv påverkan på en fysisk/psykisk nivå samt förbättring av relationerna på arbetsplatsen genom att ”humanisera” arbetsklimatet och eliminera hierarkier. Utmaningar i att införa kulturella aktiviteter i hälso- och sjukvårdssystemets diskuteras också.

De kulturella aktiviteter som är inkluderade i dessa studier visar på välgörande effekter för hälsa hos individer och grupper, likaså påverkades även hälso- och sjukvårdsorganisationen. Snällämningen kunde ge hälsofrämjande effekter för sångare. Deltagande i kulturella aktiviteter tillsammans i grupp verkar kunna minska utmattningssymptom samt skapa tillit och empati hos utmattade kvinnor. Aktiviteterna bidrog till att ge kvinnorna verktyg till att hantera sin utmattninggrad. De kulturella aktiviteterna hade också en välgörande ”spridningseffekt” på sjukvårspersonalen som inte deltog i aktiviteterna, där nystående och en önskan att vilja delta väcktes, även fast lunchrummet som användes för aktiviteterna troligen inte var en optimal plats att vara i. Hälso- och sjukvårdspersonalen som själva fick välja kulturaktiviteter upplevde att arbetsklimatet blev mer humaniserat, där personen bakom den professionella rollen kunde träda fram. SVårigheter med genomförandet av interventionen i en hälso- och sjukvårdsorganisation belystes där brist på tid och överbörden av ansvar för aktiviteterna var troliga bakomliga orsaker. Vidare påföretades att i en hälso- och sjukvårdsorganisation måste aktiviteterna sanktioneras av ledningen och ingå i ordinarie arbetsid för att kunna fungera och genomföras framgångsrikt. Det framkom även att aktiviteterna måste få vara frivilliga och inte obligatoriska.

De multimodala komponenter som är integrerade i kulturella aktiviteter upprivas möjligheter till att främja hälsa och välbevisning. I arbetet med att motverka sjukdomar uppkomna pga. av stress kan kulturaktiviteter ges större plats. Detta torde vara relevant för hälso- och sjukvårdsorganisationer där utbrändhet är ett välkänt problem. Kulturella aktiviteter kan även generera flertalet effekter såsom lärande och tillit, vilket är bärande element för utveckling.

Nyckelord: fokusgrupper, glädje, hälsa, hälso- och sjukvårdspersonal, kultur, kulturella aktiviteter, kvinnor, stress, sångare, utmattning, välbefinnande.
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Appendix

“Cardias” – Magmunnarna

This study was financed by the Swedish Research council (Vetenskapsrådet). Rationale: the study was called “Cardias” or “Magmunnarna” in Swedish. The study was conducted to examine the potential biological effects of starting to sing in a choir once a week for a year. The study was confined to participants with irritable bowel syndrome (IBS). The participants were randomised to either a choir singing or to a discussion group during spring 2006 to autumn 2007 (Grape et al., 2010; Grape et al., 2009). The aim was to explore whether choir singing could benefit IBS subjects, who had not been singing in a choir (at least not for many years), physiologically and psychologically. This was compared to the experience of lectures and discussions regarding IBS symptoms and their behavioural management.

Recruitment: in an attempt to find suitable participants, we arranged meetings with physicians at major hospitals in Stockholm. These meetings did not result in any patient recruitments. However, after an advertisement in a local newspaper and in the patient union bulletin, over one hundred patients announced interest. To later verify the diagnosis IBS, all participants had consulted physicians who had diagnosed IBS. Fifty-five patients were eligible for randomization. The age range was 28 to 66.

Proceedings: at the start there were 25 women and three men in the choir group, and 23 women and four men in the discussion group. We started with sessions or meetings once per week, lasting for one hour. Each group had a professional leader: one music teacher or therapist (RW) led the choir group and one information group leader (PF) trained by the patients’ union led the discussion or study group. As expected, participation decreased during the first sessions in both groups. But later 13 participants came to the choir singing and 14 in the discussion group. Hence, a meeting was set up with the group leaders and the participants. After this the schedule was changed to sessions of 1.5 hours per week and a coffee break. In the discussion group the frequency of meetings was changed to three times per month. However, there were some problems with further dropouts, especially after the summer break. The reason for dropouts was the different expectations and demands the participants had on the choir leader, group leader, the principal investigator and
themselves as well. Also, some participants felt that the demands in the singing exercises were too high whereas others considered the demands to be too low. In the discussion group some participants did not want to involve themselves – they took a more passive role and wanted to be served information with no active part in the discussions. Other participants considered their lives to be too stressful and reported this to be a reason for not coming to the meetings or sessions. And five persons experienced divorce, sickness, and death of a close relative. The meetings venue was not ideal in relation to public transportation. Some participants therefore wanted economic compensation for traveling. However, the study budget did not allow this. One participant considered it to be depressing to be with other IBS patients. Another participant experienced that the exercises for relaxation were stressful. He also disliked the fact that he was the only male in the choir singing group. Three participants believed the principal investigator was too “invisible” and that she should have been at the meetings every time. They expressed a “need to be seen”. Also, IBS-problems (diarrhoea, pain, nausea etc.) severely affected their possibilities and strength to come to these meetings. However, most participants expressed an appreciation and comfort in coming to a group of persons with similar problems.

After about five-six months the presence in both groups was stable, with about ten participants per group, and the group dynamic evolved. The choir singing group may have considered their experience as too shallow, “just singing and no talking” compared to the discussion and study group where the participants started to reflect on their situation. But the study group may have needed to have more fun, with choir singing.

Results: the groups were followed regarding symptom development and general energy mobilisation, as well as regenerative and anabolic indicators. Saliva testosterone increased in the choir singing group, up to 6 months. In the choir singing group 10 subjects had increased levels, one had decreased and one unchanged levels. In the discussion and information group there were smaller changes, two had increased levels, and eight had decreased levels. There were also differences between men and women. The blood samples showed a significant increase in fibrinogen in the discussion group. Also, an increase in VEGF (Vascular endothelial growth factor) and fibrinogen could be seen in both groups (total). Motilin tended to decrease in the choir group compared to the discussion group who tended to increase. Gastrointestinal pain tended to decrease in the choir group. We interpreted the results as choir singing may have stimulated regeneration and anabolism, albeit not throughout the whole study year for this group of participants. But the choir singers still had higher levels of testosterone compared to the discussion group.
The observation on saliva testosterone changes were not accepted for publication in a complete article although they were published as a short communication. We suspect that one reason for the rejection of it as a full-scale article may have been that reviewers were unhappy with the disappeared significance during the second half-year. This might be interpreted as a case of publication bias since the one-year finding for saliva testosterone was negative - journals unfortunately tend to be more willing to give full attention to “positive” findings than to “negative” ones. This could also apply to the second publication application.
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