

**Master thesis for the Attainment of the Degree Master of  
Science at the TUM School of Management  
at Technische Universität München**

**Can we reduce stress to increase happiness? - A Research  
Study of a Course on Stress Reduction and Resilience Building**



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## **Abstract**

Dealing with stress is an increasingly important issue in today's society. Studies show that stress levels have increased sharply over the years, regardless of gender, age or educational groups. Therefore, it is important to know the causes of stress, optimize stress management, and build long-term resilience. There is already a growing range of online courses available for this purpose. This thesis therefore deals with the evaluation of such a stress prevention online course. For this purpose, a sample of 48 course participants and 52 participants of a control group were studied. Using MANOVAS and paired T-tests of independent samples, significant differences between pre and post levels of stress, stress management and resilience of the course participants were observed. Finally, a correlation between experienced stress and happiness was further shown. Thus, the general effectiveness of the online course for dealing with stress could be demonstrated.

**Keywords:** Stress, Stress Level, Stress Management, Resilience, Happiness, Online Prevention Course

## **Zusammenfassung**

Der Umgang mit Stress ist ein immer wichtiger werdendes Thema in der heutigen Gesellschaft. Studien zeigen, dass das Stresslevel über die Jahre hinweg stark ansteigt, unabhängig von Geschlecht, Alter oder Bildungsgruppen. Deshalb ist es wichtig, die Ursachen von Stress zu erkennen, das Stressmanagement zu optimieren und langfristige Resilienz zu generieren. Dafür existiert bereits ein immer größer werdendes Angebot an Online-Kursen. Diese Arbeit beschäftigt sich deshalb mit der Evaluation eines solchen Online-Kurses zum Umgang mit Stress. Zu diesem Zweck wurde eine Stichprobe von 48 Kursteilnehmern und 52 Teilnehmern einer Kontrollgruppe untersucht. Mit Hilfe von MANOVAS und gepaarten T-Tests unabhängiger Stichproben konnten signifikante Unterschiede bei dem Stresslevel, Stressmanagement und der Resilienz der Kursteilnehmer nachgewiesen werden. Abschließend wurde weitergehend ein Zusammenhang zwischen erlebtem Stress und Glücklich-Sein nachgewiesen. Somit konnte die allgemeine Wirksamkeit des Online-Kurses zum Umgang mit Stress nachgewiesen werden.

**Schlagwörter:** Stress, Stresslevel, Stressmanagement, Resilienz, Glücklich-Sein, Online-Präventionskurse

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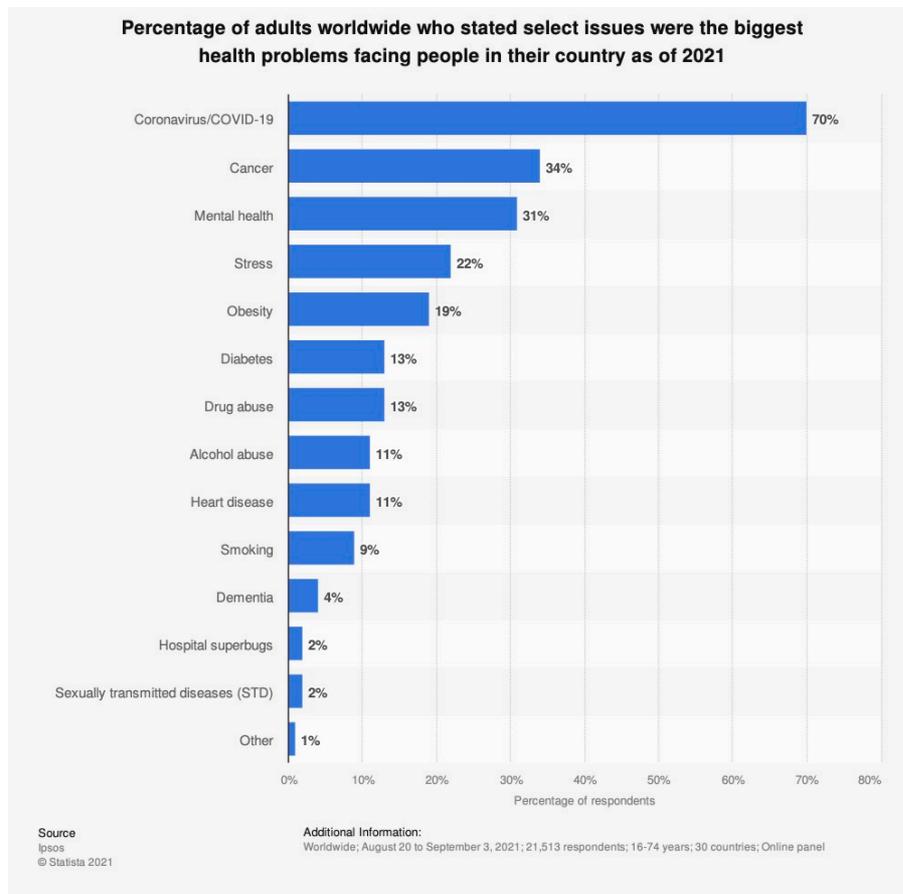
### **List of Abbreviations**

GAS	General Adaptation Syndrome
GKV	Verbände der gesetzlichen Krankenkassen
ISBF	Inventory for assessment of stress management skills
MANOVA	Multivariate Analysis of Variance
MOCS	Measure of Current Status
PSS	Perceived Stress Scale
RS	Resilience Scale
SCI	Stress- and Coping Inventar
ZPP	Zentrale Prüfstelle Prävention
ZPS	zentor Purpose Score

# 1 Introduction

"Stress" is a topic that has received rising public interest for many years and affects everyone. For many people, serious changes in living and working conditions lead to an increase in chronic stress levels. Among other things, this has an increasing impact on mental health, as well as on companies and public employers: the results are stress-related performance losses and health impairments. More and more people are also realizing that the way they live and shape their private and professional lives under the given economic, social, and cultural conditions has a serious impact on their physical and mental health. Scientists are also becoming increasingly concerned with the connection between socioemotional stress experiences and mental and physical health (Kaluza, 2018).

A global study by Statista (2021) shows that in 2021 the biggest health problem by far was the coronavirus, followed by cancer and then already in third and fourth place among the biggest health problems mental health and stress (see Figure 1). This illustrates the enormous importance of stress in today's society.



*Figure 1: Biggest health problems worldwide 2021 (Statista, 2021)*

A study conducted by Techniker Krankenkasse (2021) in Germany also concludes that stress levels have grown significantly in recent years. Whereas in 2013 one in five people was frequently stressed, by 2021 this figure had risen to more than a quarter of Germans. According to the study, the Germans' high stress levels are due to their work, the high demands they place on themselves, and illnesses among close relatives (especially in the context of the covid19 pandemic). This is followed by conflicts in private life, constant accessibility, leisure time stress, traffic stress, household stress, childcare stress, financial worries and caring for relatives in need of support as the most frequent causes of stress. The expand in stress over time means that mental illnesses have been steadily on the rise in Germany since 2007 and that they were already responsible for the most days of sick leave in Germany in 2020 (Techniker Krankenkasse, 2021).

### *Scientific research Problem*

These two studies by Statista (2021) and Techniker Krankenkasse (2021) illustrate the role stress plays in today's society. The fact that stress is among the top four health problems worldwide shows the need for action. Stress management is and remains a major social task, the further development of which is becoming increasingly urgent for the future viability of our society and requires suitable answers. Some measures are already in place to teach how to improve the way we deal with stress or how to prevent stress from occurring in the first place. Stress prevention measures include time management seminars, back training, mindfulness courses and incentives for a healthy diet and exercise (Techniker Krankenkasse, 2021). Digitalization is also bringing online courses on dealing with stress increasingly to the fore. In the area of health promotion and primary prevention, there have been few studies to date on the effects (e.g., concept, structure, and effectiveness) of digital applications (Hoffmann et al., 2019). This research gap must be closed by means of appropriate studies. The aim of this thesis is to contribute to this gap and therefore handles the evaluation of a specific online course for dealing with stress and building resilience. In order to prove the effectiveness and the effects of the course, the study deals with the following detailed questions:

- Can the course help reduce participants' stress levels by improving their stress management skills?
- Does the course have a broader impact on participants' resilience?

- Is there a relationship between the stress experienced and the overall happiness of the participants?

### *Approach*

To address these questions, the thesis is organized as follows. First, it provides a literature review of the most important theories on the subject of stress and its causes, stress management, resilience, and the connection between stress and happiness. Additionally, the offer of stress management courses and their digitalization and effect will be discussed.

Subsequently, the hypotheses are formulated, which are to be clarified with the help of this work. In the following, the study on the evaluation of the course for dealing with stress and building resilience will be explained in more detail. First, the study design, the method and the participants will be discussed, and the scales used for the evaluation will be explained. The statistical results of the quantitative analyses are then elaborated and discussed in the following chapter. Finally, a conclusion is drawn.

## **2 Literature Review**

Before evaluating the course on managing stress and building resilience, this chapter explains the relevant theory around the definition of stress, the causes, as well as stress management skills, resilience, happiness, and lastly, the offering of stress management courses.

### **2.1 Definitions and Theories of Stress**

The word stress is derived from the Latin verb “stringere”, which means to squeeze, to pull together. In its current meaning, the word stress comes originally from the English language and meant testing metal or glass for its resilience (Litzcke et al., 2010).

Research on stress has quite a long history. The use of the term stress dates back to the 14th century. The first scientific definition, however, was not made until 1932 by Walter Cannon, who defined stress as a “disturbance of homeostasis under conditions of cold, lack of oxygen, low blood sugar, and so on” (Richard S. Lazarus & Folkman, 1984, p. 2).

## *General Adaption Syndrome (GAS)*

Based on this first definition, Hans Selye further characterized the term stress in 1950. Selye's scientific research has made him an enormously important figure in stress research, and he is also known as the "father of stress". He describes stress as "the nonspecific response of the body to any demand made upon it" (Selye, 1976, p. 137). Through extensive animal experiments and observations on humans, he discovered that organisms respond to a wide variety of stresses with the same typical physical changes, the so-called stress response. Through his research, he showed that different physical and mental stresses lead to characteristic physical and mental changes. If these persist over a long period of time, this can pose a serious threat to health (Kaluza, 2012).

Selye refers to this type of stress, which poses a risk to physical health over time due to stress reactions, as distress. In contrast, according to him, there is also a type of stress that is experienced as subjectively comfortable and pleasurable and thus also has a performance-enhancing and motivating effect. He calls this type of stress eustress (Kaluza, 2012). How these two types can be distinguished from each other for individuals is described in more detail in the following section.

He further describes the stress response as a set of bodily defenses against any form of stimulation, he called this reaction General Adaptation Syndrome (GAS). GAS develops in three stages, first the Alarm reaction, then the stage of Resistance, and finally the stage of Exhaustion (Selye, 1950).

The Alarm reaction is described by the Cannon's definition of stress as flight-or-fight response. In this first phase, all body parts that are needed for fight or flight are activated. First the nervous system and the endocrine system, followed by the cardiovascular, pulmonary and musculoskeletal systems are mobilized. All senses remain on alert until the danger is averted (Selye, 1950). In the second phase, the stage of Resistance, the body attempts to return to a state of physiological rest, or homeostasis, in which it resists the alarm. The body remains activated or aroused, usually with less intensity than in the alarm reaction but with enough energy to cause a higher metabolic rate in some organs. The stress reaction ends in the third phase, the stage of Exhaustion. This occurs when one or more organs affected by the metabolic processes can no longer meet the demand, and thus normal function fails. In the worst case, this can lead to the death of the organ and, depending on which organ is affected (e.g. the heart), possibly to the death of the individual (Rana et al., 2019).

Concluding, Selye's General Adaptation Syndrome "emphasized that any agent noxious to the tissues (a stressor) would produce more or less the same orchestrated physiological defense (stress reaction)" (R. S. Lazarus, 1993, p. 4). Through the GAS, Selye primarily describes the body's physiological handling of stress. However, there are still many more psychological concepts that describe the stress response in more detail. The most scientifically widespread and influential theory is the Transactional model of Richard Lazarus (Rana et al., 2019), which is therefore explained in more detail below.

### *Transactional model*

Continuing with Selye, Richard Lazarus defines stress as a relational concept that does not describe a specific external stimulus condition (situational definition) or as a typical pattern of responses (relational definition), but as a specific relationship (transaction) between environment and person (Krohne, 2017). Specifically, he describes it as "a relationship with the environment that is considered significant by the individual in terms of his or her well-being, but at the same time places demands on the individual that strain or overwhelm his or her coping capabilities" (Richard S. Lazarus & Folkman, 1984, p. 63).

From this definition, it is clear that two key processes act as mediators within the stress-related person-environment relationship and with respect to resulting immediate and longer-term consequences: cognitive appraisal and coping (Rana et al., 2019). The concept of cognitive appraisal is based on the fact that stress-related processes depend on the expectations a person has with regard to the outcome of a specific confrontation with his or her environment. The concept is needed to explain individual differences in the type, intensity, and duration of triggered stress-related processes under otherwise similar environmental conditions for different individuals (Arnold, 1960).

According to Lazarus (1984), cognitive appraisal can take three different forms, each of which has different functions and is based on different sources of information: primary appraisal, secondary appraisal, and reappraisal. The primary appraisal refers to any engagement with the environment in terms of the person's well-being. There are three different fundamental appraisals: irrelevant, favorable, and stress-related engagements. If the assessment is stress-related, there are again three possible relationships of this appraisal: harm-loss (already occurred), threat (anticipated), and challenge (stress-related engagement with the possibility of

gain) (Krohne, 2017). Only stressful reactions that are classified as harmful, threatening, or challenging cause an adaptation reaction or stress response. The assessment of the situation does not necessarily take place consciously, but can occur very quickly and subconsciously (Greiner et al., 2012).

If it is a stress-related appraisal, the secondary appraisal assesses what subjectively perceived abilities and opportunities are available to cope with the stressor. If the resources are assessed as sufficient, no stress arises. However, if the coping abilities and possibilities are assessed as too low, this feeling leads to excessive demands and thus initially to stress (Greiner et al., 2012; Richard S. Lazarus & Folkman, 1984). The less favorable a person's perception of coping options, the more stress the person feels (Litzcke et al., 2010).

Lazarus defines coping “as constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (Richard S. Lazarus & Folkman, 1984, p. 141). He distinguishes between two different types of coping, problem-oriented coping and emotion-oriented coping. In problem-oriented coping, a person performs an instrumental activity that is action-oriented and directed toward the elimination or mitigation of a problem. It is not decisive whether the action is completed successfully (Hemming, 2015). Thus, an attempt is made to correct the problem causing the stress in the person-environment relationship (Greiner et al., 2012). Emotion-related coping, on the other hand, involves changing the way a person attends or interprets a situation. A threat that is successfully avoided, even if only for a short time, does not bother (R. S. Lazarus, 1993). This strategy thus refers to the reduction of emotions triggered by stress; no intervention in the environment or situation is made (Greiner et al., 2012).

In the process of confronting the environment and the situational conditions that may be modified, a reappraisal of the person-environment relationship may occur. However, reappraisal can also arise from an inner-psycho confrontation with the situation, i.e. without previous active intervention (Krohne, 2017). Additionally, Lazarus sees in the reappraisal a cognitive-emotional coping strategy, perhaps even one of the most effective. A successful reappraisal of the situation could promote the building up of understanding and thus helpful feelings instead of a personal defense (Richard S. Lazarus, 1999). For illustration, the following Figure 1 demonstrates the theory of the Transactional Model.

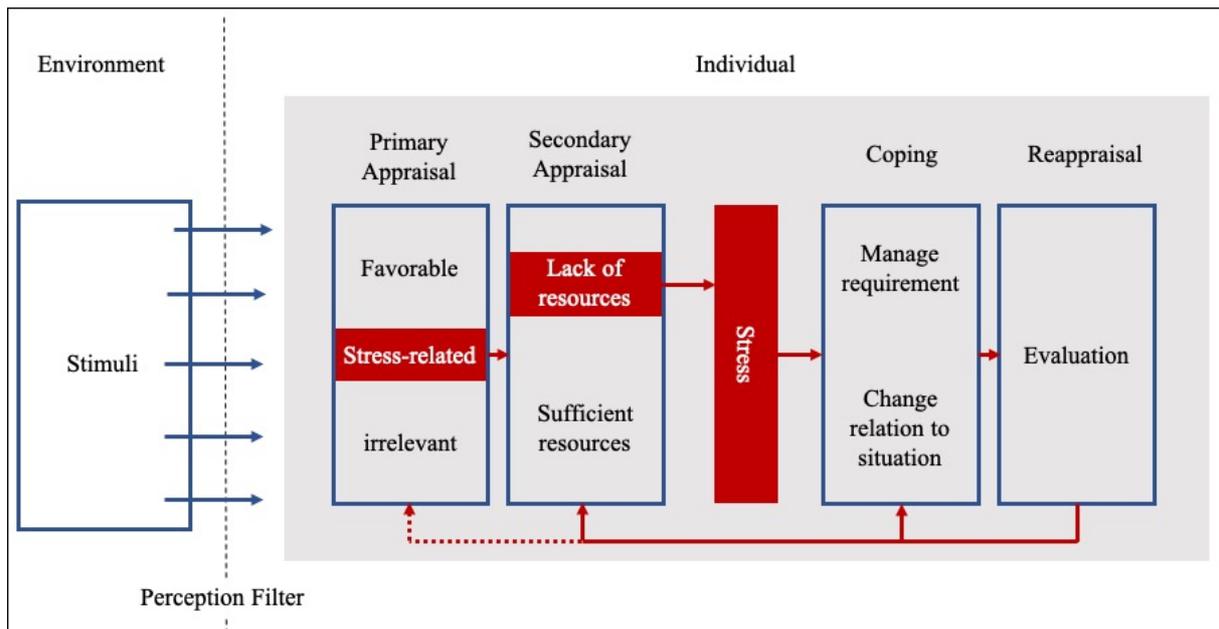


Figure 2: Transaction Model of Richard Lazarus (Based on Richard S. Lazarus & Folkman, 1984)

## 2.2 Causes of Stress

After describing the definition and the most common theories of stress, this chapter is addressed to the causes of stress. Lazarus' Transactional Model already described that stress is subjective. The perception of stressful situations is influenced by each individual's disposition, experience, attitude, personality, and coping strategies. Even objectively dangerous situations only trigger stress if the danger is recognized and the individual believes that he or she cannot cope with the situation. Conversely, just as objectively harmless situations can be experienced as threatening and generate stress (Atkinson et al., 2007). Stress is thus the organism's activation reaction to demands and threats - to the so-called stressors (Litzcke et al., 2010).

### *Stressors and the Stress Reaction*

Stressors are all external demands of the environment, as a result of which a stress reaction is triggered. In terms of content, these can be completely different situations, such as a natural catastrophe, a car accident, a judgment that is perceived as unfair, a dispute in the neighborhood, or a misplaced house key (Kaluza, 2012).

In general, however, stressors can be divided into three categories according to Litzcke et al. (2010):

- Physical stressors

For example: Noise, heat, cold, temperature changes, changes in air pressure, hunger, infections, injuries, heavy physical labor, long driving, sensory overload.

- Psychological stressors

For example: Fear of failure, excessive demands, inadequate demands, lack of time, loss of control, exams, important negotiations.

- Social stressors

For example: Conflicts, isolation, uninvited visitors, loss of familiar people, bullying.

The stress experience due to the stressors is more intense the more significant it is for the individual to successfully cope with the respective requirement. Significant means that successful coping is important with regard to the pursuit of self-imposed motives and goals. Stress arises when individuals see important goals and motives threatened (Kaluza, 2012).

Furthermore, besides the view of the individual, situational characteristics and formal characteristics, such as the influenceability and controllability of a stressor matter. Of additional importance is the degree of information about a situation and the predictability or uncertainty of whether the event will occur or not (Rusch, 2019). The temporal effect of stressors also has a considerable influence on the stress response; this is decisive with regard to the potential for injury. Since the reactions do not subside immediately at the end of the stress, but have side effects, a great vulnerability for the individual is to be expected, especially in the case of a rapid succession of pressures in the form of stressors (Kallus, 1995).

When a stressor is identified, a stress response occurs. These are processes that are set in motion by the affected person in response to confrontation with a stressor (Kaluza, 2012). The reactions occur on different levels. On the one hand, they express themselves in physical changes, but they also affect thoughts, change emotions and influence behavior (Greiner et al., 2012).

## *Biological Reaction*

The origin of the stress response goes way back to the Stone Age. At that time, ancient humans were exposed to the danger of dangerous animals while searching for food. When attacked, there were basically two options: either fight or flee. Both meant intensive physical activity. This is why the stress response optimally prepares individuals within a very short time to counter an imminent danger with a large physical action (Kaluza, 2012; Litzcke et al., 2010).

The development of this stress response program in the process of evolution gives living beings an enormous survival advantage, since it enables them to cope flexibly with a wide variety of dangerous situations, especially new ones (Kaluza, 2012). The stress response and its effects in the body are still the same today, but our stress situations have changed a lot. It is usually no longer necessary to fight or flee and the energy provided is therefore often not called upon (Litzcke et al., 2010).

The stress response is expressed by stimulating the bodily functions necessary to execute a physical coping response. These are mainly respiration, cardiovascular and energy supply. The other, more regenerative and reproductive bodily functions, which are less important for dealing with an acute danger in the short term, are throttled back. These are digestion and energy storage, reproduction and growth (Kaluza, 2012).

The question further arises as to how the stress response is triggered in the body. The control center for the stress response is the brain. The sensory organs transform information from our environment into biological signals and pass them on to the brain. Only if the evaluation of the incoming information leads to the conclusion that an alarm situation exists, the brain triggers massive physical reactions, the stress reaction (Kaluza, 2012).

In detail, when the organism is exposed to stress, this leads to a release of corticotropin-releasing hormone (CRH) and vasopressin by the hypothalamus. This is followed by the release of adrenocorticotropic hormone (ACTH) by the pituitary gland, which then leads to the release of adrenaline, noradrenaline and if the stress situation persists for a longer period of time also glucocorticoid hormones, especially cortisol from the adrenal gland (Costandi, 2015). Cortisol binds to the receptors of the target cells and exerts its specific effect there. While adrenaline can hardly penetrate the blood-brain barrier and thus acts in the rest of the body, cortisol acts primarily in the brain. Another difference is that cortisol is released more slowly than adrenaline, but remains effective for longer (Krohne, 2017).

Over a short period of time, cortisol enables the brain to better cope with stress. However, if it is chronic, unavoidable stress, this leads to the death of neurons in the brain. Experiments have shown that chronic stress thus causes premature aging of the brain (Bear et al., 2016). The physical consequences of increased cortisol levels may include these (Rusch, 2019):

- Damage to the immune system, stomach, kidneys, heart tissue and brain cells
- Impairment of skin regeneration, memory function, learning ability
- Reduction of muscle mass
- Causing anger, emotional problems and sleep disorders

However, it cannot be deduced from this that stress is generally harmful. Stress triggers a state of activation; whether this is harmful is determined by the extent of activation and the controllability of the respective demand. It is important that periods of great tension are replaced by regular recovery phases so that adrenaline and especially cortisol can be decreased (Hüther, 2011).

### *Behavioral and emotional Reaction*

Besides the biological stress reaction of the body, there are other reactions that can also be observed by externals. These are behavioral, cognitive and emotional stress reactions. Typical behaviors under stress include hasty and impatient behavior such as cutting breaks short or skipping them altogether (Greiner et al., 2012). Often, uncoordinated work behavior can be observed, such as wanting to do several things at once or lack of planning and organization. In addition, there is often a motor restlessness, such as fidgeting with the feet, drumming fingers. There may also be conflictual interactions with other people, such as aggressive, irritable behavior or frequent disagreements over minor issues (Kaluza, 2012). Often, affected people also try to reduce the inner tension by numbing behavior, such as smoking, eating, as well as alcohol or medication abuse (Bartholdt & Schütz, 2010).

The cognitive reaction is triggered because during the stress situation attention is restricted to the stress-relevant stimuli (Hasselhorn, 2007). There is an increased perceptual sensitivity, which on the one hand enables an intensive examination of the stressors. As a result, thoughts permanently revolve around the stress situation and, on the other hand, the ability to perceive other stimuli is reduced. Not infrequently, this leads to an inability to assess the situation objectively and realistically. In addition, the strong mental demand impairs other

cognitive processes, the consequences of which can be word-finding, decision-making, and memory problems (Goschke & Dreisbach, 2006; Litzcke et al., 2010; Van der Linden, Frese, & Meijman, 2003; Van der Linden, Frese, & Sonnentag, 2003).

The emotional level of the stress reaction comprises the so-called covert behavior, meaning inner-psychic processes that are not directly visible. These are all thoughts and feelings that are triggered in the affected person in a stressful situation (Kaluza, 2012). Stress often leads to emotional hypersensitivity and thus to excessive reactions and outbursts of emotion (Greiner et al., 2012). According to Kaluza (2012, p. 11), typical emotional stress reactions include:

- Feelings of inner restlessness, nervousness and being rushed
- Feelings and thoughts of dissatisfaction, anger, rage
- Fear, e.g. of failure, of embarrassment
- Feelings and thoughts of helplessness
- Feelings of self-reproach and guilt
- Circling thoughts
- Emptiness in the head (black out)
- Blockages in thinking, lack of concentration
- Tunnel vision

The different levels of stress response normally occur together, but do not exist in isolation from each other. They influence each other and can "build up" the stress reaction, thus intensifying its intention and prolonging it in time. However, the interdependence of the levels also applies with regard to a potentially balancing effect. The calming of one level can be transferred to the other levels in the same way and thus make it possible to dampen the stress reaction (Kaluza, 2012).

### **2.3 Dealing with Stress**

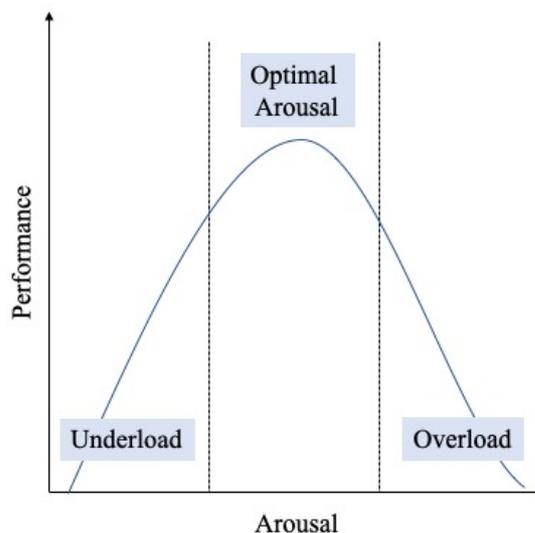
As already described, stressors have a different effect on each individual, since situations are perceived differently. This is due to the fact that the evaluation of a new situation depends on the respective personal previous experiences, the expectations and fears, the motives and goals, the demands on oneself, and on other factors (Kaluza, 2012). Despite these differences, it is of enormous importance that stress reactions are dealt with appropriately. Therefore, it is

necessary to first recognize which stress level is optimal and when coping strategies should be used.

### *The optimal stress level*

The previous comments on the different stress reactions may imply that stress is inherently something negative to be avoided. However, stress is the result of activation, which is an essential prerequisite for human performance and thus also for the initiation and performance of a wide variety of activities. Due to this activation-performance relationship, it is important to know the boundary between stress and optimal activation (Greiner et al., 2012).

The connection between arousal and performance was described in the Yerkes-Dodson law as early as 1908. According to this law, the connection between arousal and performance corresponds to an inverted U-curve, in which a medium arousal causes the highest willingness to perform (Yerkes & Dodson, 1908). This is illustrated by the following diagram 3.



*Figure 3: Yerkes-Dodson law (Based on (Yerkes & Dodson, 1908))*

According to the law of Yerkes and Dodson, the decisive factor for the perception of strong stress is the level of arousal. Stress is felt in the case of excessive demands (e.g. due to a very stressful and/or long-lasting stressor) but also in the case of underload (e.g. in the case of low mental demands or few social contacts) (Bartholdt & Schütz, 2010).

In addition to arousal, the duration of the stress situation is also of enormous importance for the optimal stress level. There are significant differences between the effects of short- and long-term stress. On the one hand, a short-term physiological stress reaction is quite healthy if the activation can be followed by an appropriate recovery phase. In this context, the short-term eustress (positive stress) defined by Selye helps to learn new skills and to master challenges (Rusch, 2019). Coping with stressful situations is always associated with inner growth and the expansion of coping strategies as well as personal and social resources (Eppel, 2007).

If, on the other hand, the stress is of a long-term nature, the system is constantly on the alert for stress-related disorders and stress-related illnesses due to increased cortisol levels. In the case of long-term stress loads, it can be the daily, small stress loads as well as a one-time misfortune (Rusch, 2019). In order to keep stress levels at an optimal level, coping strategies play an enormous role. The types of these are therefore described below.

### *Coping with stress*

As described at the beginning of this thesis, Lazarus defines coping as a person's changing, cognitive, and behavioral efforts directed towards dealing with specific external and/or internal demands that severely tax or exceed their adaptive resources (Richard S. Lazarus & Folkman, 1984). Thus, the term coping refers to successfully dealing with a stress (Brüderl, 1988).

One approach is the concept of salutogenesis by medical sociologist Aaron Antonovsky. This perspective of research also focuses on the protective health aspects that are helpful in coping with stress. He categorizes different factors (= resources) into internal and external, which can help to cope better with stress (Greiner et al., 2012). Each person has internal resources for oneself; these are psychological and physical means, i.e. behavioral and experiential patterns, competencies, cognitions, attitudes, beliefs, evaluations, physical prerequisites that prove advantageous in coping with requirements. Examples include broad knowledge, problem-solving skills, or good physical fitness (Becker et al., 2004).

External resources are given by the environment, these are all factors external to a person that make it easier to cope with stress or mitigate its effect (Greiner et al., 2012). A major role is played by a person's social support. A person's integration into a social network contributes to well-being and health in many ways (Atkins et al., 1991; Röhrle, 1994). The decisive factor

is not the quantity of social support people or the support a person receives, but rather the quality of the social relationships, as well as the perceived support of the social network (Greiner et al., 2012).

It should be noted, however, that coping attempts usually do not serve only one purpose, but are often multifunctional. In addition to emotion and problem regulation, coping pursues numerous other goals - e.g., regulation of interactions (e.g., showing the other person that one will not be provoked) or self-esteem regulation (e.g., proving something to oneself) (Laux & Weber, 1993).

According to Kaluza (2012), there are three main approaches to stress management. The first approach is stressors. The goal is to prevent stress from occurring in the first place. This can be achieved by influencing the stressors in the professional and private spheres, changing and reducing or eliminating them as far as possible. Furthermore, the development of stress can be prevented by developing professional and social skills for coping with demands (Kaluza, 2012).

The second aspect is personal stress management. This involves a self-critical approach to a person's own stress-generating or stress-exacerbating attitudes, evaluations and mental patterns in order to change them and replace them with beneficial thoughts.

The third approach is stress reactions. The aim is to relieve existing physical tension, dampen inner restlessness and nervousness, and maintain people's own resistance to stress in the long term (Kaluza, 2012).

In order to work on these approaches, Lazarus' Transaction model from chapter 2.1 can be consulted. It describes the two coping possibilities problem-referred and emotion-referred. With the problem-referred coping the mastering reaction aims directly at a change of the person environment relation as source of the load. The cause of stress is thus to be overcome (Reif et al., 2018). Examples of problem-related coping are the targeted search for information, obtaining instrumental social support, or problem-oriented action (designing a plan of action, preventing oneself from acting rashly, changing situations, openly addressing and resolving conflicts) (Carver et al., 1989; Franke, 2012; Schaper, 2014).

Emotion-related coping, on the other hand, focuses at efforts of a cognitive or behavioral nature aimed at reducing or at least controlling the emotions triggered by a stressor (Krohne, 2017). Well-being is to be restored by trying to cope with the symptoms of stress and to get the

stressful emotions and subjective states of mind under control (Reif et al., 2018). Examples include positive reinterpretation, internal distancing, expressing feelings, acceptance, relaxation, numbing, taking refuge in religion (Carver et al., 1989; Franke, 2012; Schaper, 2014).

However, the question arises as to what concrete measures a person can take in both problem-oriented and emotion-oriented coping to reduce stress or prevent it from showing up in the first place. There are a variety of individual measures for this, since the stressors and reactions to stress can differ greatly from person to person (Reif et al., 2018). A first starting point can be educational methods. In stress management training, information about stress is first provided and communicated. The aim is to show that knowledge about stress, its causes and effects, can have an impact on people's behavior in stressful situations. However, merely imparting knowledge is only effective to a limited extent (Semmer & Meier, 2014).

Cognitive-behavioral stress management methods are a more advanced measure. They prove to be very effective and are designed to teach individuals about the role of attitudes, thoughts and feelings in the stress process. This method is carried out, for example, by learning and applying rational self-instructions in stressful situations, by expanding the repertoire of coping strategies, or by generally increasing stress resistance (Reif et al., 2018).

One type of cognitive stress training is working with internal images. According to brain research, humans store rational things and facts in the left hemisphere of the brain in long-term memory; these can be consciously retrieved. Emotions and affecting events, on the other hand, are stored in the right hemisphere of the brain in the frontal lobe in the subconscious. As soon as a person replays positive images, such as the last vacation, in his mind's eye, he relives the situation. The body reacts to this with relaxation and calm breathing. Positive images therefore promote motivation, optimism and self-confidence. An intense mental image or visualization activates the body almost as strongly as actual physical activity. At the same time, unconscious negative images can have an extremely negative influence on the state and trigger stress. Therefore, it is even more important to be aware of these images and to counter them with positive images (Rusch, 2019).

Another measure is relaxation training. The basic idea of this is that stress is a state of tension, which can consequently be counteracted by relaxation. A common method of relaxation training is progressive muscle relaxation by Jacobsen (1996). This method has been shown to be effective overall, especially in terms of reducing psychophysiological stress

responses (Sonnentag & Frese, 2003). Progressive muscle relaxation involves tightening and then relaxing specific muscle groups, such as the hands, arms, neck, shoulders, etc., under guidance. In order to detect the respective muscle groups, instructions are given on how to hold the body (e.g., make a fist or raise the eyebrows). The resulting state of relaxation should then go beyond that of the initial level (Jacobsen, 1996). Relaxation can thus be learned with the help of this method by comparing the tense and relaxed state of the respective muscle group, which also trains the person's own body awareness (Rusch, 2019).

Other measures to deal better with stress or to prevent it from arising in the first place are mindfulness and meditation approaches. These techniques have become increasingly important in recent years. Mindfulness-based interventions seem to contribute as mechanisms of change especially with regard to stress processing, physical and psychological well-being, and emotion-regulatory processes (Carmody & Bear, 2008; Nyklíček & Kuijpers, 2008). The basic idea is that people practice a basic accepting and calm attitude. This should improve their ability to find constructive ways to flee out of stressful situations (Reif et al., 2018). Mindfulness means being consciously in the here and now, being aware of oneself and turning off the autopilot. Mindfulness consists of four basic building blocks: directing attention, focusing attention on the present moment, noticing one's surroundings without judging, and lastly, participating observation with a certain distance (Solé-Leris, 1994). There are now quite a few studies on the effect of mindfulness-based interventions that examined effects on stress experience, well-being, psychological and physical symptom burden, emotion perception and regulation, and quality of life (Rusch, 2019).

## **2.4 Recovery and Resilience**

The methods described above are aimed primarily at reducing stress that has already arisen or at preventing the emergence of stress. These physical and mental stress reactions will never be completely avoided. However, the previous chapters have also shown that this is not at all sensible or desirable (Kaluza, 2012). When a stress reaction occurs, it is then of great importance to give the body the necessary rest.

## *Recovery Methods*

Recovery is the process that counteracts the stress process (i.e., the effects of stress on the person). Recovery reverses or at least mitigates the negative effects of stressors. Successful recovery results in batteries being recharged, thus restoring well-being and also performance (Reif et al., 2018). The most popular methods of relaxation and stress relief in Germany in 2021 include pursuing a hobby, going for a walk or gardening, comfortably lazing around, playing or listening to music, meeting with family or friends, playing sports, reading or watching TV (Techniker Krankenkasse, 2021).

In addition to the above-mentioned measures of rest, there is another passive form of rest of great importance: restful sleep. Sleep is probably one of the most important and efficient biological regeneration programs. Sleeping serves the recovery of the organs. However, sleep can also be easily impaired by strong or persistent stress reactions. Restful sleep is characterized by sleep duration (optimally 7-8 hours for adults) and sleep quality (Kaluza, 2012). Sleep quality is negatively related to perceived fatigue the next morning and even seems to play a more important role in the recovery process than switching off from work (Reif et al., 2018).

Studies show that vacations can also help people to recover and reduce stressful experiences (Reif et al., 2018). Alongside sleep as a passive measure for regeneration, it is the most important active recovery measure. Vacation helps to regain energies used up in everyday life, to find inner peace and to return to everyday life more resistant, resilient and balanced. This happens through the fact that new stimuli, experiences and impressions can be gained during the vacation. However, this chance of recovery by vacation is based on two prerequisites. Firstly, the vacation must be planned and designed from the outset so that it is free of hectic, stress and stressful demands. Secondly, the vacation should be tailored as closely as possible to one's own recreational needs (Kaluza, 2012).

In addition to sleep and vacations, studies show that the weekend and after-work hours also contribute to recovery. The important point here is to avoid work-related activities. In contrast, low-effort activities, social activities, and physical activities should be preferred (Sonntag, 2001). Restorative leisure activities are process-oriented rather than result-oriented. The focus is not on purpose, but on fun, pleasure, and enjoyment (Kaluza, 2012).

## *Building Resilience*

As already described, everyone perceives stress to different degrees individually. In this context, resilience research has become increasingly important in recent years. Individual resilience factors of the individual can be an explanation for the differences in the effects of stress. Research has already shown that resilient people have psychological factors that help them actively cope with stress (Scharnhorst, 2008).

The term resilience originally comes from the Latin word *resilire*, meaning to bounce back. The term comes from physics, where it is used for the property of materials that can be deformed and still find their way back to their old shape, e.g. foam (Scharnhorst, 2012). Jeanne and Jack Block introduced the term to psychology as early as 1950 (Eckart, 2013). There are different definitions for the term resilience. According to Wurstmann, resilience is "[...] the psychological resistance to biological, psychological and psychosocial developmental risks. [...] It is about the ability to not let a difficult life situation get you down or to not break down because of it" (Wurstmann, 2004, p. 18). The occurrence of resilient behavior is thus linked to two conditions: Firstly, a difficult life situation and secondly, its successful overcoming. The second condition, successful coping with the stressful situation, occurs through person-related protective factors and resources (Patzelt, 2015).

An important distinction of resilience must be made from coping, described earlier. Coping is the management of threats and stressors. Resilience is distinguished from coping by the underlying energy and motivation that allows the behavior to cope with the crisis in the first place. Moreover, resilience does not correspond to mental health or to learning social skills. Both can be consequences of resilience, but no psychosocial threat needs to be present (Henninger, 2016).

The focus of resilience research is the identification of the described risk and protective factors that lead to a favorable development in dealing with stressors (Bengel & Lyssenko, 2012). They are seen as an important prerequisite for resilient behavior. They influence each other in a complex mechanism of action. Several studies have identified six overarching personal resilience factors (protective factors) (Bengel & Lyssenko, 2012; Fröhlich-Gildhoff & Rönna-Böse, 2014; Renneberg & Hammelstein, 2006). These are:

- Self-awareness, in order to assess a person's strengths and weaknesses
- Self-control, in order to react appropriately to emotions and tensions

- Self-efficacy, for trust and confidence in oneself
- Social competence, to be able to solve social conflicts
- Coping skills, to deal with stress
- Problem solving, to make decisions in difficult situations

Resilience factors were previously thought to be related to personality traits. In today's resilience research, it is assumed that resilience is an interactive process between the individual and the environment and thus has a protective function, which is also a flexible adaptive capacity (Welter-Enderlin & Hildenbrand, 2010). Accordingly, individuals develop resilience by dealing with problems and difficulties in their environment. In other words, resilience should not be seen merely as a static physical characteristic, but as a dynamic process of adaptation and development. Resilience factors can therefore be acquired and learned in every life cycle (Patzelt, 2015).

Promoting resilience is a proactive salutogenetic approach. This has been shown to be effective in initial intervention and evaluation studies (Robertson et al., 2015; Vanhove et al., 2016). However, the measures used to promote resilience vary widely. According to Soucek et al. (2015) there are some behaviors, especially at work, that describe resilient behavior and to which suggestions for promoting resilience can be linked. One of these is emotional coping. When problems arise, successfully managing the individual's own emotional reactions (e.g., anger, agitation) is important in overcoming the problems (Soucek et al., 2015).

Furthermore, positive reinterpretation is relevant. Problems represent challenges and offer the opportunity to contribute and develop a person's abilities. In addition, comprehensive planning is important. Different possible solutions should be considered to be able to weigh up the advantages and disadvantages of all possible solutions. Finally, resilient behavior is characterized by focused implementation. This means focusing on solving the problem and not getting distracted, even if it is intense and ongoing (Janneck, 2018). An initial study has already confirmed that these four behaviors are associated with better psychological well-being, especially at work (Soucek et al., 2015).

## **2.5 Stress and Happiness**

Some studies have already proven a negative effect of stress on well-being (Schiffirin & Nelson, 2010). Therefore, the connection between stress and happiness in particular will be

explained in more detail below. For this purpose, the term happiness will be defined first. When philosophers write about happiness, they are either talking about a state of mind or a life that goes well for the person leading it. The former is mainly about a psychological matter (Haybron, 2019).

Happiness, in the psychological sense, is research on certain mental states (Haybron, 2019). There are an infinite number of things that make people happy. All these things make you feel good, enjoy life, and find it wonderful (Smith, 2008). Since everyone perceives happiness differently, there is no clear definition of happiness and what triggers or reinforces it. However, positive psychology makes it its mission to understand and increase the strengths of the human psyche in order to enhance human well-being. In short, positive Psychology is the scientific study of what goes right in life (Peterson, 2006). Research is therefore concerned with virtues and character strengths, healthy coping with crises and critical life events, happiness and well-being (Johann & Möller, 2013).

It goes on to ask how happiness influences behavior. It can be considered the ultimate goal of human beings to be happy. Therefore, the pursuit of happiness subconsciously motivates in any activity. When someone is happy, he or she is in a perfect, lasting state of most intense contentment and wishes that this moment would last for a long time (Laszlo, 2008). Happiness is the feeling in which one is one with oneself and the environment and everything makes pleasant sense (Haas, 2010). The feeling of happiness is similar in all people, nevertheless it is not possible to describe a patent recipe for the feeling of happiness, because the triggers of happiness emotions are different for each person. A person's perception, thought processes and level of development mean that the feeling of happiness is based on a person's own personality and must be considered individually. Since everyone has different ideas about beautiful things or situations that make people happy, everyone perceives happiness individually (Frey & Frey, 2010).

The emergence of happiness is dependent on person, culture, and time and the determinants of happiness are diverse. In addition to the internal individual factors, there are also external factors that influence the perception of happiness. External factors are those that surround us on a daily basis, such as socio-demographic and economic factors, contextual and situational factors, culture, religion, and political influences (Johann & Möller, 2013).

One of the pioneers of positive psychology is the U.S. psychologist M. E. P. Seligman, who is concerned with the question of how happiness and well-being arise. He has developed

an approach, the theory of well-being with five different elements that contribute to well-being and which have become known by the acronym PERMA (Ebner, 2018). The five elements are:

- Positive emotions
- Engagement
- Positive relationships
- Meaning
- Accomplishment/ Achievement

The positive emotions can also be called pleasant life or life satisfaction. Concrete examples of positive emotions are gratitude, contentment, satisfaction, hope, love and joy. The second element, engagement, occurs when two conditions are met: First, the state of flow, that is complete immersion and absorption in an effort. On the other hand, when a person's personal strengths are exploited and well-being is triggered. Seligman understands positive relationships as the friendly attitude towards other people, which increases an individual's own well-being. The fourth element, meaning, includes the feeling of belonging to something or serving a cause that we judge to be greater than our own self (Johann & Möller, 2013). The last element is achievement. This can also be seen as experiencing oneself as effective. It is seen as its own element because goal achievement is exercised as an end in itself, even without the occurrence of positive feelings, engagement, positive relationships, and meaning (Seligman, 2011).

In addition to the psychological approach to defining happiness, there is also a philosophical approach. Aristotle already dealt with the question of what happiness is and what constitutes happiness. For the interpretation of happiness, two basic philosophical approaches can be distinguished, hedonism and eudaimonia. Hedonism teaches that happiness is a feeling, for example, satisfaction, joy, pleasure, and the absence of pain (Lelkes, 2018). The concept of hedonism originated in ancient Greece and states that enjoyment or pleasure is the highest good and is an inward-looking value. The main proponents of hedonism are Aristippos of Cyrene and Epicurus of Athens. Both consider pleasure to be the ultimate goal of life and emphasize the importance of the physical senses (O'Keefe, 2010).

The most recent hedonist-oriented philosophy is utilitarianism. Here, maximizing utility is considered the most important goal in life. This is equated with pleasure. Human action is motivated by the search for pleasure while avoiding pain (Lelkes, 2018). The feeling of pleasure is not necessarily critical. It can even be used as an excellent index of a person's mental balance (Lelkes, 2013). However, it becomes problematic when a person's life strategy is based solely

on it. For the paradox of happiness is that hedonism (especially radical) does not make a person happy in the long run. Trying to avoid negative feelings does not eliminate their cause or their presence. Hedonistic people even have higher stress levels compared to eudemonic oriented people (Fredrickson et al., 2013) and hedonism is often accompanied by selfishness, materialism and a lack of solidarity (Molinsky et al., 2012).

In contrast, according to the doctrine of eudaimonia, happiness is an action. The word eudaimonia is derived from the words “eu” for good and “daimon” for a supernatural being, a spirit. Eudaimonia comes from the ancient world, in which the goal of human striving to achieve the perfection of the heavenly spheres in someone's own inner being was anchored in the world view. The study of eudaimonia began with Aristotle (Lelkes, 2018). According to him, the bliss is "an activity of the soul according to the perfected virtue" (Aristoteles, 1911, p. 1102a). These virtues include, on the one hand, the intellectual virtues such as wisdom, perspicacity, and prudence and, on the other hand, the ethical virtues of generosity and moderation. However, he did not start from a universal definition of the good, but he saw the good as a concept that has an individual meaning for each person. Thus, everyone must find the virtuous life that leads to happiness for himself. He further defines bliss as the result of conscious action (Lelkes, 2018).

Eudaimonic parameters are still among the most important parameters for measuring subjective well-being and are increasingly used in household surveys (Lelkes, 2018). In contrast to hedonic parameters, eudaimonic parameters show a greater variety. One current definition focuses the eudaimonic approach on meaning and self-actualization and defines well-being as dependent on the extent of human functioning (Ryan et al., 2008). Other definitions use composite parameters that include emotional well-being, vitality, resilience and self-esteem, supportive relationships, and other elements (Michaelson et al., 2009).

It follows from these approaches that the basis for a happy life according to the doctrine of eudaimonia is for each person to figure out, in a very personal and individual way, what makes sense to them. Everyone must search for what serves his or her own unfoldment as a life task. Virtuous actions help to fulfill people's longing for perfection. Finally, the ultimate reward is the feeling of happiness (Lelkes, 2018).

Also of interest for the context of this thesis is the connection between stress and happiness. There are various studies that either prove a connection or not. Positive emotions have already been shown to play a key role in reversing the cardiovascular effects of negative emotions, which may ultimately have positive effects on resilience. Lightsey (1994) also found

that positive automatic thoughts about self-worth have an impact on experienced stress and act as a buffer. In contrast, subjective beliefs about global happiness were not found to have a positive effect on stress.

Research on stress and happiness has also shown that activities such as exercise, meditation, and written expression, some of which have already been described in more detail in Coping Strategies, have been demonstrated to reduce stress while increasing happiness. However, further research is needed to substantiate the exact nature of the relationship between stress and happiness. It has not yet been researched, for example, whether it is possible to be stressed and happy at the same time or whether they may be two separate dimensions.

## **2.6 Digital Health Management and Stress Management courses**

Since this thesis deals with the evaluation of an online course for handling stress and building resilience, the following section will also discuss online courses and their impact in general.

Digitalization is also changing the fitness and health sector. As a result, the number of digital health-promoting and preventive health and exercise offerings is continuously increasing. Such digital offerings provide the advantage, above all, of better and more efficient care and broader access to health- and exercise-related information than classic courses. Digital health courses can be considered a segment of the e-health field (Hoffmann et al., 2019). E-health is "the term used to refer to tools and services that use information and communication technologies (ICTs) to improve prevention, diagnosis, treatment, monitoring and management of health and lifestyle. Digital health and care has the potential to innovate and improve access to care, quality of care, and to increase the overall efficiency of the health sector" (Hoffmann et al., 2019, p. 61).

Digital applications have been part of everyday healthcare practice since the 2010s at the latest. Since then, the use of information and communication technologies in medicine has been increasing rapidly worldwide. Examples include the introduction of electronic medical records, big data, pervasive computing and, for some years now, the use of artificial intelligence and the Internet of things. E-health thus offers a wide range of potential for ensuring quality and plays a key role in the future viability of healthcare systems. Digital transformation primarily involves technology-supported change management that helps to increase the efficiency and

effectiveness of service provision, thus enhancing the benefits for patients and healthcare professionals (Bratan, 2022). The most frequently demonstrated positive benefit effect of e-Health applications in research is improved health status, with other benefit effects such as higher cost efficiency as well as time savings following at a far distance (McKinsey, 2020).

Although the German healthcare system is the second most expensive in Europe, it is not yet as advanced in digitalization as other countries. In a study by the Bertelsmann Foundation, the Digital Health Index, Germany ranks second to last (Thiel et al., 2018). The reasons for this include conflicts of interest between stakeholder groups, a strict interpretation of data protection, skepticism and insufficient benefits among service providers, bureaucracy and high technology costs (Bratan, 2022). This study has also driven the digitization of healthcare in Germany. An e-Health Monitor was developed that shows where German healthcare institutions stand in their digital development and networking each year, how large the digital supply and demand are, how intensively digital healthcare applications are already being adopted by consumers, and what benefit effects e-Health has in the mirror of research. The aim is to catch up with other countries (McKinsey, 2020). That this is also necessary is shown by the following studies on the positive effects and effectiveness first of all of the stress courses relevant in this thesis in general and then specifically of online-based stress courses.

Studies on the positive effects of digital applications are already available, particularly from the clinical sector. Andersson and Cuijpers found that online-based self-help programs can significantly reduce depressive symptoms (Andersson & Cuijpers, 2009). Digital and mobile health services have been shown to be particularly effective in preventing disease, treating cardiovascular disease, diabetes, and mental illness (Changzi & Kaveh, 2017). In the area of health promotion and primary prevention, there have been hardly any studies to date on the effectiveness of digital offerings (Hoffmann et al., 2019). This work is intended to contribute to this, among other things.

For this thesis, only the digital health offerings of Germany are considered, as it deals with the evaluation of a German online course. In Germany, the Prevention Act (Präventionsgesetz) has stipulated since 2015 that offers specifications for health promotion and prevention must be fulfilled in order to be considered as sustainable health offers and thus be funded by health insurance companies. For example, measures for individual behavioral prevention must comprise eight to twelve units, each lasting 45 to 90 minutes. Generally, these units are to be carried out in a weekly rhythm. The providers of such measures are primarily health insurance funds (43%) and commercial providers (34%). In addition, scientific, medical

and political institutions also offer such digital courses. Most programs in Germany can be assigned to the general fitness sector. In contrast, only one-third of the offerings fall into the area of health promotion / prevention. The offerings in the area of health promotion / prevention can also be divided into the areas of stress, nutrition offerings, and offerings for addiction prevention (Hoffmann et al., 2019).

Since this work deals with the evaluation of a course on how to deal with stress, the following only looks at the effectiveness of measures against stress. Such measures can address stress prevention, stress reduction, and the treatment of negative consequences of stress. They may relate to an individual or to an entire organization. Scientific studies show that especially individual measures against stress, i.e. measures that specifically target a person and contain cognitive-behavioral elements, have a strong effect (Bhui et al., 2012; Richardson & Rothstein, 2008; Van der Klink et al., 2001). One reason for this may be that cognitive-behavioral interventions train both a proactive and a reactive way of dealing with stress (Reif et al., 2018).

In contrast, there are also interventions that focus on relaxation and meditation. These tend to take a passive, reactive approach that does not involve directly confronting individuals with their stressors (Reif et al., 2018). Many stress management training programs combine different approaches to stress reduction. These trainings are to be more effective than trainings that use only one method (Semmer & Meier, 2014).

Van der Klink et al. (2001) found that stress interventions have particular effects on reducing stress-related complaints (anxiety and depressive symptoms), increasing individual resources (self-esteem, mastery, coping skills), and increasing the perceived quality of work life (demands, pressure, control, working conditions, social support from leadership, and colleagues) (Van der Klink et al., 2001).

Also, a study focusing mainly on implicit self-aspects by combining psychoanalytic and cognitive-behavioral methods in self-management training showed significant effects in stress management. The aim of the training is to help the participants to develop personal resources in order to maintain the integrity of the social self, which are otherwise classified as threatening to the social self. The study mainly shows that the resource-activating self-management training has a promoting effect on the psychobiological stress response. Participants in the study showed a lower cortisol stress response in a standardized test after the training. In addition, the study found that the endocrine response also depended on the participants' stress appraisal (Wirtz et al., 2013).

In addition to traditional stress management training, more and more online-based interventions are becoming established these days to provide individuals with stress management training. Such online training programs are mostly based on cognitive-behavioral therapy principles (Ebert et al., 2018). However, there are major differences in face-to-face contact with a healthcare professional. Some courses offer no contact at all, while others offer contact several times a week. One advantage of online courses that has been shown by therapy results is that they can contribute to the prevention of mental disorders (Baumeister et al., 2014). Andersson et al. (2014) also showed that treatment outcomes were not significantly different for a face-to-face course compared to an online-based course, and both could be considered equivalent.

Furthermore, there are some advantages that online courses have over face-to-face training. Online courses provide participants with flexible and time-independent availability while using multimedia content of consistent quality (Andersson & Titov, 2014). The disadvantages include high fluctuation and higher dropout rates than in face-to-face training. Scientific studies have also shown that online courses have a medium impact on stress levels and that programs lasting five to eight weeks are most effective; longer programs have no additional impact (Stächele et al., 2020).

In addition to studies on online-based programs to manage and reduce stress levels, there are also some studies on online-based resilience promotion (Burton et al., 2010). Scientific studies have shown above all that increasing the personal resource mindfulness has a beneficial effect on resilience. However, the training courses studied were several weeks long and involved a large financial investment. Thus, online-based learning concepts are usually shorter and more economical, and they have the enormous advantage that they can be used independently of work location and working hours (Pauls et al., 2016).

The general effectiveness of computer-based applications has been promisingly demonstrated by several studies (Glück & Maercker, 2011). The effects have indeed been shown to have a similar positive impact on stress and anxiety as comparable face-to-face trainings (Krusche et al., 2013). The fact that resilience can be increased by means of computer-based interventions is also evident from a study by Aikens et al. (2014) in which the effectiveness of an online-based mindfulness program was investigated. In this study, a web-based intervention with webinars (mindfulness sessions with trainers) and web-based training (questionnaires and specific feedback) led to an increase in resilience that was still evident at the six-month follow-up measurement (Aikens et al., 2014).

## 2.7 Hypotheses

From the preceding theory, it can be derived that stress is one of the most important health risk factors that people face in modern Western societies (Kaluza, 2012). Therefore, it is of great importance to deal with someone's personal stressors and to learn how to deal best with stress. One way to improve stress management is through online stress management training. As described, there are already a few studies on the effectiveness of such courses. In the context of this work, the results of the effectiveness are to be confirmed by looking at one specific course for dealing with stress and increasing resilience. Thus, the general hypothesis that participation in a course helps to reduce the general stress level of the participants will be investigated first. Therefore, the following hypothesis H1 will be tested:

H1: Participants of a course on reducing stress and building resilience can reduce their stress level after completing the course.

Since the first hypothesis is general, the second hypothesis will be more specific about the skills that will be taught in the course. It deals with the individual persons' stress management. The course should encourage participants to think more positively, teach relaxation techniques and mindfulness exercises, which should lead to improved management of their own stressors, among other things. This leads to the following hypothesis H2:

H2: Participants are able to identify stressors early and cope better with negative situations and think positively even in stressful situations after completing a course on reducing stress and building resilience.

In addition to dealing with stress, the course also focuses on increasing resilience so that participants become more resistant to, for example, their current stressors in the long term. To investigate this effect of the course, hypothesis H3 arises:

H3: Participants have a higher level of resilience after completing a course on reducing stress and building resilience than before taking the course.

As described in the previous chapter, there is also a relationship between stress and happiness. Therefore, the last hypothesis to be tested is whether or to what extent this connection exists in the sample of this thesis, in order to illustrate that finding the right way to deal with stress is also of great importance for higher happiness in life. To test this, the last hypothesis H4 emerges:

H4: The lower a person's stress level, the happier they are.

### **3 Method**

The following chapter describes the method used. For this purpose, the study design, as well as the procedure and the participants are explained. Subsequently, the scales used for the study are described.

#### **3.1 Study Design**

The study examines the impact of completing an online course for managing stress on stress level, stress management, resilience, and happiness of participants. Therefore, it is a two-groups design with an intervention group that completes the course and a control group that does not participate in the course. The survey is a pre-post design and will take place twice, before and directly after completion of the course, and for the control group at intervals of four weeks. Following this thesis, approximately three months after the intervention, the survey will be conducted again with both groups to measure the long-term effect. These results are not part of this thesis due to the time frame.

The measured variables are therefore assessed within-subject with repeated measures before and directly after the intervention. The effects of the intervention group are compared against the control group and over the time.

#### **3.2 Procedure and Participants**

As a first step, the questionnaire for the study was designed. For this purpose, the required scales were selected, which can measure the stress level, stress management, resilience, as well as happiness most reliably. The detailed reasoning and description of these can be found in the chapter 3.3. Four different surveys were created in the survey tool Qualtrics, two for the course

participants (before and after) and two as well for the control group (before and after). Afterwards, the two questionnaires of the course participants were integrated into the online course to be evaluated.

The online course is created by the startup zentor GmbH. Founded in 2018, with the vision of a society in which every life is understood as a fulfilling journey of discovery and life transitions as an opportunity despite adversity. The essential sources for a fulfilling life are purpose, engagement and appreciation from fellow human beings. Therefore, zentor`s aim is to support its` clients as a digital mentor to find these sources in life on their pursuit of happiness (zentor, 2022a). To pursue this goal, zentor offers online courses, hybrid learning and in-person workshops for personal and professional development for individuals and companies. These trainings focus on the prevention of mental disorders as well as on the development of personal growth and resilience (zentor, 2022b).

One of these online trainings is the course “Successfully Manage Stress and Build Resilience”, which is evaluated in this thesis. For the evaluation of the course, participants were searched. This was done through various channels. Posts were made on social media such as LinkedIn and Facebook, and distributed via zentor's newsletter. In addition, emails were sent to students at the Technical University of Munich and the link to the evaluation was also posted on the social network of the company Siemens. As an additional incentive for the study, a raffle of Amazon vouchers for completing the pre and post surveys was communicated. These were given away both among the course participants and in the control group among those who have completed all questionnaires. However, most of the participants for the course were found through individual approaches in the direct environment of family and friends. Since the main goal of the course is the general reduction of stress, the participants needed to explicitly confirm to currently not suffer from any acute mental illness (but otherwise didn`t need to meet further selection criteria).

The course is structured as follows. First, participants get an introduction to reducing stress. They learn how stress is perceived differently. Then, the pre-questionnaire is included in the introductory chapter. In order to match pre-questionnaires with post-questionnaires anonymously, a unique code is entered by the participants at the end of the first questionnaire with the use of initials of the participants and their parents as well as their months of birth.

The introduction is followed by the content chapters, in each of which there are videos for theoretical explanations as well as a handout with the most important information and an

assignment to practice the content, literature recommendations and a short quiz to test the knowledge learned in order to get access to the next chapter.

In the first content chapter, "Stress Basics", the participants learn to better understand stress to be able to more effectively recognize it themselves. Furthermore, the various stress phases that everyone goes through in stressful situations are addressed. In the next chapter, "Stressors", the participants learn theoretically and by practical tasks which different stressors there are and how to better identify them in order to subsequently reduce them. The third chapter deals with stress management. It explains how stress is caused by our subjective evaluation and which dysfunctional assumptions develop from this. It is taught how the assumptions can be changed and a specific exercise for this is outlined – an exercise on positive focus and reframing. To form this retreat, an audio meditation exercise is included in the course, which can and should be repeated at any time.

The last chapter deals with regeneration and resilience. It teaches what the terms mean and shows two concrete approaches to improving resilience. The first approach is progressive muscle relaxation. Participants are introduced to this relaxation method using a 15-minute audio file. The idea is to consciously tense and relax individual muscle groups to contribute to rapid regeneration after stress. The second approach is mindfulness. This is also introduced with a ten-minute audio file on meditation. After all course contents have been worked on, there is the post-course questionnaire at the end of the course to measure the results of the participation.

To clarify the results, a control group is surveyed in addition to the course participants. The control group was recruited via social networks such as a Facebook group of volunteer study participants, groups of different universities and, above all, via the social network of the company Siemens where most participants could be found. This group completes the same questionnaire as the course participants twice at an interval of four weeks, the period that the course participants will also need for the stress course approximately. In order to be able to contact the participants for the follow-up questionnaire, the e-mail address is requested at the end of the first questionnaire. Therefore, the second questionnaire was emailed to all participants of the first questionnaire at the same time.

In total, 126 pre-questionnaires were completely filled out by the control group. When the second questionnaire was sent to the control group, 61 questionnaires were completed in whole. Of these, some questionnaires could not be used because none of the coding of the first questionnaire matched the post-survey and thus no complete data set could be generated. After

exclusion, 52 complete data sets of the control group can be used for the analysis. Since the sample size should not differ excessively from that of the course participants to maintain comparability, the number of 52 control group participants is appropriate.

There were a total of 52 registrations for the course. Not all registered participants have started or fully processed the course. There are three drop-outs and thus 48 complete records that can be used for the evaluation. Because the study has a pre-post control group / intervention group design, the goal was to recruit at least 50 participants per group, few drop-outs were expected. This goal was met as described in both groups.

After collecting the whole data, the pre-questionnaire had to be matched the post-questionnaire according to the coding. Therefore, the data was exported from Qualtrics as Excel table. Using the S-reference to search for coding in the post datasets, the correct questionnaires were matched. This procedure was applied to the course participants as well as to the control group. In order to clearly distinguish between the two groups, a variable was inserted into the data set indicating whether the data belonged to the control group (labeled "0") or to the course participants ("1"). In total, a data set of 101 participants was the result, which was integrated into the statistical program IBM SPSS version 26 for the analysis.

### **3.3 Measures and Variables**

The following section describes the scales that the participants had to answer in the survey and represent the different dependent variables measuring the stress level, stress management, resilience and happiness.

#### *Specifications of the Central Prevention Office (ZPP)*

In order to prove the effectiveness of an online prevention course, the central prevention testing office has set a number of requirements. Only if the requirements are met an online course is certified and thus eligible for reimbursement by statutory health insurance companies. The most important requirement is to demonstrate the impact of the digital health promotion offering. The health benefit must be proven in a scientific study (GKV Spitzenverband, 2021). For this proof, ZPP has developed in collaboration with GKV Spitzenverband a questionnaire that is suitable for asking both before and after the course.

Few instruments are available for evaluating primary prevention courses. The only pure course evaluation system comes from the IKK Baden-Württemberg. Building on this, the GKV Spitzenverband has expanded and further developed questionnaires. For the field of activity stress, an item group was developed for evaluation, which aims to pursue the following goals: Causal knowledge, attitude change and positive self-instruction, self-management skills and the ability to self-regulate by learning relaxation techniques. Furthermore, questions were asked about the general state of health and stress level. In addition to health behavior, health-related quality of life is also examined. The questions on this were taken from the internationally widely used Short Form Health Survey SF-36, which was already used in the 1998 Federal Health Survey of Germany (GKV Spitzenverband, 2014).

The SF-36 was developed from the Medical Outcomes Study in the United States to measure physical and mental health. Therefore, eight dimensions are used: physical functioning, role limitations-physical, bodily pain, general health, vitality, social functioning, role limitations-emotional and mental health (Anderson et al., 1996). In several factor analytics studies of patients participating in the Medical Outcomes Study and in the general U.S. population considerable support for construct validity was constituted. It was proven that each scale measures a physical or / and mental health component which is very similar across populations (Ware et al., 1994).

Among the eight original dimensions, only the vitality and mental health dimensions are used in the GKV Spitzenverband version for course evaluation. The questions were asked in a five-point Likert scale from 1: “Never” to 5: “Always”. In order to generate a scale to measure the state of health in total, four items were reversed and all items were summed up. Lower Scores indicate a better state of health (GKV Spitzenverband, 2014). The instruction and all items can be retrieved in Appendix 1.

#### *Perceived Stress Scale (PSS)*

The second scale used in the questionnaire to measure the dealing with stressors is the Perceived Stress Scale (PSS). It was developed by Cohen, Kamarck, and Mermelstein for measuring the experienced level of stress according to different situations in someone’s life (Cohen et al., 1983). It serves as further development of the existing literature and most recent popular measures, which mainly deal with objective measures of the impact of live events

(Hewitt et al., 1992). Based on Lazarus' Transactional Stress Model, explained in Chapter 2.1, the focus of the PSS is on the subjective appraisal of life stress because stressors impact individuals differently, due to the perception as well as the ability to cope with the source of stress (Cohen et al., 1983; Hewitt et al., 1992). The three central components of the experienced level of stress used in the PSS are the issues if an individual appraises its life unpredictable, uncontrollable, and overloading (Cohen et al., 1983).

Cohen et al. (1983) developed the PSS in the original 14-item form. To date, the 10-item form PSS-10 and a four-item form PSS-4 evolved as standard version as well (Taylor, 2015). Due to a subsequent study, four poorly performing items were identified by an exploratory factor analysis and were therefore excluded from the original 14-item scale transforming into the international most common used 10-item scale (Schneider et al., 2020; Taylor, 2015).

Regarding the current most common use, for this thesis the PSS is used as a 10-item scale with a two-factorial structure. There has been a continuing discussion if the PSS-10 is best described by two subscales or as unidimensional scale (Taylor, 2015). Nonetheless, most studies pointed out that the two-factorial structure describes the best psychometric properties (Schneider et al., 2020). The two factors are perceived helplessness, consisting of six items, and the factor perceived self-efficacy, consisting of four reverse-scored items. Due to the fact that stress has several negative effects on mental health (Schneider et al., 2020), helplessness seems to be an important component of occurring psychopathological symptoms (Zahn et al., 2015). On the other side, the second factor self-efficacy can mitigate the effects of stressors on psychopathology. Both factors are substantial elements of overall perceived stress of individuals (Schneider et al., 2020).

Respondents are asked in the German-translated PSS-10 scale how often they experienced specific feelings in the last months. The questions aim at situations where individuals perceive that their demands exceed their ability to cope with the stressors which leads them to evaluate the situation as stressful (Cohen, 1986). All questions are asked in a five-point Likert Scale. It ranges from 1: "Never" to 5: "Very Often". The total PSS score is calculated by reversing the self-efficacy items and summing up all ten items. Higher scores indicate a greater level of stress (Schneider et al., 2020). Instructions and items used in the questionnaire can be retrieved in the Appendix 2.

### *Stress- and Coping Inventory (SCI)*

In order to measure stress management, two different scales are used in this thesis. The first scale used is the Satow (2012) Stress and Coping Inventory (SCI). The scale consists of three stress scales with 21 items, one stress-symptom scale with 13 items, and a coping scale with five subscales, each consisting of four items (Satow, 2012). The three stress scales and the stress symptom scale are not used for the present study because there is no documentation about the development and selection of the stress symptoms and the specific life domains asked about (stress due to uncertainty, excessive demands, loss, and negative events that actually occurred) (Wurzer, 2016). The Coping Scale, on the other hand, has a detailed description and is therefore used for the study conducted. Furthermore, the Coping Scale was selected because, like the PSS scale described earlier, it is based on Lazarus' theory that both the appraisal of a situation and the way stress is handled determine how stress is experienced and affects people (Richard S. Lazarus & Folkman, 1984).

One of the best known coping questionnaires is the Brief Cope by Carver (1997), which distinguishes between 14 ways of coping with stress (Carver, 1997). Factor analyses, however, could never confirm this structure. It turned out much more that individuals use only a few coping strategies. Most factor analyses confirm three to five coping strategies (Krägeloh, 2011). These coping strategies include: positive thinking, active preventive stress management, social support, and finding support in faith. All four strategies are covered in the SCI (Satow, 2012). Since the stress course that is being evaluated deals mainly with the two strategies positive thinking and active, preventive stress coping, this thesis is limited to these two subscales.

With a sample size of 5520, a factor analysis confirmed the adoption of coping strategies from the SCI. The strategies positive thinking and active, preventive stress management both achieved good internal consistencies with a Cronbach's Alpha  $\alpha = 0.74$ . Both subscales consist of four items each. The items were answered using a four-point Likert scale. The scale ranges from 1: "Does not apply at all" to 4: "Applies exactly". To measure the general coping with stress, both subscales are summed up. Higher scores indicate better coping abilities (Satow, 2012). These and their instructions, which were used for the questionnaire, can be found in Appendix 3.

### *Inventory for Assessment of Stress Management Skills (ISBF)*

The second scale used for measuring coping with stress is the Inventory for Assessment of Stress Management Skills (ISBF). Like the previous scales PSS and SCI, the ISBF scale is also based on the theory of Lazarus' stress model, in which individual resources play an important role in coping with stressful situations (Richard S. Lazarus & Folkman, 1984).

Complementing the SCI Coping Scale, which primarily addresses general stress management, the ISBF scale additionally targets the awareness of bodily tension, which is often integrated into stress management interventions (Meichenbaum, 2003). Awareness of bodily tension cannot reduce the perceived stress alone, but as an indicator of the current stress level, it serves as a key to promote the active use of stress management techniques by creating awareness of adverse effects (Wirtz et al., 2013). Since the participants of the stress reduction course learn and practice methods such as progressive muscle relaxation and tension of the body in the course, the scale is an appropriate way to measure the participants' skills in stress management methods.

Although some studies describe the psychological and physiological adverse effect of stress related to some psychological processes, there was no standardized published instrument to measure the assessment of stress management skills in the general population. For this purpose, a reliable, valid and short instrument is needed above all (Wirtz et al., 2013). The only hitherto existing instrument measuring relevant stress management skills was the Measure of Current Status (MOCS), an English 17-item questionnaire by Carver (2005). MOCS is based on the stress management interventions factors cognitive strategies, problem solving, use of social support, awareness of tension, anger management, and relaxation. It showed adequate factor structure and internal consistency in samples of cancer patients (Carver, 2005).

Based on this, the ISBF scale was developed. It is a 14-item questionnaire which asks participants to rate on a five-point Likert scale how well they can perform each of the items. The scale ranges from 1: "Not at all" to 5: "Very good" (Wirtz et al., 2013). An exploratory as well as a confirmatory factor analysis confirmed the five-factor structure of the original MOCS questionnaire. However, three items had to be excluded due to the factor analysis because of ambivalent wording that did not represent one single factor. The used ISBF scale achieved good internal consistencies with a total Cronbach's Alpha  $\alpha = 0.83$  (Wirtz et al., 2013). For measuring the overall stress management skills, all 14 items are summed up. Higher scores

indicate better stress management skills. All items can be found in the questionnaire in Appendix 4.

### *Resilience Scale (RS-13)*

Since the stress management course, which the participants have taken is also expected to increase the participants' resilience in the long run, a scale to measure resilience was included in the questionnaire. To be able to measure psychological resilience as a personal characteristic, the Resilience Scale 13 was used. The scale was developed from the Resilience Scale by Wagnild and Young (1993). Its purpose is to "identify the degree of individual resilience, considered a positive personality characteristic that enhances individual adaption" (Wagnild & Young, 1993, p. 167). The original scale is the most widely used scale in the Anglo-American world to measure resilience. The German short form developed was statistically tested using a population-representative sample (Leppert et al., 2008).

Among the 13 items selected from the original 25-item scale, nine are assigned to the "Personal Competence" scale and four to the "Acceptance of Self and Life" scale. The scale thus represents both areas needed to measure psychological resilience. Moreover, it is a one-dimensional scale whose items load only on a common factor. Internal consistency is good with a Cronbach's alpha of  $\alpha = 0.91$ , which is only slightly lower than the original 25-item resilience scale, despite a few remaining items. Due to the high correlation of the short scale with the original scale, the RS-13 qualifies as a valid short version of the resilience scale (Leppert et al., 2008).

The 13 items were answered by the course participants and the control group in a seven-point Likert scale. This ranged from 1: "Disagree" to 7: "Agree completely". To measure the general Resilience of the participants, the items of the two subscales Personal Competence and Acceptance of Self and Life are summed up. Higher Scores indicate a higher Resilience of the individual. The exact questions and the items that were used can be found in Appendix 5.

### *Zentor Purpose Score (ZPS)*

The last measure asked in the questionnaire in order to evaluate happiness is the zentor Purpose Score. There are hardly any detailed measurement instruments on the topic of

happiness that meet scientific quality criteria, allow individual recommendations, and are easy to fill out and evaluate. That's why zentor has designed its own scientifically validated measurement instrument based on the zentor Model for a Fulfilling Life. The zentor Purpose Score allows valid insights about the current emotional state, as well as conclusions about the sources, to be able to give advice for more fulfillment in life (Zentor, 2022).

The three significant components of the zentor Purpose Score are the in Chapter 2.5 described sources of well-being: Purpose, Engagement, and Appreciation. These main elements are measured in the zentor Purpose Score with ten items. In addition, an eleventh item captures overall happiness. All eleven items are measured using a seven-point Likert scale. Since every item is formulated as a standalone question, each requires adjusted answer opportunities. Therefore, the different scales are defined as 1: "Low" to 7: "High", 1: "Negative" to 7: "Positive", 1: "Never" to 7: "Always", 1: "Not at all", 7: "Completely", 1: "None" to 7: "All", or 1: "Completely unhappy" to 7: "Completely happy" (Dietrich, 2020). The instructions and questions of the ZPS used for the study can be found in Appendix 6.

Unlike the other measures, the calculation is not performed by simple summation. ZPS consists of five factors, each of them includes two items. The three main factors are the three main sources of well-being Purpose, Engagement, and Appreciation, based on the happiness model zentor created on its own. The Purpose factor here involves using our best selves for a greater whole. It describes the cognitive level at which a person deals with things that go beyond oneself. The second factor, Engagement, is felt in activities that people like and are good at, because it gives them the energy and motivation they need to stay active. As social beings, everyone also seeks the third factor of appreciation, which is the positive affirmation of fellow human beings to whom we feel connected, and we also like to give it back (Dietrich, 2020).

The calculation is made as follows: First, the two items of each factor are respectively multiplied, then all five factors are summed. The five factors are named as Purpose (P1\*P2), Engagement (E1\*E2), Appreciation (A1\*A2), as well as an Overlap factor (O1\*O2) and Sentiment (S1\*S2). Accordingly, the overall ZPS Score is calculated as:  $ZPS = P1 * P2 + E1 * E2 + A1 * A2 + O1 * O2 + S1 * S2$  (Dietrich, 2020).

### *Sociodemographic Variables*

Following the items of the described scales, six items were integrated in the survey in order to collect certain sociodemographic data. Participants first had to indicate how many days they have worked in the last four weeks and how many days of work they have missed due to health problems. These items were asked as open text question. Afterwards, participants were asked about their gender with the answer options: female (1), male (2), or diverse (3). To indicate their age group, the following answer options in intervals of ten years were given: < 21 (1), 21-30 (2), 31-40 (3), 41-50 (4), 51-60 (5), 61-70 (6) and > 70 (7). Finally, two items about education and occupation were asked. For education participants had to select between: Major School degree (1), high school diploma (2), completed apprenticeship (3), Bachelor (4), Master / Diploma / state exam (5), doctorate (6), others (7). To indicate the occupation the answer options were: Managing Director / Board of Directors (1), Department Manager / Team Leader (2), Specialist (3), self-employed / freelancer (4), pensioner / retiree (5), (dual) student (6), job seeker (7), others (8).

Since zentor operates pre-dominantly in German-speaking areas, the complete study was conducted in German whereas the German Version of all measures was used.

## **4 Results**

After including the dataset into the statistical program IBM SPSS some adjustments were made for analyzing. The individual items of the scales were combined into one variable according to the respective previous descriptions. This results in one variable per scale for pre and for post, with which all analyses were carried out.

### *Descriptive Statistics*

As described in the previous chapter, 48 complete data sets can be analyzed for the experimental group, the course participants, and 52 for the control group. Of these total 100 participants, 61% are female and 39% are male. The most represented age group are people between 21 and 30 years old, with a share of 38%. Followed by the age group 51 - 60 years with a share of 25%. Another 16% are in the 41 - 50 age group, and people aged 31 - 40 make up 12% of the sample. Lastly, there are two marginal groups, 7% are between 61 and 70 years

old and 2% are under 21 years old. None of the participants are over 70 years old. Thus, the majority of the sample is female and just over a third are in the 21 - 30 age group.

Next, the participants' education was queried. It turns out that a large majority of 41% of the sample have a Master's, Diploma, or State Degree. Another 31% of the participants have a Bachelor's Degree, and 10% of the sample each have Mittlere Reife or Abitur or have completed vocational training. The remaining percentages are distributed as follows: 2% have an Elementary School Degree and 1% have a Doctorate. The remaining 5% have indicated other, these are, for example, technicians or have not yet completed school.

Furthermore, the occupation of the participants was surveyed. More than half (55%) of the sample are professionals. Another 22% are (dual) students. In addition, 9% are distributed among others. These are, for example, pupils, interns or subject matter experts. Furthermore, 6% of the sample are department heads or team leaders, 4% are self-employed or freelancers, 3% are job seekers and 1% are managing directors or board members.

Lastly, the descriptive statistics include the number of days worked and days absent by the participants in the last four weeks at the start of the study as well as at the post-survey. For the working days of the first survey, 96 valid responses could be evaluated. The mean value of working days is 17.7 days with a standard deviation of 5.655 days. The maximum is 30 working days, while the minimum is 0 days. The mean value for days absent from work is 0.64 days with a standard deviation of 2.617 days. The minimum is 0 days absent and the maximum is 20 days. In the second survey, it was possible to use all 100 data on working days. The mean value of working days is 12.94 with a standard deviation of 5.665 days. The minimum is 0 days, the maximum is 25. All 100 entries could also be evaluated for the days absent. The mean value here is 0.44 days with a standard deviation of 1.506. The minimum is 0 days, the maximum 10. The mean value of the working days and the days absent has thus decreased in the second survey.

### *Structural Model*

As already described in chapter 2.7 with the hypotheses and chapter 3.0 with the method, in this thesis the influence of the participation in a course for dealing with stress and building resilience on the stress level, stress management and resilience of the participants in comparison to a control group will be examined. In addition, the last step is to determine whether stress in

general has an influence on happiness. The following structural model, which depicts the hypotheses examined in the following, serves to illustrate the analysis.

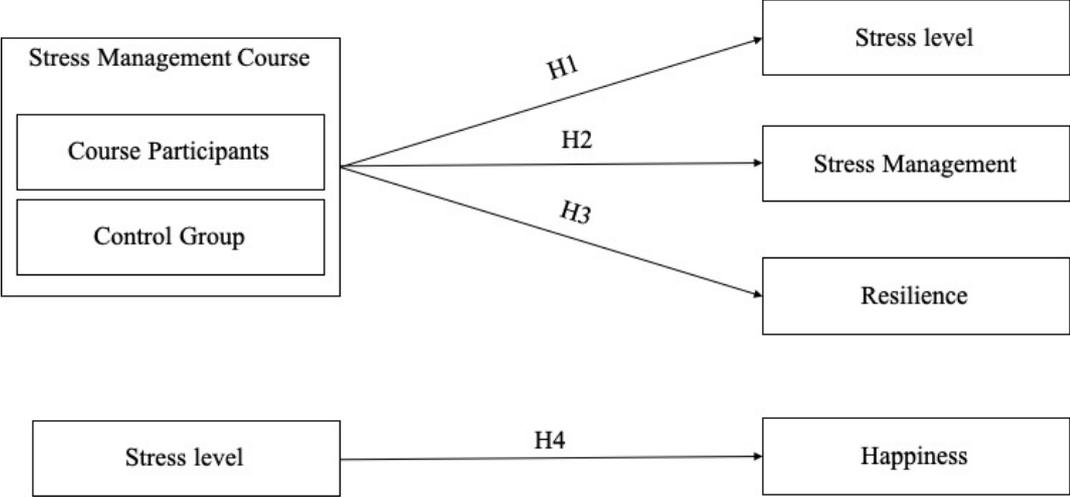


Figure 4: Structural Model of the hypotheses (own illustration)

**4.1 Reduction of Stress level**

To analyze the data and evaluate the effectiveness of the course on stress management, several multivariate analyses of variance (MANOVA) for repeated measures were conducted to determine the interaction effect for time of measurement \* course participation. In order to perform a MANOVA with a sample, some basic requirements of the data set must be met to calculate the MANOVA. Therefore, the prerequisites for both the pre and post data sets and the respective dependent variables of the hypotheses are examined below. To start with, for the first hypothesis, the dependent variables Perceived Stress Scale, Stress Level, and Stress Experience (both from the ZPP scale) are tested.

The first precondition concerns outliers in a data set. There must be no outliers for the calculation of the MANOVA, as these would distort the results. Boxplots were used to check this prerequisite. In the pre-data set, there were two slight outliers in the Stress level for the control group and one slight outlier in the Perceived Stress Scale for the course participants. In the post survey, there were also some slight outliers. In the control group, there were three outliers for Stress Experience and one outlier for the Perceived Stress Scale; in the course participants group, there was one outlier for stress level, three outliers for Stress Experience, and two outliers for the Perceived Stress Scale. Since all are only slight outliers, no data are

excluded from the data set; otherwise, exclusion could result in loss of power of the overall sample.

The second prerequisite for a MANOVA is the normal distribution of the data set. Since the sample is relatively small with 48 and 52 participants, respectively, the Shapiro-Wilk test is used to test for normal distribution. This has the best properties for small samples (Razali & Wah, 2011). For the pre-survey, for the Perceived Stress scale and the Stress Experience for both the course participants ( $p = 0.595$ , and  $p = 0.524$ ) and the control group ( $p = 0.378$ , and  $p = 0.249$ ), the test becomes non-significant, confirming a normal distribution. Only the Stress level is significant for both groups ( $p < 0.001$ ) and thus not normally distributed. A similar picture emerges in the post-survey. The Perceived Stress Scale is normally distributed ( $p = 0.069$  and  $p = 0.334$ ), the Stress Experience is normally distributed only in the course participants group ( $p = 0.023$ ), not in the control group ( $p < 0.05$ ), the Stress level is not normally distributed in both groups ( $p < 0.001$ ). In general, the MANOVA is considered relatively robust to violations of the normal distribution (Finch, 2005), so the analysis is proceeded without countermeasures.

The next requirement concerns multicollinearity. The dependent variables should not have too high a correlation  $p > 0.9$  (Schroeder, 1990). This was checked using Pearson's correlation. All correlations of the three dependent variables ranged between  $p > 0.4$  and  $p < 0.85$  in both the pre and post surveys, indicating that multicollinearity did not confound the analysis.

Last, the variables are tested for homoscedasticity of error variances and homogeneity of variance-covariance matrices. Levene's test was used to test for homogeneity of the error variances. Homogeneity of error variances between groups was fulfilled according to Levene's test for all variables except pre-Stress level ( $p = 0.034$ ) with  $p > 0.05$ . To test for equality of covariance matrices, the Box test was applied. Homogeneity of the covariance matrices was not given according to the Box test ( $p = 0.001$ ). However, MANOVA is relatively robust to unequal covariance matrices (Ates et al., 2019), so analysis was continued without statistical adjustments.

Once all the basic prerequisite for performing a MANOVA was performed for all dependent variables and there was no violation of the prerequisite that would have required adjustment, it was possible to proceed with performing the MANOVA on the existing data set.

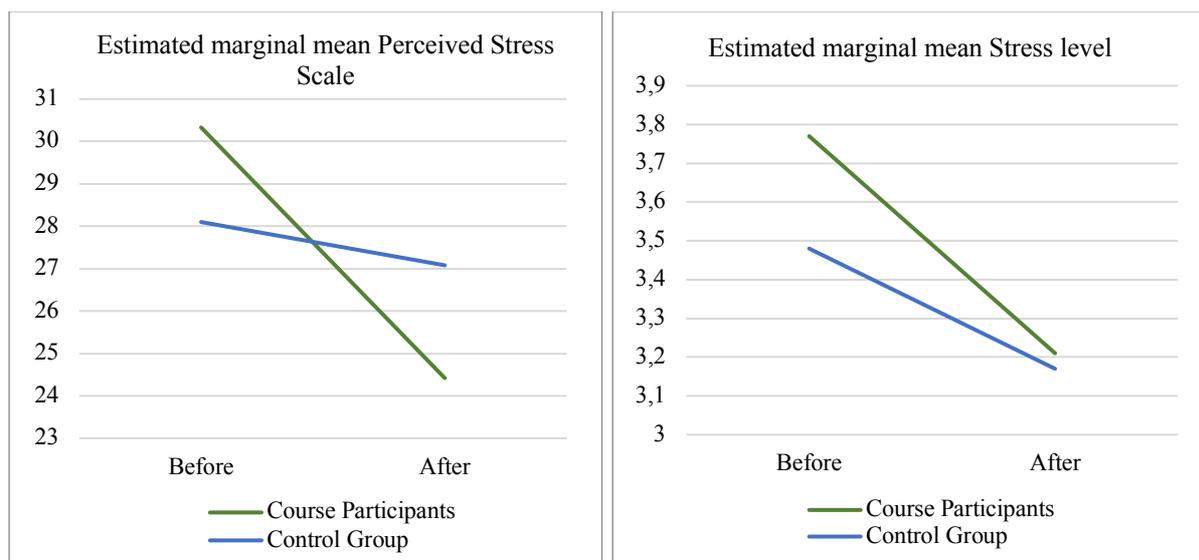
The first MANOVA with the dependent variables Perceived Stress Scale, Stress level and Stress Experience was used to analyze the hypothesis H1:

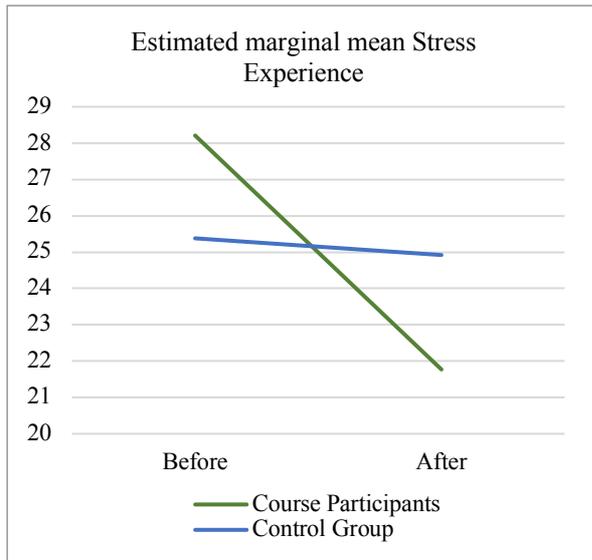
H1: Participants of a course on reducing stress and building resilience can reduce their stress level after completing the course.

To test the influence of participation in the course on Stress Management on Stress level, three dependent variables were used. These were the questions about Stress level from the ZPP scale, Stress Experience from the ZPP scale, and the Perceived Stress Scale. By a MANOVA with repeated measures and group as a factor, the results show a significant interaction effect for time of measurement \* course participation (F-value = 9.29 and  $p < 0.01$ ). Further, univariate tests show significant interaction effects for two of the three variables. These are:

- Stress Experience: F-value = 26.58 and  $p < 0.01$ .
- Perceived Stress: F-value = 14.85 and  $p < 0.01$
- Stress level: F-value = 1.75 and  $p$  not significant ( $p > 0.05$ )

The results are illustrated by the following graphs (see figure 5), which show the estimated marginal means indicating the changes in the variables as a function of course participation and time of measurement (before and after).





*Figure 5: Estimated marginal means of Stress level (own illustration)*

The result can be confirmed by conducted T-tests with paired samples. There is a decrease in the stress level of the course participants from a mean of 3.77 before course completion to 3.21 afterwards with a T-value of 3.947 and  $p < 0.001$ . Stress Management improved from a mean of 11.88 to 15.50 with a T-value of -7.39 and  $p < 0.001$ . Furthermore, Perceived Stress decreases from a mean of 28.21 to 21.77 with a T-value of 6.19 and  $p < 0.01$ .

The control group was also able to significantly reduce its Stress level, but to a lesser extent. The mean moves from 3.48 at the beginning of the study period to 3.17 four weeks later with a T-value of 2.36 and  $p < 0.05$ . Further explanation for this significance is given in the following chapter. The Stress Experience and the Stress Perceived also improved slightly, but does not become significant. Stress Experience reduces marginally from a mean of 25.38 to 24.92 with a T-value of 0.82 and  $p > 0.05$ . Perceived Stress also reduces moderately from a mean of 28.10 to 27.08 with a T-value of 1.52 and  $p > 0.05$ . This is also illustrated in the following table 1, all other outputs on the T-tests may be found in Appendix 9. Therefore, it is concluded that both the MANOVA and the paired T-tests support the hypothesis H1.

		Mean Value	N	Standard Deviation	Standard Deviation of the mean value
<b>Control Group</b>					
Pairs 1	Pre-Stress level	3.48	52	1.019	.141
	Post-Stress level	3.17	52	1.004	.139
Pairs 2	Pre-Stress Experience	25.38	52	5.531	.767
	Post-Stress Experience	24.92	52	5.930	.822
Pairs 3	Pre-Perceived Stress	28.10	52	6.206	.861
	Post-Perceived Stress	27.08	52	6.401	.888
<b>Course Participants</b>					
Pairs 1	Pre-tress level	3.77	48	.778	.112
	Post-Stress level	3.21	48	.898	.130
Pairs 2	Pre-Stress Experience	28.21	48	5.426	.783
	Post-Stress Experience	21.77	48	5.714	.825
Pairs 3	Pre-Perceived Stress	30.33	48	6.214	.897
	Post-Perceived Stress	24.42	48	6.010	.867

*Table 1: Statistic of paired samples for Stress level*

## 4.2 Improvement of Stress Management

To test the second hypothesis, a MANOVA was performed with the dependent variables Stress Management (from ZPP), the SCI, and the ISBF scale. The preconditions were also tested for these variables. Again, the boxplots revealed only slight outliers. For the control group, one for post Stress Management and pre SCI, and two for post ISBF. For the course participants, there were three slight outliers for pre Stress Management, two post, and one for post SCI. Again, no data were excluded. The test for normal distribution confirmed it with  $p > 0.05$  for

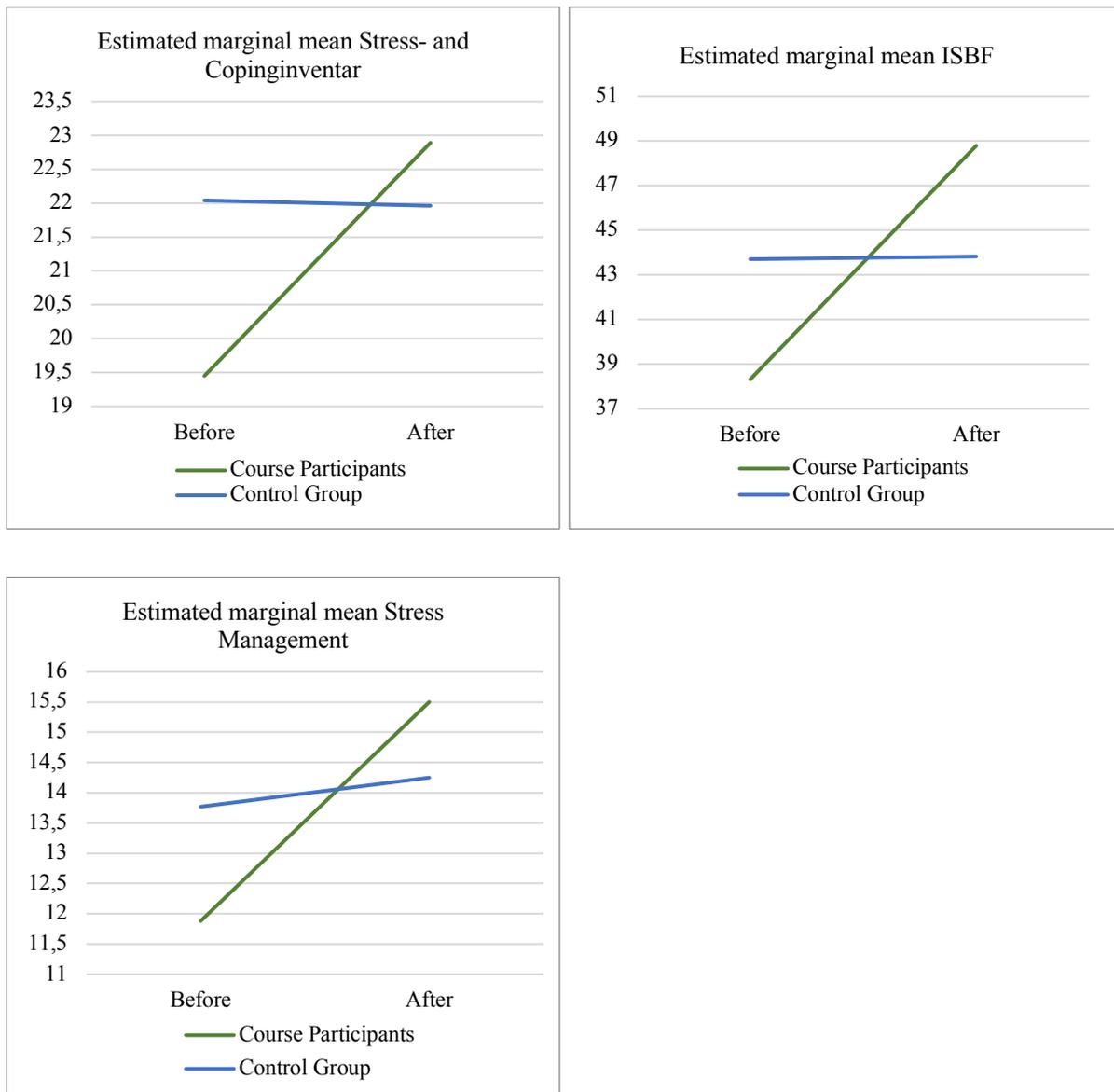
all variables except pre Stress Management and pre SCI of course participants. As with hypothesis 1, there was no adjustment. Pearson's correlation showed correlations for the variables in the range of  $p > 0.08$  to  $p < 0.7$ , thus no multicollinearity was given. Homogeneity of error variances between groups was fulfilled according to Levene's test for all variables ( $p > 0.05$ ). The Box test also confirmed the homogeneity of the covariance matrices ( $p > 0.001$ ). Since all basic prerequisites were also met for these dependent variables and there was no violation of the prerequisites, it was continued with the existing data set to test the following hypothesis H2:

H2: Participants are able to identify stressors early and cope better with negative situations and think positively even in stressful situations after completing a course on reducing stress and building resilience.

To analyze the influence of course completion on stress management, a MANOVA repeated measures was also conducted with group as a factor. For this test, the dependent variables Stress Management (from the ZPP survey questions), the Stress and Coping Inventory, and the ISBF scale were used. This MANOVA also shows a significant interaction effect in the test of within-subjects effects for time of measurement \* course participation overall, as well as for all three dependent variables:

- Stress Management: F-value = 30.92 and  $p < 0.001$ .
- Stress and Coping Inventory (SCI): F-value = 22.78 and  $p < 0.001$ .
- ISBF: F-value = 51.18 and  $p < 0.001$

Again, for these variables, the results are illustrated in the following graphs (see figure 6) of estimated marginal means and thereafter the effects are confirmed using paired-sample T-tests.



*Figure 6: Estimated marginal means of Stress Management Skills (own illustration)*

For the experimental group, paired-samples T-tests show significant results for all three dependent variables. Stress Management improves from a mean of 11.88 before course participation to 15.50 after course completion, with a T-value of -7.39 and  $p < 0.001$ . The SCI scale improves from a mean of 19.45 to 22.89 with a T-value of -4.98 and  $p < 0.001$ . Last, the ISBF scale also improves strongly from a mean of 38.32 to 48.79 with a T-value of -7.96 and  $p < 0.001$ .

In contrast, the control group does not show a significant result in any of the three dependent variables in the paired samples T-test. Stress Management improves slightly from the beginning of the survey to the second survey from a mean of 13.77 to 14.25 but not

significantly at a T-value of -1.54 and  $p > 0.05$ . The SCI scale actually decreases slightly from a mean of 22.04 to 21.96 at a T-value of 0.24 and  $p > 0.05$ . The ISBF scale remains about the same from a mean of 43.71 to 43.83 at a T-value of -0.17 and  $p > 0.05$ . The results are shown in the following table 2, all other outputs on the T-tests may be found in Appendix 10. Therefore, it is also concluded that both the MANOVA and the paired T-tests support the hypothesis H2.

		Mean Value	N	Standard Deviation	Standard Deviation of the mean value
<b>Control Group</b>					
Pairs 1	Pre Stress Management	13.77	52	2.348	.326
	Post Stress Management	14.25	52	2.535	.352
Pairs 2	Pre Stress and Coping Inventory	22.04	52	2.821	.391
	Post Stress and Coping Inventory	21.96	52	3.055	.424
Pairs 3	Pre ISBF	43.71	52	7.915	1.098
	Post ISBF	43.83	52	7.687	1.066
<b>Course Participants</b>					
Pairs 1	Pre Stress Management	11.88	48	2.358	.340
	Post Stress Management	15.50	48	2.370	.342
Pairs 2	Pre Stress and Coping Inventory	19.45	48	3.348	.488
	Post Stress and Coping Inventory	22.89	48	3.589	.523
Pairs 3	Pre ISBF	38.32	48	7.265	1.060
	Post ISBF	48.79	48	7.196	1.050

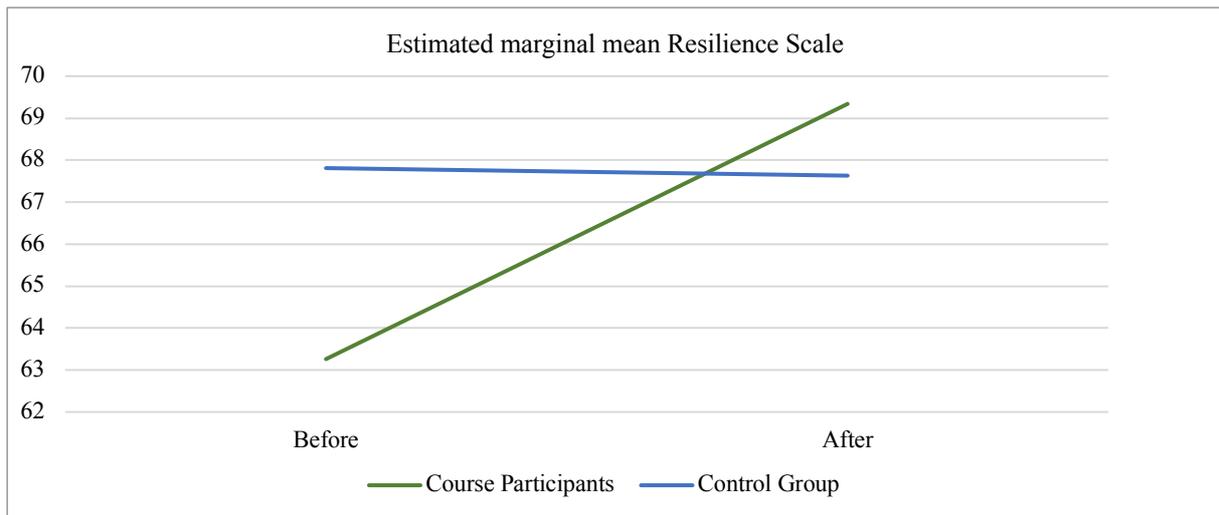
*Table 2: Statistic of paired samples for Stress Management*

### 4.3 Building Resilience

To test the interaction effect of time of measurement \* course participation for the dependent variable Resilience, a MANOVA was also conducted. The following conditions were met. First, the test for outliers was performed. It revealed one slight outlier for the control group before and two slight outliers for the course participants before and one after. As with the other two MANOVAs, no adjustments were made. Normal distribution was present for the control group ( $p > 0.05$ ) but not for the course participants ( $p < 0.05$ ). Pearson's correlation showed a correlation of 0.414 between the variables Resilience pre and post, thus there is no multicollinearity ( $p > 0.9$ ). Homogeneity of the error variances between the groups was given according to Levene's test for Resilience pre and post ( $p > 0.05$ ). In contrast, there was no homogeneity of covariance matrices ( $p < 0.001$ ). Again, for the third MANOVA, there were no violations of the basic requirements for performing the MANOVA and therefore the existing data set could be used for further analysis without any adjustments. Thus, hypothesis H3 was examined:

H3: Participants have a higher level of resilience after completing a course on reducing stress and building resilience than before taking the course.

To test this hypothesis, and thus the influence of participation in the course on participants' resilience, another MANOVA was conducted with repeated measures with group as a factor. The RS Resilience scale was used as the dependent variable. Also, for this hypothesis the test for within-subjects effects shows a significant interaction effect for time of measurement \* course participation with an F-value = 6.65 and  $p < 0.05$ . This effect is shown in the following graph (see figure 7) of the estimated marginal mean of the Resilience scale.



*Figure 7: Estimated marginal mean of Resilience Scale (own illustration)*

Going further, paired-sample T-tests were also conducted for this hypothesis. For the course participants, overall Resilience increases on average from 63.26 before course participation to 69.34 after course completion with a T-value of -2.66 and  $p < 0.05$ . For the control group, there is even a slight reduction in overall Resilience from a mean of 67.81 at the first interview to 67.63 at the second interview four weeks later with a T-value of 0.17 and not significant at  $p > 0.05$ . These results are also shown in the following table 3, further outputs can be seen in Appendix 11. Therefore, it is also concluded that both the MANOVA and the paired T-tests support the hypothesis H3.

		Mean Value	N	Standard Deviation	Standard Deviation of the mean value
<b>Control Group</b>					
Pairs 1	Pre Resilience	67.81	52	11.099	1.539
	Post Resilience	67.63	52	11.312	1.569
<b>Course Participants</b>					
Pairs 1	Pre Resilience	63.26	48	11.326	1.652
	Post Resilience	69.34	48	11.788	1.720

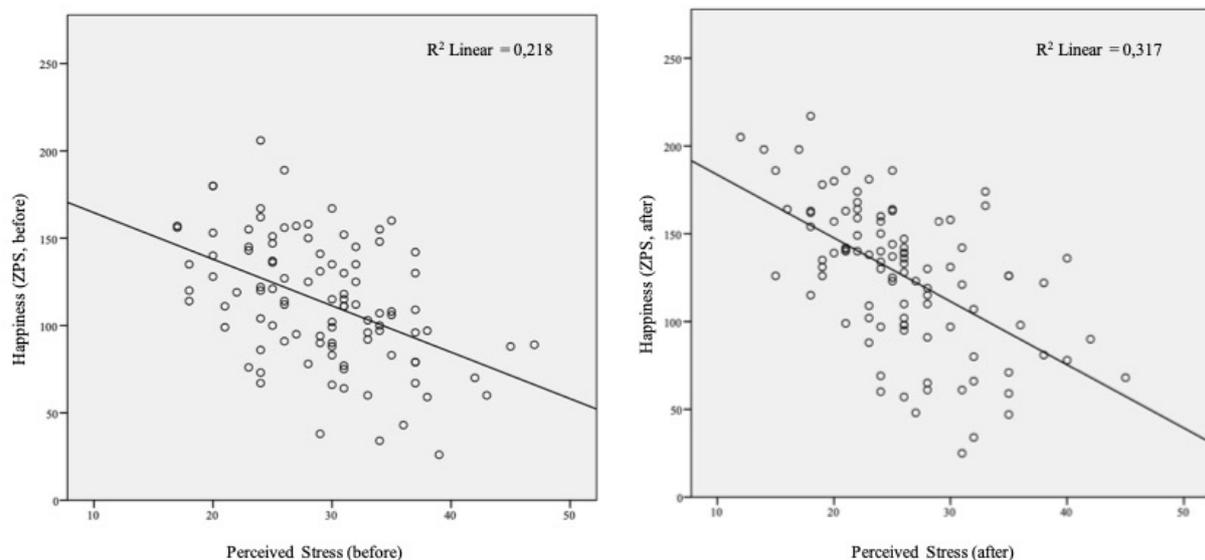
*Table 3: Statistic of paired samples for Resilience*

#### 4.4 Correlation of Stress and Happiness

The last hypothesis examines the relationship between the variables Happiness and Perceived Stress. To test the following hypothesis 4, a regression was performed:

H4: The lower a person's stress level, the happier they are.

To test the relationship between Happiness as the dependent variable, measured by the zentor Purpose Score, and the independent variable, stress level, measured by the Perceived Stress Scale, a linear regression was performed. All 100 participants were analyzed, both the course participants and the control group. Since there is a pre- and an post-data set, linear regression was performed for both data sets. The results including the regression lines are shown in the following graphs (see figure 8).



*Figure 8: Linear Regression of Perceived Stress and Happiness (own illustration)*

In the pre-survey, a simple linear regression with Happiness as the dependent variable and Perceived Stress as the explanatory variable is significant with an F-value  $F(1, 99) = 27.26$  and  $p < 0.001$ . The  $R^2$  is 0.218, thus 21.8% of the variance of Happiness can be explained by the variable Perceived Stress. The regression coefficient of the variable Perceived Stress is -2.66 and is significant at a T-value of -5.22 and  $p < 0.001$ .

Also, in the analysis of the post survey, a simple linear regression with Happiness as the dependent variable and Perceived Stress as the explanatory variable is significant at  $F(1,99) = 44.92$  and  $p < 0.001$ . The  $R^2$  is 0.317, which means that 31.7% of the variance of happiness can be explained by the variable Perceived Stress, thus even about 10% more than in the pre-survey. The regression coefficient of the variable Perceived Stress is -3.61 with a T-value of -6.70 and significant at  $p < 0.001$ . Significance is also proven by the following ANOVA in table 4, further outputs can be retrieved in Appendix 12. These results show that hypothesis H4 is supported.

#### ANOVA<sup>b</sup>

Model		Square Sum	df	Means of squares	F	Sig.
Pre	Regression	27662.490	1	27662.490	27.255	.000 <sup>a</sup>
	Non-standardized residuals	99466.350	99	1014.963		
	Total	127128.840	100			
Post	Regression	51423.653	1	51423.653	44.923	.000 <sup>a</sup>
	Non-standardized residuals	111037.094	99	1144.712		
	Total	162460.747	100			

a: Inbound variable: (constant), Pre-Perceived Stress resp. Post Perceived Stress

b: Dependent variable: Pre-Happiness, resp. Post Happiness

*Table 4: ANOVA Output of the Linear Regression between Perceived Stress and Happiness*

## 5 Discussion

The present thesis examined the relationship between participation in a course on managing stress and increases in resilience. In the following, the results described in the previous chapter are interpreted in more detail. It also discusses limitations of the study and provides implications for future research.

## 5.1 Interpretation of the Results

### *Reduction of Stress level*

The first hypothesis aimed to measure the change in Stress level over time or before and after participation in the course. The dependent variables to measure the difference are the Stress level and Stress Experience from the ZPP and the Perceived Stress Scale. The results of the MANOVA show that, as expected, there is a reduction in Stress level among course participants. For them, all three variables become significant and show an improvement in Stress level by the means with the T-tests. The MANOVA also shows that there is a significant difference over time and in comparison to the control group except for the variable Stress level.

The estimated marginal means of the individual variables again illustrate the difference in the development of the two groups immensely. The estimated marginal means of the Perceived Stress Scale show that the course participants improve greatly after completing the course and have thus much lower perceived stress than the control group, which can improve over time, but only marginally compared to the course participants. The change in Perceived Stress over time from pre to post survey of the course participants is also demonstrated to be significantly higher than the change of the control group (see Figure 4).

The estimated marginal mean of the individual question on Stress level also shows that the course participants have a bigger change in Stress level over the time and that the reduction is much more pronounced compared to the control group. However, the reduction in the Stress level question is also significant in the control group, this effect is discussed in the limitations section. The Stress Experience, which revolves around the participants' feelings, shows a similar picture. Here, too, the estimated marginal mean reveals that the course participants are able to improve extremely over the course of the study; the control group, on the other hand, remains on a similar, slightly reduced levels. That all three variables show similar graphs reinforces the thesis that participation in the course contributes to improving the Stress level.

It can be concluded that the knowledge and methods taught in the course help the participants to reduce their own Stress level. As described, awareness of the topic of stress and the effects of stress in the body may be the first step to enable participants to deal more consciously with their own Stress levels.

### *Improvement of Stress Management*

The second hypothesis addressed Stress Management, that is, the study participants' abilities to cope with stress. The MANOVA with the dependent variables Stress and Coping Inventory, ISBF and Stress Management from the ZPP shows a similar picture as the MANOVA on the general Stress level. Again, all three variables show significant improvement over time in the sample of course participants. In comparison, none of the three variables become significant in the control group. This once again illustrates the effect that participation in the course has on the participant's Stress Management.

The estimated marginal means also serve to illustrate the effect in this MANOVA. The questions of the Stress and Coping Inventory deal with positive thinking and active Stress Management. Looking at the estimated marginal means of the SCI for the two groups, it is clear that the participants in the pre-completion course are much less likely to think positively or have poorer Stress Coping than the control group. However, they are able to improve greatly after completing the course and end up significantly above the control group, which even marginally worsens over time.

The second scale used, the ISBF, differs from the SCI questions in one important aspect: While the SCI is more concerned with positive thinking and Stress Management, the ISBF questions are mainly concerned with the methods that can be used to better manage or reduce stress and which are also taught in the course. Therefore, this scale also has an important significance. Nevertheless, the picture is similar to the previous SCI. Here, too, the course participant's results are significantly below the course participants in the estimated marginal mean at the beginning and thus assume poorer Stress Management than the control group. However, they are able to increase very strongly and at the end of the study are far above the control group, which remains at roughly the same level.

The last scale used to measure Stress Management also confirms the result of the first two scales. The ZPP stress survey questionnaire also shows a large increase in the estimated marginal mean among course participants. Here, the control group also improves, but not significantly, and is nevertheless also at a lower level than the course participants, who rate themselves better in their own stress management.

This suggests that the relaxation methods and stress management strategies taught helped the course participants to better cope with their stress, among other things, or possibly prevent stress from occurring in the first place.

### *Building Resilience*

The third hypothesis, unlike the first two, was not concerned with Stress levels or coping with stress, but with Resilience. In the long term, the course should promote and build up the Resilience of the participants so that they will not be stressed so easily in the future and will be more resistant to possible stressors. It is interesting to see in the results of the MANOVA, which was conducted with the Resilience scale as the dependent variable, that it shows similar results to the MANOVAs on Stress level and Stress Management. Also in this third MANOVA, the improvement in Resilience becomes significant for the course participants, but not for the control group.

The estimated marginal mean of the Resilience scale also clearly shows that the course participants have a lower level of Resilience before the start of the course than the control group, but over the course of time after completing the course they improve very strongly and overtake the control group, which actually deteriorates slightly. This shows that the course helps the participants to build up a higher average level of Resilience after completing the course, and that they may no longer be so stressed by the stressors, which is also evident from the improvement in the participants' Stress Management.

### *Correlation of Stress and Happiness*

The last hypothesis examined in this thesis no longer distinguishes between course participants and control group. Rather, it was intended to show the general relationship between Experienced Stress and Happiness. For this purpose, both groups were combined into a total sample. This has the advantage that it is a larger sample size and thus has a higher significance. In addition, the survey included a pre and post questionnaire. This also offers advantages for this hypothesis, as the analysis was carried out separately for both data sets and the resulting results reinforce each other once again.

Thus, 100 questionnaires were considered in each of the pre and post surveys (48 course participants + 52 control group). The correlation was established by linear regression. As expected, both regressions showed that the less stress the participants experience, the happier they are. This was further confirmed by the calculated  $R^2$  in both regressions. For the Before survey, the  $R^2$  is 21.8%, which means that the independent variable Perceived Stress can explain 21.8% of the dependent variable Happiness, indicating a relatively strong relationship. This theory is strengthened by the linear regression of the second data set of the post survey. Here, the  $R^2$  is 31.7%, indicating an even stronger relationship between Experienced Stress and Happiness.

This correlation makes it clear once again how important it is for everyone to deal with the topic of stress and to find out for themselves how to best deal with stress or how to best avoid it before it arises, since a high Stress level, as has been established, can also have far-reaching effects on overall well-being.

## **5.2 Limitations**

### *General Limitations on online health and prevention courses*

When interpreting the results, however, some limitations must be considered. In general, as already described, digital offerings have great potential in terms of time and space. The reach of these programs is almost unlimited and offers many opportunities to improve and maintain the health of broad sections of the population (Hoffmann et al., 2019). However, this is also accompanied by the limitation that there is no precise addressing of specific target groups and needs in the online stress courses, but the course content is kept rather general. If participants want an individual program, a coach can be called in if necessary, for example.

However, this does not make it easy to measure the quality of the courses, as the success or non-success of the course depends on the individual starting situation of each participant. When taking the course, each participant is in a different life situation or life stage that cannot be compared, but can have an influence on the success of the course. Such events or situations were not asked about in the study, as such information is difficult to evaluate in a comparable way.

In addition to the different starting situations in which the participants may find themselves, it is not possible to measure how intensively the participants engage with the course content in the case of digital offerings, which represents a further limitation. The course provider makes a recommendation as to how much time should be spent on the course and over what period of time. However, in the case of online courses, it is up to the participant to decide how often and how long he or she wants to spend on the content. This time aspect was not queried in the study. It is therefore possible that some participants completed the course in a relatively short period of time, which may mean that not as much of the content is kept in mind.

In order to reduce the Stress level in the long term, to manage stress better and to build Resilience, it is of enormous importance to internalize the course content and to adopt the methods learned through continuous practice, which is the first step towards a long-term improvement of the Stress level. Since the post questionnaire was completed directly after the last chapter, the significance of the long-term change in the Stress level or Stress Management is limited.

#### *Limitations on the conducted study design*

In addition to the limitations that affect online health and prevention courses in general, there are also limitations that apply to this specific study. One of these is that the survey period for the participants in the study is limited to December to February. The first survey of the control group and of the course participants before completion of the course took place at the beginning of December. In this pre-Christmas period, it is often the case that people feel more stressed shortly before the end of the year and still want to get a lot done before Christmas and the turn of the year. Around Christmas and New Year's Eve, many people are on vacation. As already described, vacations generally contribute to relaxation and thus also often reduce the stress level.

The second survey of the control group took place in mid-January. This occurred exactly after the Christmas vacation (if one was taken). For the course participants, on the other hand, there was no fixed date when the second questionnaire was completed. This was done after completion of the course, whereby, as mentioned, each course participant spent different amounts of time on the course content. In the control group, this limitation is also shown by the fact that the results indicate a significant reduction in the single question about the general

Stress level between the two survey dates. This may be due to the fact that the pre-Christmas stress is no longer present after the vacation, or, for example, due to good resolutions for the New Year, or simply the recovery after the vacation.

One participant in the control group also gave feedback that his insecurity and nervousness were also strongly influenced by external factors, as an example he mentioned the restrictions of the Covid19 pandemic and also the invasion of Russia in Ukraine in February 2022. However, as described, such external factors influence each individual differently and thus cannot be measured and considered in the results of the study.

Another feedback involving limitations comes from a course participant. She confirms the effectiveness of the course in that she was able to get some inspiration, relaxation, and mindfulness she can already implement well in her everyday life. However, there are still problems with the implementation of the rest of the contents taught in order to reduce the Stress level. In particular, she mentions the comparison with others and the evaluation within stressful situations. For her it is still very difficult to set a new positive focus in acute stress situations and to deal with what she can influence and change herself and what not. However, she is positive that with some practice this will become more successful. This feedback reveals that the theory is easier to convey than to accompany the practical implementation of the course participants, whereby more practice or even in some cases support is still needed.

The question on general Stress levels also offers further room for discussion. Since it is a single question "How high do you estimate your Stress level in the last four weeks?" with the answer options of a Likert scale from 1 to 5, the significance of the question can be discussed. The question is specified by the ZPP for the certification of online stress courses. However, it is a single subjective assessment. Therefore, more attention should be paid to the Perceived Stress Scale to assess the results of the Stress level. This is far more scientifically validated by various studies and thus one of the most widely used scales for measuring Stress levels worldwide.

In this study, too, more importance should therefore be attached to this scale than to the individual question on the Stress level. This assumption is also confirmed by the results of the study, especially in the control group. The control group's results showed that the participants were able to significantly reduce their Stress level in the single question on Stress level during the study period. As described above, this may also be due to the pre-Christmas/New Year period. On the other hand, the MANOVA and the paired T-test of independent samples show

that the Perceived Stress Scale is not significant for the control group and thus no reduced effect of the Experienced Stress over time can be demonstrated. Due to its better scientific validity, greater importance should therefore be attached to the results of the Perceived Stress Scale.

There are certain limitations to be noted in the relationship between Stress and Happiness. When analyzing the  $R^2$  between Perceived Stress and Happiness, it must be noted that there are several individual factors besides stress that have an influence on happiness. The zentor purpose score, which is used to measure Happiness in this study, considers Purpose, Commitment and Appreciation as the main factors that determine Happiness. However, it is not only the Stress Experienced that determines how happy a person is. Due to the different evaluation of stress and the different factors that cause Happiness for each individual, no general statement can be made about the relationship between Stress and Happiness.

To be concluded, the  $R^2$  explains by the measured 21,8% and 31,7% a very high proportion of the influence on Happiness and can be interpreted besides the many other factors on Happiness as relatively high. However, no statement can be made as to which other factors or which stressful situations generally have an influence on Happiness.

### **5.3 Implications**

The study of this thesis contributes to the research on the effectiveness of courses on Stress Management. However, there are some implications that should be considered for further future studies. These are divided into theoretical implications that concern scientific research. In addition, there are some practical implications that are relevant for participants of online courses on Stress Management, as well as for the creators of such courses.

#### *Theoretical Implications*

The aim of this work was to contribute to the few scientific studies on the effectiveness of online health and prevention courses. As expected, effectiveness in reducing Stress levels, improving Stress Management, and Resilience was demonstrated, thus contributing to the scientific studies. However, more scientific research needs to be done.

An impact on subsequent studies is evident through the different scales used to measure Stress levels. For this purpose, the Perceived Stress Scale and, from the given questions of the ZPP, the single question on the Stress level and the Stress Experience were asked of the study participants. It has become clear that already scientifically validated scales, which consist of more than just one item, have a higher significance than a single question on the Stress level. Since the topic of stress is assessed very subjectively by everyone and different stressors have a different influence, further scientific studies should focus primarily on validated scales in order to have greater significance.

As already mentioned, a person's Stress Management improves primarily through long-term practice and internalization of the methods. However, the second questionnaire was completed by participants immediately after completing the course on Stress Management. In order to prove a long-term effect of the contents of the course, a further survey must take place. Therefore, further research should send the questionnaire with the same scales to the course participants a third time to maintain comparability to the first two surveys. The third survey could take place at a time interval of three to six months after completion of the course and thus also show again in comparison with the control group whether the Stress level has risen again and whether Stress Management has deteriorated again or whether both have remained at the same level or even further improved.

In addition to a third survey, it would be advisable to conduct further studies at other times of the year. The study of this thesis was conducted during the pre-Christmas/New Year period. For further stress research, it would be important to prove that a study in other months, e.g., spring or fall, yield the same results, since the pre-Christmas period is generally considered stressful and stress often decreases at New Year. If another study comes to similar results, this would further strengthen the findings of this study.

### *Practical Implications*

The current studies on the increase of the general Stress level in Germany and stress as one of the biggest health problems worldwide show the need for action to better deal with stress for each individual. The results of this study on the effectiveness of an online stress management course also show that such online courses are a suitable means of improving a person's own stress management. Therefore, it is advisable to take such a course and to deal

intensively with people's own stressors and thus improve the Stress level and Stress Management. However, as already mentioned, even after completing the course, a long-term engagement with the taught content should take place in order to increase the Resilience in the long term and thus increase the general state of health and Happiness.

In addition to dealing with each individual's own Stress level, it is also the task of the employer to deal with the Stress level of the employees and to support them in this respect. It would therefore be a possible implication for the future to make online courses on dealing with stress, such as those from this study, increasingly available to employees as part of company health management. One reason for this is the high demands in today's working world, which can have a negative impact on employees' mental health. These developments require employees to have solid competencies of their own work in order to cope with the increased demands (Janneck, 2018). These competencies for improving Stress level, Stress Management and Resilience can be increased by offering online courses on dealing with stress, among other things.

For the creators of such online courses on dealing with stress, digitalization offers many advantages, as mentioned above. They should take advantage of this by constantly developing their courses to offer participants the greatest added value. However, since stress is very individual, one option to further increase the effectiveness of the online courses would be to offer individual content such as personal coaching within the course in addition to the standardized content of the course. This could help participants to lower their Stress levels more efficiently or to internalize the methods taught. An indicator for this is the described feedback of a participant of the course, in which she explains her difficulty in the implementation in everyday life. This could therefore be a starting point for the course providers to further increase the effectiveness of the course in dealing with stress.

## 6 Conclusion

The study by Techniker Krankenkasse (2021) on the development of Stress levels in Germany over the years since 2013 shows that stress plays an enormous role in today's society and continues to increase. This study is supported by the survey of Statista (2021) on the current major health problems worldwide with stress in the top four. Therefore, it is important for everyone to know and manage their Stress level to be more resistant to possible stress and ultimately be happier. The study of this thesis with the evaluation of an online course for dealing with stress and building Resilience shows a scientifically proven effective way to better manage a person's own stress, which may also influence the general state of health.

The effectiveness of the course was demonstrated as the course participants were able to significantly reduce their Stress levels after completing the course, improve their Stress Management skills, and increase their Resilience. In conclusion, it was found that people who experience less stress are generally happier. These results indicate that it is important for everyone to address the issue of stress and that an online stress management course is a suitable way to do so.

Nevertheless, further development of such online courses and further scientific studies on their effectiveness are necessary in order to keep improving the courses, also in terms of digitalization. In this regard, a contribution could be made to reducing stress as one of the biggest health problems worldwide.

## Appendix

### Appendix 1: Central Prevention Office (ZPP) Questionnaire

Fragen zum Allgemeinen Stresslevel	Sehr gering					Hoch
Wie hoch schätzen Sie Ihr Stresslevel in den letzten 4 Wochen ein?	1	2	3	4	5	
<hr/>						
In den letzten 4 Wochen...	Nie					Immer
Habe ich die Ursachen von unangenehmem Stress erkannt.	1	2	3	4	5	
Konnte ich Stress-Situationen gut bewältigen.	1	2	3	4	5	
Habe ich versucht, gegen die Ursachen von Stress etwas zu tun.	1	2	3	4	5	
Hatte ich gute Methoden, um mich zu entspannen.	1	2	3	4	5	
<hr/>						
In den letzten 4 Wochen fühlte ich mich...	Nie					Immer
Voller Schwung	1	2	3	4	5	
Sehr nervös	1	2	3	4	5	
So niedergeschlagen, dass mich nichts aufheitern konnte	1	2	3	4	5	
Ruhig und gelassen	1	2	3	4	5	
Voller Energie	1	2	3	4	5	
Entmutigt und traurig	1	2	3	4	5	
Erschöpft	1	2	3	4	5	
Glücklich	1	2	3	4	5	
Müde	1	2	3	4	5	

---

	Schlecht	Weniger gut	Gut	Sehr gut	Ausgezeichnet
Wie würden Sie Ihren Gesundheitszustand im Allgemeinen beschreiben?	1	2	3	4	5
	Derzeit viel schlechter	Derzeit etwas schlechter	Etwa gleich	Derzeit etwas besser	Derzeit viel besser
Im Vergleich zum Beginn der Studie, wie würden Sie Ihren derzeitigen Gesundheitszustand beschreiben?	1	2	3	4	5

---

## Appendix 2: Perceived Stress Scale – 10

Die folgenden Fragen beschäftigen sich mit Ihren Gedanken und Gefühlen während des letzten Monats. Bitte geben Sie für jede Frage an, wie oft sie in entsprechender Art und Weise gedacht oder gefühlt haben.

	Nie	Fast Nie	Manchmal	Ziemlich oft	Sehr oft
Wie oft waren Sie im letzten Monat aufgewühlt, weil etwas unerwartet passiert ist?	1	2	3	4	5
Wie oft hatten Sie im letzten Monat das Gefühl, nicht in der Lage zu sein, die wichtigen Dinge in Ihrem Leben kontrollieren zu können?	1	2	3	4	5
Wie oft haben sie sich im letzten Monat nervös und gestresst gefühlt?	1	2	3	4	5
Wie oft waren Sie im letzten Monat zuversichtlich, dass Sie fähig sind, ihre persönlichen Probleme zu bewältigen?	1	2	3	4	5
Wie oft hatten Sie im letzten Monat das Gefühl, dass sich die Dinge zu Ihren Gunsten entwickeln?	1	2	3	4	5
Wie oft hatten Sie im letzten Monat den Eindruck, nicht all Ihren anstehenden Aufgaben gewachsen zu sein?	1	2	3	4	5
Wie oft waren Sie im letzten Monat in der Lage, ärgerliche Situationen in Ihrem Leben zu beeinflussen?	1	2	3	4	5
Wie oft hatten Sie im letzten Monat das Gefühl, alles im Griff zu haben?	1	2	3	4	5
Wie oft haben Sie sich im letzten Monat über Dinge geärgert, über die Sie keine Kontrolle hatten?	1	2	3	4	5
Wie oft hatten Sie im letzten Monat das Gefühl, dass sich so viele Schwierigkeiten angehäuft haben, dass Sie diese nicht überwinden konnten?	1	2	3	4	5

Skala Hilflosigkeit (H): Summe der Items 1, 2, 3, 6, 9, 10; Skala Selbstwirksamkeit (S): Summe der Items 4, 5, 7, 8. Für die Berechnung des Gesamtscores müssen die Items 4, 5, 7 und 8 der Selbstwirksamkeitsskala invertiert werden. Der Gesamtscore berechnet sich aus der Summe der Items der Hilflosigkeitsskala und der Summe der invertierten Items der Selbstwirksamkeitsskala. Höhere Werte deuten auf ein erhöhtes Stresslevel hin.

Original Items in English (Cohen et al., 1983)

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way.

1 PH: In the last month, how often have you been upset because of something that happened unexpectedly?

2 PH: In the last month, how often have you felt that you were unable to control the important things in your life?

3 PH: In the last month, how often have you felt nervous and “stressed”?

4 PSE: In the last month, how often have you felt confident about your ability to handle your personal problems?

5 PSE: In the last month, how often have you felt that things were going your way?

6 PH: In the last month, how often have you found that you could not cope with all the things that you had to do?

7 PSE: In the last month, how often have you been able to control irritations in your life?

8 PSE: In the last month, how often have you felt that you were on top of things?

9 PH: In the last month, how often have you been angered because of things that were outside of your control?

10 PH: In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Answer range: 1 = never, 2 = almost never, 3 = sometimes, 4 = fairly often, 5 = very often; PH=perceived helplessness subscale; PSE=perceived self-efficacy; Items 4, 5, 7 and 8 are reverse scored for the total score. The PH subscale is computed by summing up Items 1, 2, 3, 6, 9 and 10; the PSE subscale is computed by summing up items 4, 5, 7 and 8; the total score is the sum of all PH and reversed PSE items. Higher scores reflect greater levels of stress

### Appendix 3: Stress- and Coping Inventory

Psychometrische Kennwerte für die Skala „Positives Denken“:

Itemnr.	Item	Trifft gar nicht zu	Trifft eher nicht zu	Trifft eher zu	Trifft genau zu
Positiv1	Ich sage mir, dass Stress und Druck auch ihre guten Seiten haben.	1	2	3	4
Positiv2	Ich sehe Stress und Druck als positive Herausforderung an.	1	2	3	4
Positiv3	Bei Stress und Druck konzentriere ich mich einfach auf das Positive.	1	2	3	4
Positiv4	Auch wenn ich sehr unter Druck stehe, verliere ich meinen Humor nicht.	1	2	3	4

Psychometrische Kennwerte für die Skala „Aktive Stressbewältigung“:

Itemnr.	Item	Trifft gar nicht zu	Trifft eher nicht zu	Trifft eher zu	Trifft genau zu
Aktiv1	Ich tue alles, damit Stress erst gar nicht entsteht.	1	2	3	4
Aktiv2	Ich mache mir schon vorher Gedanken, wie ich Zeitdruck vermeiden kann.	1	2	3	4
Aktiv3	Ich versuche Stress schon im Vorfeld zu vermeiden.	1	2	3	4
Aktiv4	Bei Stress und Druck beseitige ich gezielt die Ursachen.	1	2	3	4

**Appendix 4:** Inventory for assessment of stress management skills (ISBF)

Scale	Item no.	Item wording English ( <i>German</i> )	Überhaupt nicht	Nur ein wenig	Einigermaßen gut	Ziemlich gut	Sehr gut
CogPro	4	I can easily stop and re-examine my thoughts to gain a new perspective ( <i>Ich kann meine Gedanken leicht stoppen und überprüfen, um zu neuen Perspektiven zu gelangen</i> )	1	2	3	4	5
	5	It's easy for me to decide how to cope with whatever problems arise ( <i>Es fällt mir leicht zu entscheiden, wie ich mit neu aufgetauchten Problemen umgehen kann</i> )	1	2	3	4	5
	8	When problems arise I know how to cope with them ( <i>Wenn Probleme auftauchen, weiss ich, wie ich sie angehe</i> )	1	2	3	4	5
	15	I am confident about being able to choose the best coping responses for hard situations ( <i>Ich vertraue darauf, dass ich in schwierigen Situationen in der Lage bin, die besten Bewältigungsstrategien zu wählen</i> )	1	2	3	4	5
	16	I can come up with emotionally balanced thoughts even during negative times ( <i>Auch in belasteten Zeiten kann ich emotional ausgeglichene Gedanken aufkommen lassen</i> )	1	2	3	4	5
SocRes	10	It's easy for me to go to people in my life for help	1	2	3	4	5

		or support when I need it ( <i>Es fällt mir leicht, Menschen aus meinem Umfeld um Unterstützung zu bitten, wenn ich Unterstützung brauche</i> )						
	17	I can ask people in my life for support or assistance whenever I need it ( <i>Wann immer es nötig ist, kann ich Menschen aus meinem Umfeld um Unterstützung oder Beistand bitten</i> )	1	2	3	4	5	
RelaxAb	1	I am able to use muscle relaxation techniques to reduce any tension I experience ( <i>Ich bin in der Lage, Muskelentspannungstech- niken anzuwenden, um wahrgenommene Anspannung zu reduzieren</i> )	1	2	3	4	5	
	13	I am able to use mental imagery to reduce any tension I experience ( <i>Ich kann mich mentaler Bilder bedienen, um meine Anspannung zu reduzieren</i> )	1	2	3	4	5	
AngEx As	7	If I get angry, I can express the anger openly without overdoing it ( <i>Wenn ich ärgerlich werde, kann ich meinen Ärger offen zeigen, ohne zu übertreiben</i> )	1	2	3	4	5	
	12	I can stand up for my rights without violating the rights of others ( <i>Ich kann für meine Rechte einstehen, ohne damit die</i>	1	2	3	4	5	

		<i>Rechte anderer zu verletzen)</i>					
	14	I can express my anger in a balanced and reasonable manner ( <i>Ich kann meinen Ärger in vernünftiger und ausgewogener Art und Weise ausdrücken</i> )	1	2	3	4	5
PBod Tens	2	I become aware of any tightness in my body as soon as it develops ( <i>Wenn sich Verspannungen in meinem Körper aufbauen, dann merke ich das sofort</i> )	1	2	3	4	5
	9	I notice right away whenever my body is becoming tense ( <i>Ich bemerke sofort, wenn mein Körper beginnt, sich zu verspannen</i> )	1	2	3	4	5

Bold reliability coefficients are the reliability coefficients of the respective subscales. Italic numbers and terms are used to facilitate comprehension of what belongs together without any additional meaning.

CogProb, scale “cognitive strategies and problem solving”; SocRes, scale “identification and use of social resources”; RelaxAb, scale “relaxation abilities”; AngExAs, scale “adequate anger expression and assertiveness”; PBodTens, scale “perception of bodily tension”; Excluded, items 3, 6, and 11 of the initial questionnaire that were excluded in the CFA models; factor loadings, standardized factor loadings of the 5-factor multigroup CFA-model, all factor loadings are significant (t-values > 2).

## Appendix 5: Resilience Scale (RS-13)

	Stimme nicht zu							Stimme völlig zu
Wenn ich Pläne habe, verfolge ich sie auch.	1	2	3	4	5	6	7	
Normalerweise schaffe ich alles irgendwie.	1	2	3	4	5	6	7	
Ich lasse mich nicht so schnell aus der Bahn werfen.	1	2	3	4	5	6	7	
Ich mag mich.	1	2	3	4	5	6	7	
Ich kann mehrere Dinge gleichzeitig bewältigen.	1	2	3	4	5	6	7	
Ich bin entschlossen.	1	2	3	4	5	6	7	
Ich nehme die Dinge wie sie kommen.	1	2	3	4	5	6	7	
Ich behalte an vielen Dingen Interesse.	1	2	3	4	5	6	7	
Normalerweise kann ich die Situation aus mehreren Perspektiven betrachten.	1	2	3	4	5	6	7	
Ich kann mich auch überwinden, Dinge zu tun, die ich eigentlich nicht machen will.	1	2	3	4	5	6	7	
Wenn ich in einer schwierigen Situation bin, finde ich gewöhnlich einen Weg heraus.	1	2	3	4	5	6	7	
In mir steckt genügend Energie, um alles zu machen, was ich machen muss.	1	2	3	4	5	6	7	
Ich kann es akzeptieren, wenn mich nicht alle Leute mögen.	1	2	3	4	5	6	7	

## Appendix 6: Zentor Purpose Score

### Energie & Stimmung

Studien haben gezeigt, dass unsere aktuelle Stimmung und unser Energie-Niveau beeinflussen, was wir gern tun und was uns leichtfällt.

	Niedrig						Hoch
Wie würden Sie ihr Energieniveau der vergangenen vier Wochen bewerten?	1	2	3	4	5	6	7
	Negativ						Positiv
Wie würden Sie Ihre Stimmung der vergangenen vier Wochen bewerten?	1	2	3	4	5	6	7

Im Folgenden stellen wir Ihnen einige Fragen zu drei Themen, die in der Glücksforschung als Quellen für ein erfüllendes Leben identifiziert wurden.

Am besten beantworten Sie diese Fragen intuitiv ohne lange darüber nachzudenken - es gibt kein richtig oder falsch.

	Nie						Immer
Wie oft erkennen Sie derzeit tieferen Sinn in Ihrem Leben – wie etwa eine größere Aufgabe oder ein übergeordnetes Ziel?	1	2	3	4	5	6	7
	Überhaupt nicht						Vollkommen
Inwiefern sind Sie derzeit auf der Suche nach tieferem Sinn in Ihrem Leben?	1	2	3	4	5	6	7
Wenn Sie sich ein ideales, erfülltes Leben vorstellen, wie sehr ist dieses Leben von tieferem Sinn geprägt?	1	2	3	4	5	6	7
	Nie						Immer

Wie oft können Sie sich für Dinge, die Sie derzeit tun, begeistern bzw. sind vollkommen darin versunken?	1	2	3	4	5	6	7
	Keine						Alle
Wie viele der Dinge, für die Sie sich begeistern, empfinden Sie als sinnstiftend?	1	2	3	4	5	6	7
	Überhaupt nicht						Vollkommen
Wenn Sie sich ein ideales, erfülltes Leben vorstellen, wie sehr ist dieses Leben von Dingen geprägt, für die Sie sich begeistern?	1	2	3	4	5	6	7
	Nie						Immer
Wie oft haben Sie das Gefühl, dass Sie von anderen wertgeschätzt werden?	1	2	3	4	5	6	7
	Keine						Alle
Wie viele Ihrer Interaktionen mit anderen empfinden Sie als sinnstiftend?	1	2	3	4	5	6	7
	Überhaupt nicht						Vollkommen
Wenn Sie sich ein ideales, erfülltes Leben vorstellen, wie sehr ist dieses Leben von gegenseitiger Wertschätzung geprägt?	1	2	3	4	5	6	7
	Äußerst unglücklich						Äußerst glücklich
Alles in allem betrachtet, wie glücklich sind Sie?	1	2	3	4	5	6	7

## Appendix 7: Pre-Questionnaire

### Fragebogen Vorher

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Herzlich Willkommen und vielen Dank, dass Sie sich Zeit für diese Befragung nehmen!

Im Rahmen meiner Masterarbeit an der Technischen Universität München untersuche ich in Zusammenarbeit mit der zentor GmbH, ob Stress aktiv reduziert werden kann und ob dies Auswirkungen auf eine höhere Resilienz hat.

Daher würde ich mich freuen, wenn Sie mir ein paar Fragen zu Ihrer aktuellen Stresslage und -bewältigung beantworten. Bitte bearbeiten Sie alle Fragen, damit die Umfrage vollständig ausgewertet werden kann. Es gibt keine "falschen" oder "richtigen" Antworten.

Die vollständige Beantwortung der Fragen wird ca. 10 Minuten dauern. Aus methodischen Gründen wird der Fragebogen sowohl zu Beginn des Kurses, sowie nach Beendigung des Kurses durchgeführt. Bitte beantworten Sie deshalb beide Fragebögen. Ihre Daten werden vertraulich und anonym behandelt. Die Analyse Ihrer Antworten erfolgt nur in zusammengefasster Form unter Verwendung aller Teilnehmenden an dieser Befragung und dient ausschließlich wissenschaftlichen Zwecken. Namen werden grundsätzlich nicht erfasst oder vermerkt, ein Rückschluss auf einzelne Personen ist dadurch nicht möglich und auch nicht Ziel dieser Studie.

Bei Fragen zur Studie können Sie sich jederzeit unter folgender E-Mail Adresse an mich wenden: [elsa.gruenauer@tum.de](mailto:elsa.gruenauer@tum.de)

Vielen Dank für Ihre Unterstützung!  
Elsa Grünauer

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Ich stimme der Verarbeitung meiner Angaben im Rahmen dieser Studie auf Grundlage der gegebenen Informationen zum Befragungszweck und Datenschutz zu und möchte an dieser Studie teilnehmen.

Ja, ich stimme zu und möchte teilnehmen.

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## Beginn des Blocks: Stresslevel

### Fragen zum Allgemeinen Stresslevel

Wie hoch schätzen Sie Ihr Stresslevel in den letzten 4 Wochen ein?

- Sehr gering (1)
  - (2)
  - (3)
  - (4)
  - Hoch (5)
- 

Bitte kreuzen Sie an, wie häufig die folgenden Aussagen in den letzten 4 Wochen auf Sie zutrafen.

In den letzten 4 Wochen...

	Nie (1)	(2)	(3)	(4)	Immer (5)
habe ich die Ursachen von unangenehmem Stress erkannt.	<input type="radio"/>				
konnte ich Stress-Situationen gut bewältigen.	<input type="radio"/>				
habe ich versucht, gegen die Ursachen von Stress etwas zu tun.	<input type="radio"/>				
hatte ich gute Methoden, um mich zu entspannen.	<input type="radio"/>				

---

In den folgenden Fragen geht es darum, wie Sie sich fühlen und wie es Ihnen in den vergangenen 4 Wochen gegangen ist.

In den letzten 4 Wochen fühlte ich mich...

	Nie (1)	(2)	(3)	(4)	Immer (5)
voller Schwung	<input type="radio"/>				
sehr nervös	<input type="radio"/>				
so niedergeschlagen, dass mich nichts aufheitern konnte	<input type="radio"/>				
ruhig und gelassen	<input type="radio"/>				
voller Energie	<input type="radio"/>				
entmutigt und traurig	<input type="radio"/>				
erschöpft	<input type="radio"/>				
glücklich	<input type="radio"/>				
müde	<input type="radio"/>				

Wie würden Sie Ihren Gesundheitszustand im Allgemeinen beschreiben?

- schlecht
- weniger gut
- gut
- sehr gut
- ausgezeichnet

## Ende des Blocks: Stresslevel

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### Beginn des Blocks: Stressoren

Die folgenden Fragen beschäftigen sich nochmals mit Ihren Gedanken und Gefühlen während der letzten 4 Wochen. Bitte geben Sie für jede Frage an, wie oft Sie in entsprechender Art und Weise gedacht oder gefühlt haben

	Nie	Fast nie	Manchmal	Ziemlich oft	Sehr oft
Wie oft waren Sie in den letzten 4 Wochen aufgewühlt, weil etwas unerwartet passiert ist?	<input type="radio"/>				
Wie oft hatten Sie in den letzten 4 Wochen das Gefühl, nicht in der Lage zu sein, die wichtigen Dinge in Ihrem Leben kontrollieren zu können?	<input type="radio"/>				
Wie oft haben Sie sich in den letzten 4 Wochen nervös und gestresst gefühlt?	<input type="radio"/>				
Wie oft waren Sie in den letzten 4 Wochen zuversichtlich, dass Sie fähig sind, ihre persönlichen Probleme zu bewältigen?	<input type="radio"/>				
Wie oft hatten Sie in den letzten 4 Wochen das Gefühl, dass sich die Dinge zu Ihren Gunsten entwickeln?	<input type="radio"/>				
Wie oft hatten Sie in den letzten 4 Wochen den Eindruck, nicht all Ihren anstehenden Aufgaben gewachsen zu sein?	<input type="radio"/>				
Wie oft waren Sie in den letzten 4 Wochen in der Lage, ärgerliche Situationen in Ihrem Leben zu beeinflussen?	<input type="radio"/>				
Wie oft hatten Sie in den letzten 4 Wochen das Gefühl, alles im Griff zu haben?	<input type="radio"/>				

Wie oft haben Sie sich in den letzten 4 Wochen über Dinge geärgert, über die Sie keine Kontrolle hatten?

Wie oft hatten Sie in den letzten 4 Wochen das Gefühl, dass sich so viele Schwierigkeiten angehäuft haben, dass Sie diese nicht überwinden konnten?

**Ende des Blocks: Stressoren**

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**Beginn des Blocks: Stressbewältigung**

Wie gehen Sie mit Stress um? Es gibt keine richtigen oder falschen Antworten. Antworten Sie möglichst spontan und lassen Sie keine Aussage aus.

	Trifft gar nicht zu	Trifft eher nicht zu	Trifft eher zu	Trifft genau zu
Ich tue alles, damit Stress erst gar nicht entsteht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich mache mir schon vorher Gedanken, wie ich Zeitdruck vermeiden kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich versuche Stress schon im Vorfeld zu vermeiden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bei Stress und Druck beseitige ich gezielt die Ursachen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich sage mir, dass Stress und Druck auch ihre guten Seiten haben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich sehe Stress und Druck als positive Herausforderung an.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bei Stress und Druck konzentriere ich mich einfach auf das Positive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Auch wenn ich sehr unter Druck stehe, verliere ich meinen Humor nicht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Menschen können unterschiedlich auf alltägliche Anforderungen und Herausforderungen reagieren. Die folgenden Aussagen zeigen verschiedene Möglichkeiten oder Abstufungen auf, wie man mit alltäglichem Stress umgehen kann.

Bitte geben Sie für jede Aussage an, wie gut es Ihnen gegenwärtig gelingt, sich entsprechend der Aussage zu verhalten.

	Überhaupt nicht	Nur ein wenig	Einigermaßen gut	Ziemlich gut	Sehr gut
Ich bin in der Lage, Muskelentspannungstechniken anzuwenden, um wahrgenommene Anspannung zu reduzieren.	<input type="radio"/>				
Ich vertraue darauf, dass ich in schwierigen Situationen in der Lage bin, die besten Bewältigungsstrategien zu wählen	<input type="radio"/>				
Ich kann meine Gedanken leicht stoppen und überprüfen, um zu neuen Perspektiven zu gelangen.	<input type="radio"/>				
Es fällt mir leicht zu entscheiden, wie ich mit neu aufgetauchten Problemen umgehen kann.	<input type="radio"/>				
Wenn ich ärgerlich werde, kann ich meinen Ärger offen zeigen, ohne zu übertreiben.	<input type="radio"/>				
Wenn Probleme auftauchen, weiß ich, wie ich sie angehe.	<input type="radio"/>				
Ich bemerke sofort, wenn mein Körper beginnt, sich zu verspannen.	<input type="radio"/>				
Es fällt mir leicht, Menschen aus meinem Umfeld um Unterstützung zu bitten, wenn ich Unterstützung brauche.	<input type="radio"/>				

Ich kann für meine Rechte einstehen, ohne damit die Rechte anderer zu verletzen.	<input type="radio"/>				
Ich kann mich mentaler Bilder bedienen, um meine Anspannung zu reduzieren.	<input type="radio"/>				
Ich kann meinen Ärger in vernünftiger und ausgewogener Art und Weise ausdrücken.	<input type="radio"/>				
Wenn sich Verspannungen in meinem Körper aufbauen, dann merke ich das sofort	<input type="radio"/>				
Auch in belastenden Zeiten kann ich emotional ausgeglichene Gedanken aufkommen lassen.	<input type="radio"/>				
Wann immer es nötig ist, kann ich Menschen aus meinem Umfeld um Unterstützung oder Beistand bitten.	<input type="radio"/>				

**Ende des Blocks: Stressbewältigung**

**Beginn des Blocks: Resilienz**

Im folgenden finden Sie eine Reihe von Feststellungen. Bitte lesen Sie sich jede Feststellung durch und kreuzen Sie an, wie sehr die Aussagen im Allgemeinen auf Sie zutreffen, d.h. wie sehr Ihr übliches Denken und Handeln durch diese Aussagen beschrieben wird.

	Stimme nicht zu (1)	(2)	(3)	(4)	(5)	(6)	Stimme völlig zu (7)
Wenn ich Pläne habe, verfolge ich sie auch.	<input type="radio"/>						
Normalerweise schaffe ich alles irgendwie.	<input type="radio"/>						
Ich lasse mich nicht so schnell aus der Bahn werfen.	<input type="radio"/>						
Ich mag mich	<input type="radio"/>						

Ich kann mehrere Dinge gleichzeitig bewältigen.	<input type="radio"/>						
Ich bin entschlossen	<input type="radio"/>						
Ich nehme die Dinge wie sie kommen.	<input type="radio"/>						
Ich behalte an vielen Dingen Interesse.	<input type="radio"/>						
Normalerweise kann ich die Situation aus mehreren Perspektiven betrachten.	<input type="radio"/>						
Ich kann mich auch überwinden, Dinge zu tun die ich eigentlich nicht machen will.	<input type="radio"/>						
Wenn ich in einer schwierigen Situation bin, finde ich gewöhnlich einen Weg heraus.	<input type="radio"/>						
In mir steckt genügend Energie, um alles zu machen, was ich machen muss.	<input type="radio"/>						
Ich kann es akzeptieren, wenn mich nicht alle Leute mögen.	<input type="radio"/>						

Ende des Blocks: Resilienz

---

Beginn des Blocks: Purpose

Studien haben gezeigt, dass unsere aktuelle Stimmung und unser Energie-Niveau beeinflussen, was wir gern tun und was uns leichtfällt.

Wie würden Sie Ihr Energieniveau der vergangenen vier Wochen bewerten?

- Niedrig (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Hoch (7)
- 

Wie würden Sie Ihre Stimmung der vergangenen vier Wochen bewerten?

- Negativ (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Positiv (7)
- 

Im Folgenden stellen wir Ihnen einige Fragen zu drei Themen, die in der Glücksforschung als Quellen für ein erfüllendes Leben identifiziert wurden.

Am besten beantworten Sie diese Fragen intuitiv ohne lange darüber nachzudenken - es gibt kein richtig oder falsch.

Wie oft erkennen Sie derzeit tieferen Sinn in Ihrem Leben - wie etwa eine größere Aufgabe oder ein übergeordnetes Ziel?

- Nie (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Immer (7)
- 

Inwiefern sind Sie derzeit auf der Suche nach tieferem Sinn in Ihrem Leben?

- Überhaupt nicht (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Vollkommen (7)
-

Wenn Sie sich ein ideales, erfülltes Leben vorstellen, wie sehr ist dieses Leben von tieferem Sinn geprägt?

- Überhaupt nicht (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Vollkommen (7)
- 

Wie oft können Sie sich für Dinge, die Sie derzeit tun, begeistern bzw. sind vollkommen darin versunken?

- Nie (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Immer (7)
-

Wie viele der Dinge, für die Sie sich begeistern, empfinden Sie als sinnstiftend?

- Keine (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Alle (7)
- 

Wenn Sie sich ein ideales, erfülltes Leben vorstellen, wie sehr ist dieses Leben von Dingen geprägt, für die Sie sich begeistern?

- Überhaupt nicht (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Vollkommen (7)
-

Wie oft haben Sie derzeit das Gefühl, dass Sie von anderen wertgeschätzt werden?

- Nie (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Immer (7)
- 

Wie viele Ihrer Interaktionen mit anderen empfinden Sie als sinnstiftend?

- Keine (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Alle (7)
-

Wenn Sie sich ein ideales, erfülltes Leben vorstellen, wie sehr ist dieses Leben von gegenseitiger Wertschätzung geprägt?

- Überhaupt nicht (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Vollkommen (7)
- 

Alles in allem betrachtet, wie glücklich sind Sie?

- Äußerst unglücklich (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- Äußerst glücklich (7)

**Ende des Blocks: Purpose**

---

**Beginn des Blocks: Allgemeine Fragen**

Bitte beantworten Sie abschließend noch einige allgemeine Fragen zu Ihrer Person und Arbeit.

---

Wie viele Tage haben Sie in den letzten 4 Wochen gearbeitet?

---

Wie viele Arbeitstage haben Sie wegen gesundheitlicher Probleme in den letzten 4 Wochen versäumt? Berücksichtigen Sie hierbei bitte z.B. auch Verspätungen und vorzeitiges Nachhausegehen aufgrund gesundheitlicher Probleme.

---

Welchem Geschlecht fühlen Sie sich zugehörig?

- Weiblich
- Männlich
- Divers

In welcher Altersgruppe befinden Sie sich gegenwärtig?

- < 21
- 21 - 30
- 31 - 40
- 41 - 50
- 51 - 60
- 61 - 70
- > 70

Was ist Ihr höchster Bildungsabschluss?

- Volk- / Hauptschulabschluss
  - Realschule (Mittlere Reife) oder Abitur
  - Abgeschlossene Ausbildung
  - Bachelor
  - Master / Diplom / Staatsexamen
  - Promotion
  - Anderer (Bitte Angeben) \_\_\_\_\_
- 

Welche Position beschreibt Ihre berufliche Situation am besten? (Anmerkung: Aus Gründen der besseren Lesbarkeit wird nachfolgend auf eine Geschlechterunterscheidung verzichtet und die maskuline Form gewählt.)

- Geschäftsführer / Vorstand
  - Abteilungsleiter / Teamleiter
  - Fachkraft
  - Selbständiger / Freiberufler
  - Rentner / Pensionär
  - (Dualer) Student
  - Arbeitssuchender
  - Anderer (Bitte Angeben) \_\_\_\_\_
- 

Aus methodischen Gründen ist es wichtig, dass der Fragebogen von heute der zweiten Befragung zugeordnet werden kann.

Deshalb bitte ich Sie, sich durch die folgenden Angaben eine Kodierung zu erstellen (diese müssen Sie beim 2. Fragebogen nochmal eingeben):

- 1) Die letzten beiden Buchstaben Ihres Vornamens
- 2) Ihr Geburtsmonat (als zweistellige Zahl, z.B. "04" für April)
- 3) Die letzten beiden Buchstaben des Vornamens Ihrer Mutter
- 4) Geburtsmonat Ihres Vaters (als zweistellige Zahl, z.B. "04" für April)

Beispiel: Wenn Sie Anna heißen und im November Geburtstag haben, Ihre Mutter Simone heißt und Ihr Vater im Mai Geburtstag hat, dann lautet Ihre Kodierung: NA11NE05

Bitte tragen Sie Ihre vollständige Kodierung in untenstehendes Feld ein (ohne Leerzeichen, in Großbuchstaben!)

---

---

Zur erneuten Durchführung des Fragebogens in ca. 4 Wochen, wird zur Kontaktaufnahme eine Email-Adresse benötigt. Diese wird in keiner Weise mit den ausgefüllten Daten in Verbindung gebracht und lediglich zur Kontaktaufnahme verwendet.

Unter allen Teilnehmenden werden nach dem Ausfüllen der drei Fragebögen zusätzlich zwei Amazon Gutscheine über 25€ verlost, die Gewinner werden per Mail benachrichtigt.

Bitte geben Sie deshalb im Folgenden eine Email-Adresse an:

---

**Ende des Blocks: Allgemeine Fragen**

---

## **Appendix 8: Post-Questionnaire**

### **Fragebogen Nachher**

---

Herzlich willkommen und vielen Dank, dass Sie sich nochmal Zeit für diese Befragung nehmen!

Wie Sie bereits wissen, untersuche ich in meiner Masterarbeit in Zusammenarbeit mit der zentor GmbH, ob Stress aktiv reduziert werden kann und ob dies Auswirkungen auf eine höhere Resilienz hat.

Bitte bearbeiten Sie alle Fragen, damit die Umfrage vollständig ausgewertet werden kann. Es gibt keine "falschen" oder "richtigen" Antworten. Die vollständige Beantwortung der Fragen wird ca. 10 Minuten dauern.

Ihre Daten werden vertraulich und anonym behandelt. Anhand Ihrer Kodierung werden Ihre heutigen Angaben mit der Datenreihe des ersten Fragebogens verknüpft, wobei die Analyse Ihrer Antworten nur in zusammengefasster Form unter Verwendung aller Teilnehmenden erfolgt und ausschließlich wissenschaftlichen Zwecken dient. Namen werden grundsätzlich nicht erfasst oder vermerkt, ein Rückschluss auf einzelne Personen ist dadurch nicht möglich und auch nicht Ziel dieser Studie.

Bei Fragen zur Studie können Sie sich jederzeit unter folgender E-Mail Adresse an mich wenden:

[elsa.gruenauer@tum.de](mailto:elsa.gruenauer@tum.de)

Vielen Dank für Ihre Unterstützung!

Elsa Grünauer

---

Ich stimme der Verarbeitung meiner Angaben im Rahmen dieser Studie auf Grundlage der gegebenen Informationen zum Befragungszweck und Datenschutz zu und möchte an dieser Studie teilnehmen.

Ja, ich stimme zu und möchte teilnehmen.

---

### Beginn des Blocks: Allgemeine Fragen

Im ersten Fragebogen haben Sie eine individuelle Kodierung erstellt. Damit Ihr Fragebogen von heute der ersten Befragung zugeordnet werden kann, bitte ich Sie, Ihre Kodierung erneut anzugeben.

Es ist von enormer Wichtigkeit, dass Ihre Kodierungen aus der ersten und zweiten Umfrage übereinstimmen!

Ihre Kodierung bestand aus den folgenden Angaben:

- 1) Die letzten beiden Buchstaben Ihres Vornamens
- 2) Ihr Geburtsmonat (als zweistellige Zahl, z.B. "04" für April)
- 3) Die letzten beiden Buchstaben des Vornamens Ihrer Mutter
- 4) Geburtsmonat Ihres Vaters (als zweistellige Zahl, z.B. "04" für April)

Beispiel: Wenn Sie Anna heißen und im November Geburtstag haben, Ihre Mutter Simone heißt und Ihr Vater im Mai Geburtstag hat, dann lautet Ihre Kodierung: NA11NE05

Sollten Sie eine abweichende Kodierung gewählt haben, so verwenden Sie diese bitte unbedingt wieder!

Bitte tragen Sie Ihre vollständige Kodierung in untenstehendes Feld ein (ohne Leerzeichen).

---

---

Wie viele Tage haben Sie in den letzten 4 Wochen gearbeitet?

---

---

Wie viele Arbeitstage haben Sie wegen gesundheitlicher Probleme in den letzten 4 Wochen versäumt? Berücksichtigen Sie hierbei bitte z.B. auch Verspätungen und vorzeitiges Nachhausegehen aufgrund gesundheitlicher Probleme.

---



---

War die Teilnahme an einem Kurs zur Stressbewältigung von zentor alles in allem für Sie eher ein Misserfolg oder eher ein Erfolg?

- Eher ein Misserfolg
  - (2)
  - (3)
  - (4)
  - Eher ein Erfolg
- 

Wie beurteilen Sie die folgenden Gesichtspunkte des von Ihnen besuchten Kurses?

	Sehr schlecht	(2)	(3)	(4)	Sehr gut
Die Ankündigung und Information über den Kurs	<input type="radio"/>				
Die Medien und Materialien	<input type="radio"/>				
Die Verständlichkeit der Informationen und Anleitungen	<input type="radio"/>				
Die Art und Weise, wie die Inhalte vermittelt wurden	<input type="radio"/>				
Eingehen auf Rückfragen und Bedürfnisse der Teilnehmer/innen	<input type="radio"/>				
Die Art und Weise, wie der Bezug zum Alltag hergestellt wurde	<input type="radio"/>				

## Ende des Blocks: Allgemeine Fragen

---

### Beginn des Blocks: Stresslevel

#### Fragen zum Allgemeinen Stresslevel

Wie hoch schätzen Sie Ihr Stresslevel in den letzten 4 Wochen ein?

- Sehr gering (1)
  - (2)
  - (3)
  - (4)
  - Hoch (5)
- 

Bitte kreuzen Sie an, wie häufig die folgenden Aussagen in den letzten 4 Wochen auf Sie zutrafen.

In den letzten 4 Wochen...

	Nie (1)	(2)	(3)	(4)	Immer (5)
habe ich die Ursachen von unangenehmem Stress erkannt.	<input type="radio"/>				
konnte ich Stress-Situationen gut bewältigen.	<input type="radio"/>				
habe ich versucht, gegen die Ursachen von Stress etwas zu tun.	<input type="radio"/>				
hatte ich gute Methoden, um mich zu entspannen.	<input type="radio"/>				

---

In den folgenden Fragen geht es darum, wie Sie sich fühlen und wie es Ihnen in den vergangenen 4 Wochen gegangen ist.

In den letzten 4 Wochen fühlte ich mich....

	Nie (1)	(2)	(3)	(4)	Immer (5)
voller Schwung	<input type="radio"/>				
sehr nervös	<input type="radio"/>				
so niedergeschlagen, dass mich nichts aufheitern konnte	<input type="radio"/>				
ruhig und gelassen	<input type="radio"/>				
voller Energie	<input type="radio"/>				
entmutigt und traurig	<input type="radio"/>				
erschöpft	<input type="radio"/>				
glücklich	<input type="radio"/>				
müde	<input type="radio"/>				

---

Wie würden Sie Ihren Gesundheitszustand im Allgemeinen beschreiben?

- schlecht
  - weniger gut
  - gut
  - sehr gut
  - ausgezeichnet
-

Im Vergleich zum Beginn der Studie, wie würden Sie Ihren derzeitigen Gesundheitszustand beschreiben?

- Derzeit viel schlechter
- Derzeit etwas schlechter
- Etwa gleich
- Derzeit etwas besser
- Derzeit viel besser

**Ende des Blocks: Stresslevel**

---

**Beginn des Blocks: Stressoren**

Die folgenden Fragen beschäftigen sich nochmals mit Ihren Gedanken und Gefühlen während der letzten 4 Wochen. Bitte geben Sie für jede Frage an, wie oft Sie in entsprechender Art und Weise gedacht oder gefühlt haben.

	Nie	Fast nie	Manchmal	Ziemlich oft	Sehr oft
Wie oft waren Sie in den letzten 4 Wochen aufgewühlt, weil etwas unerwartet passiert ist?	<input type="radio"/>				
Wie oft hatten Sie in den letzten 4 Wochen das Gefühl, nicht in der Lage zu sein, die wichtigen Dinge in Ihrem Leben kontrollieren zu können?	<input type="radio"/>				
Wie oft haben Sie sich in den letzten 4 Wochen nervös und gestresst gefühlt?	<input type="radio"/>				
Wie oft waren Sie in den letzten 4 Wochen zuversichtlich, dass Sie fähig sind, ihre persönlichen Probleme zu bewältigen?	<input type="radio"/>				

Wie oft hatten Sie in den letzten 4 Wochen das Gefühl, dass sich die Dinge zu Ihren Gunsten entwickeln?	<input type="radio"/>				
Wie oft hatten Sie in den letzten 4 Wochen den Eindruck, nicht all Ihren anstehenden Aufgaben gewachsen zu sein?	<input type="radio"/>				
Wie oft waren Sie in den letzten 4 Wochen in der Lage, ärgerliche Situationen in Ihrem Leben zu beeinflussen?	<input type="radio"/>				
Wie oft hatten Sie in den letzten 4 Wochen das Gefühl, alles im Griff zu haben?	<input type="radio"/>				
Wie oft haben Sie sich in den letzten 4 Wochen über Dinge geärgert, über die Sie keine Kontrolle hatten?	<input type="radio"/>				
Wie oft hatten Sie in den letzten 4 Wochen das Gefühl, dass sich so viele Schwierigkeiten angehäuft haben, dass Sie diese nicht überwinden konnten?	<input type="radio"/>				

Ende des Blocks: Stressoren

Beginn des Blocks: Stressbewältigung

Wie gehen Sie mit Stress um? Es gibt keine richtigen oder falschen Antworten. Antworten Sie möglichst spontan und lassen Sie keine Aussage aus.

	Trifft gar nicht zu	Trifft eher nicht zu	Trifft eher zu	Trifft genau zu
Ich tue alles, damit Stress erst gar nicht entsteht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich mache mir schon vorher Gedanken, wie ich Zeitdruck vermeiden kann.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich versuche Stress schon im Vorfeld zu vermeiden.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bei Stress und Druck beseitige ich gezielt die Ursachen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich sage mir, dass Stress und Druck auch ihre guten Seiten haben.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich sehe Stress und Druck als positive Herausforderung an.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bei Stress und Druck konzentriere ich mich einfach auf das Positive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Auch wenn ich sehr unter Druck stehe, verliere ich meinen Humor nicht.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Menschen können unterschiedlich auf alltägliche Anforderungen und Herausforderungen reagieren. Die folgenden Aussagen zeigen verschiedene Möglichkeiten oder Abstufungen auf, wie man mit alltäglichem Stress umgehen kann.

Bitte geben Sie für jede Aussage an, wie gut es Ihnen gegenwärtig gelingt, sich entsprechend der Aussage zu verhalten.

	Überhaupt nicht	Nur ein wenig	Einigermaßen gut	Ziemlich gut	Sehr gut
Ich bin in der Lage, Muskelentspannungstechniken anzuwenden, um	<input type="radio"/>				

wahrgenommene Anspannung zu reduzieren.

Ich vertraue darauf, dass ich in schwierigen Situationen in der Lage bin, die besten Bewältigungsstrategien zu wählen.

Ich kann meine Gedanken leicht stoppen und überprüfen, um zu neuen Perspektiven zu gelangen.

Es fällt mir leicht zu entscheiden, wie ich mit neu aufgetauchten Problemen umgehen kann.

Wenn ich ärgerlich werde, kann ich meinen Ärger offen zeigen, ohne zu übertreiben.

Wenn Probleme auftauchen, weiß ich, wie ich sie angehe.

Ich bemerke sofort, wenn mein Körper beginnt, sich zu verspannen.

Es fällt mir leicht, Menschen aus meinem Umfeld um Unterstützung zu bitten, wenn ich Unterstützung brauche.

Ich kann für meine Rechte eintreten, ohne damit die Rechte anderer zu verletzen.

Ich kann mich mentaler Bilder bedienen, um meine Anspannung zu reduzieren.

Ich kann meinen Ärger in vernünftiger und ausgewogener Art und Weise ausdrücken.

Wenn sich Verspannungen in meinem Körper aufbauen, dann merke ich das sofort

Auch in belastenden Zeiten kann ich emotional ausgeglichene Gedanken aufkommen lassen.

Wann immer es nötig ist, kann ich Menschen aus meinem Umfeld um Unterstützung oder Beistand bitten.

**Ende des Blocks: Stressbewältigung**

---

**Beginn des Blocks: Resilienz**

Im folgenden finden Sie eine Reihe von Feststellungen. Bitte lesen Sie sich jede Feststellung durch und kreuzen Sie an, wie sehr die Aussagen im Allgemeinen auf Sie zutreffen, d.h. wie sehr Ihr übliches Denken und Handeln durch diese Aussagen beschrieben wird.

	Stimme nicht zu (1)	(2)	(3)	(4)	(5)	(6)	Stimme völlig zu (7)
Wenn ich Pläne habe, verfolge ich sie auch.	<input type="radio"/>						
Normalerweise schaffe ich alles irgendwie.	<input type="radio"/>						
Ich lasse mich nicht so schnell aus der Bahn werfen.	<input type="radio"/>						
Ich mag mich.	<input type="radio"/>						

Ich kann mehrere Dinge gleichzeitig bewältigen.	<input type="radio"/>						
Ich bin entschlossen.	<input type="radio"/>						
Ich nehme die Dinge wie sie kommen.	<input type="radio"/>						
Ich behalte an vielen Dingen Interesse.	<input type="radio"/>						
Normalerweise kann ich die Situation aus mehreren Perspektiven betrachten.	<input type="radio"/>						
Ich kann mich auch überwinden, Dinge zu tun die ich eigentlich nicht machen will.	<input type="radio"/>						
Wenn ich in einer schwierigen Situation bin, finde ich gewöhnlich einen Weg heraus.	<input type="radio"/>						
In mir steckt genügend Energie, um alles zu machen, was ich machen muss.	<input type="radio"/>						
Ich kann es akzeptieren, wenn mich nicht alle Leute mögen.	<input type="radio"/>						

Ende des Blocks: Resilienz

Beginn des Blocks: Purpose

Studien haben gezeigt, dass unsere aktuelle Stimmung und unser Energie-Niveau beeinflussen, was wir gern tun und was uns leichtfällt.

Wie würden Sie Ihr Energieniveau der vergangenen vier Wochen bewerten?

- Niedrig (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Hoch (7)
- 

Wie würden Sie Ihre Stimmung der vergangenen vier Wochen bewerten?

- Negativ (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Positiv (7)
- 

Im Folgenden stellen wir Ihnen einige Fragen zu drei Themen, die in der Glücksforschung als Quellen für ein erfüllendes Leben identifiziert wurden.

Am besten beantworten Sie diese Fragen intuitiv ohne lange darüber nachzudenken - es gibt kein richtig oder falsch.

Wie oft erkennen Sie derzeit tieferen Sinn in Ihrem Leben - wie etwa eine größere Aufgabe oder ein übergeordnetes Ziel?

- Nie (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Immer (7)
- 

Inwiefern sind Sie derzeit auf der Suche nach tieferem Sinn in Ihrem Leben?

- Überhaupt nicht (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Vollkommen (7)
-

Wenn Sie sich ein ideales, erfülltes Leben vorstellen, wie sehr ist dieses Leben von tieferem Sinn geprägt?

- Überhaupt nicht (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Vollkommen (7)
- 

Wie oft können Sie sich für Dinge, die Sie derzeit tun, begeistern bzw. sind vollkommen darin versunken?

- Nie (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Immer (7)
-

Wie viele der Dinge, für die Sie sich begeistern, empfinden Sie als sinnstiftend?

- Keine (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Alle (7)
- 

Wenn Sie sich ein ideales, erfülltes Leben vorstellen, wie sehr ist dieses Leben von Dingen geprägt, für die Sie sich begeistern?

- Überhaupt nicht (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Vollkommen (7)
-

Wie oft haben Sie derzeit das Gefühl, dass Sie von anderen wertgeschätzt werden?

- Nie (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Immer (7)
- 

Wie viele Ihrer Interaktionen mit anderen empfinden Sie als sinnstiftend?

- Keine (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Alle (7)
-

Wenn Sie sich ein ideales, erfülltes Leben vorstellen, wie sehr ist dieses Leben von gegenseitiger Wertschätzung geprägt?

- Überhaupt nicht (1)
  - (2)
  - (3)
  - (4)
  - (5)
  - (6)
  - Vollkommen (7)
- 

Alles in allem betrachtet, wie glücklich sind Sie?

- Äußerst unglücklich (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- Äußerst glücklich (7)

**Ende des Blocks: Purpose**

---

## Appendix 9: Output for Hypotheses 1: Reduction of Stress level

### MANOVA repeated measures

#### Inner subject factors

Measure	Time	Dependent Variable
PSS	1	Pre-PSS
	2	Post-PSS
Stress level	1	Pre-Stress level
	2	Post-Stress level
Stress Experience	1	Pre-Stress Experience
	2	Post-Stress Experience

#### Between subject factors

	N
Control group = 0	52
Course Participants = 1	48

#### Box-Test on equality of the covariance matrices <sup>a</sup>

Box-M-Test	50.127
F	2,230
df1	21
df2	34837.386
Sig.	.001

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a: Design: Constant term + group; Inner-subject design: Time

**Multivariate Tests <sup>b</sup>**

Effect		Time	Value	F	Hypothesis df	Error df	Sig.
Between subjects	Constant term	Pillai-Trace	.970	1047.913 <sup>a</sup>	3.000	96.000	.000
		Wilks-Lambda	.030	1047.913 <sup>a</sup>	3.000	96.000	.000
		Hotelling-Trace	32.747	1047.913 <sup>a</sup>	3.000	96.000	.000
		Largest characteristic root after Roy	32.747	1047.913 <sup>a</sup>	3.000	96.000	.000
Group		Pillai-Trace	.018	.595 <sup>a</sup>	3.000	96.000	.000
		Wilks-Lambda	.982	.595 <sup>a</sup>	3.000	96.000	.000
		Hotelling-Trace	.019	.595 <sup>a</sup>	3.000	96.000	.000
		Largest characteristic root after Roy	.019	.595 <sup>a</sup>	3.000	96.000	.000
Within subjects	Time	Pillai-Trace	.291	13.155 <sup>a</sup>	3.000	96.000	.000
		Wilks-Lambda	.709	13.155 <sup>a</sup>	3.000	96.000	.000
		Hotelling-Trace	.411	13.155 <sup>a</sup>	3.000	96.000	.000
		Largest characteristic root after Roy	.411	13.155 <sup>a</sup>	3.000	96.000	.000
Time * Group		Pillai-Trace	.225	9.293 <sup>a</sup>	3.000	96.000	.000
		Wilks-Lambda	.775	9.293 <sup>a</sup>	3.000	96.000	.000
		Hotelling-Trace	.290	9.293 <sup>a</sup>	3.000	96.000	.000
		Largest characteristic root after Roy	.290	9.293 <sup>a</sup>	3.000	96.000	.000

a. Exact Statistic

b. Design: Constant term + Group; Inner-subject Design: Time

**Mauchly-Test on Sphericity <sup>b</sup>**

Inner-subject effect	Measure	Mauchly-W	Approximate chi-quadrat	df	Sig.
Time	PSS	1.000	.000	0	.
	Stress level	1.000	.000	0	.
	Stress Experience	1.000	.000	0	.

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variable is proportional to the unit matrix.

**Test for Univariates**

Source	Measure		Type III square sum	df	Means of squares	F	Sig.
Time	PSS	Sphericity assumed	600.371	1	600.371	29.786	.000
		Greenhouse-Geisser	600.371	1.000	600.371	29.786	.000
		Huynh-Feldt	600.371	1.000	600.371	29.786	.000
		Lower limit	600.371	1.000	600.371	29.786	.000
	Stress level	Sphericity assumed	9.450	1	9.450	20.379	.000
		Greenhouse-Geisser	9.450	1.000	9.450	20.379	.000
		Huynh-Feldt	9.450	1.000	9.450	20.379	.000
		Lower limit	9.450	1.000	9.450	20.379	.000
	Stress Experience	Sphericity assumed	594.007	1	594.007	35.423	.000

		Greenhouse-Geisser	594.007	1.000	594.007	35.423	.000
		Huynh-Feldt	594.007	1.000	594.007	35.423	.000
		Lower limit	594.007	1.000	594.007	35.423	.000
Time * Group	PSS	Sphericity assumed	299.331	1	299.331	14.850	.000
		Greenhouse-Geisser	299.331	1.000	299.331	14.850	.000
		Huynh-Feldt	299.331	1.000	299.331	14.850	.000
		Lower limit	299.331	1.000	299.331	14.850	.000
Stress level		Sphericity assumed	.810	1	.810	1.747	.189
		Greenhouse-Geisser	.810	1.000	.810	1.747	.189
		Huynh-Feldt	.810	1.000	.810	1.747	.189
		Lower limit	.810	1.000	.810	1.747	.189
Stress Experience		Sphericity assumed	445.687	1	445.687	26.578	.000
		Greenhouse-Geisser	445.687	1.000	445.687	26.578	.000
		Huynh-Feldt	445.687	1.000	445.687	26.578	.000
		Lower limit	445.687	1.000	445.687	26.578	.000
Error (Time)	PSS	Sphericity assumed	1975.324	98	20.156		
		Greenhouse-Geisser	1975.324	98.000	20.156		
		Huynh-Feldt	1975.324	98.000	20.156		
		Lower limit	1975.324	98.000	20.156		
Stress level		Sphericity assumed	45.445	98	.464		
		Greenhouse-Geisser	45.445	98.000	.464		

	Huynh-Feldt	45.445	98.000	.464
	Lower limit	45.445	98.000	.464
Stress Experience	Sphericity assumed	1643.368	98	16.769
	Greenhouse- Geisser	1643.368	98.000	16.769
	Huynh-Feldt	1643.368	98.000	16.769
	Lower limit	1643.368	98.000	16.769

**Levene test for equality of error variances <sup>a</sup>**

	F	df1	df2	Sig.
Pre-PSS	.319	1	98	.574
Post-PSS	.258	1	98	.612
Pre-Stress level	4.603	1	98	.034
Post-Stress level	.668	1	98	.416
Pre-Stress Experience	.003	1	98	.959
Post-Stress Experience	.679	1	98	.412

Tests the null hypothesis that the error variance of the dependent variable is the same across groups.

a. Design: Constant term + Group; Inner-subject Design: Time

*Paired T-Tests*

**Correlation for paired samples**

		N	Correlation	Significance
<b>Control Group</b>				
Pairs 1	Pre- & Post-Stress level	52	.568	.000
Pairs 2	Pre- & Post-Stress Experience	52	.580	.000
Pairs 3	Pre- & Post-Perceived Stress	52	.706	.000
<b>Course Participants</b>				
Pairs 1	Pre- & Post-Stress level	48	.313	.030
Pairs 2	Pre- & Post-Stress Experience	48	-.034	.871
Pairs 3	Pre- & Post-Perceived Stress	48	.216	.141

**Test for paired samples**

		Paired Differences				
		Mean	Standard Deviation	Standard error of the mean value	95% Confidence interval of the difference	
					Lower	Upper
<b>Control Group</b>						
Pairs 1	Pre- & Post-Stress level	.308	.940	.130	.046	.569
Pairs 2	Pre- & Post-Stress Experience	-.481	2.245	.311	-1.106	.144
Pairs 3	Pre- & Post-Perceived Stress	1.019	4.841	.671	-.328	2.367
<b>Course Participants</b>						

Pairs 1	Pre- & Post-Stress level	.563	.987	.143	.276	.849
Pairs 2	Pre- & Post-Stress Experience	-3.625	3.400	.491	-4.612	-2.638
Pairs 3	Pre- & Post-Perceived Stress	5.917	7.657	1.105	3.693	8.140

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**Test for paired samples**

		T	df	Sig. (2-sided)
<b>Control Group</b>				
Pairs 1	Pre- & Post-Stress level	2.360	51	.022
Pairs 2	Pre- & Post-Stress Experience	-1.544	51	.129
Pairs 3	Pre- & Post-Perceived Stress	1.518	51	.135
<b>Course Participants</b>				
Pairs 1	Pre- & Post-Stress level	3.947	47	.000
Pairs 2	Pre- & Post-Stress Experience	-7.387	47	.000
Pairs 3	Pre- & Post-Perceived Stress	5.353	47	.000

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## Appendix 10: Output for Hypotheses 2: Improvement of Stress Management

*MANOVA repeated measures*

### Inner subject factors

Measure	Time	Dependent Variable
SCI	1	Pre-SCI
	2	Post-SCI
ISBF	1	Pre-ISBF
	2	Post-ISBF
Stress Management	1	Pre-Stress Management
	2	Post-Stress Management

### Between subject factors

	N
Control group = 0	52
Course Participants = 1	48

### Box-Test on equality of the covariance matrices <sup>a</sup>

Box-M-Test	47.086
F	2.093
df1	21
df2	33851.686
Sig.	.002

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a: Design: Constant term + group; Inner-subject design: Time

**Multivariate Tests <sup>b</sup>**

Effect		Time	Value	F	Hypothesis df	Error df	Sig.
Between subjects	Constant term	Pillai-Trace	.987	2460.311 <sup>a</sup>	3.000	96.000	.000
		Wilks-Lambda	.013	2460.311 <sup>a</sup>	3.000	96.000	.000
		Hotelling-Trace	77.694	2460.311 <sup>a</sup>	3.000	96.000	.000
		Largest characteristic root after Roy	77.694	2460.311 <sup>a</sup>	3.000	96.000	.000
Group		Pillai-Trace	.038	1.251 <sup>a</sup>	3.000	96.000	.000
		Wilks-Lambda	.962	1.251 <sup>a</sup>	3.000	96.000	.000
		Hotelling-Trace	.040	1.251 <sup>a</sup>	3.000	96.000	.000
		Largest characteristic root after Roy	.040	1.251 <sup>a</sup>	3.000	96.000	.000
Within subjects	Time	Pillai-Trace	.403	21.391 <sup>a</sup>	3.000	96.000	.000
		Wilks-Lambda	.597	21.391 <sup>a</sup>	3.000	96.000	.000
		Hotelling-Trace	.676	21.391 <sup>a</sup>	3.000	96.000	.000
		Largest characteristic root after Roy	.676	21.391 <sup>a</sup>	3.000	96.000	.000
Time * Group		Pillai-Trace	.355	17.400 <sup>a</sup>	3.000	96.000	.000
		Wilks-Lambda	.645	17.400 <sup>a</sup>	3.000	96.000	.000
		Hotelling-Trace	.549	17.400 <sup>a</sup>	3.000	96.000	.000
		Largest characteristic root after Roy	.549	17.400 <sup>a</sup>	3.000	96.000	.000

a. Exact Statistic

b. Design: Constant term + Group; Inner-subject Design: Time

**Mauchly-Test on Sphericity <sup>b</sup>**

Inner-subject effect	Measure	Mauchly-W	Approximate chi-quadrat	df	Sig.
Time	SCI	1.000	.000	0	.
	ISBF	1.000	.000	0	.
	Stress Management	1.000	.000	0	.

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variable is proportional to the unit matrix.

**Test for Univariates**

Source	Measure		Type III square sum	df	Means of squares	F	Sig.
Time	SCI	Sphericity assumed	140.174	1	140.174	20.833	.000
		Greenhouse-Geisser	140.174	1.000	140.174	20.833	.000
		Huynh-Feldt	140.174	1.000	140.174	20.833	.000
		Lower limit	140.174	1.000	140.174	20.833	.000
	ISBF	Sphericity assumed	1382.586	1	1382.586	53.484	.000
		Greenhouse-Geisser	1382.586	1.000	1382.586	53.484	.000
		Huynh-Feldt	1382.586	1.000	1382.586	53.484	.000
		Lower limit	1382.586	1.000	1382.586	53.484	.000
	Stress Management	Sphericity assumed	213.777	1	213.777	52.286	.000

		Greenhouse-Geisser	213.777	1.000	213.777	52.286	.000
		Huynh-Feldt	213.777	1.000	213.777	52.286	.000
		Lower limit	213.777	1.000	213.777	52.286	.000
Time * Group	SCI	Sphericity assumed	153.265	1	153.265	22.779	.000
		Greenhouse-Geisser	153.265	1.000	153.265	22.779	.000
		Huynh-Feldt	153.265	1.000	153.265	22.779	.000
		Lower limit	153.265	1.000	153.265	22.779	.000
	ISBF	Sphericity assumed	1322.950	1	1322.950	51.177	.000
		Greenhouse-Geisser	1322.950	1.000	1322.950	51.177	.000
		Huynh-Feldt	1322.950	1.000	1322.950	51.177	.000
		Lower limit	1322.950	1.000	1322.950	51.177	.000
	Stress Management	Sphericity assumed	126.403	1	126.403	30.916	.000
		Greenhouse-Geisser	126.403	1.000	126.403	30.916	.000
		Huynh-Feldt	126.403	1.000	126.403	30.916	.000
		Lower limit	126.403	1.000	126.403	30.916	.000
Error (Time)	SCI	Sphericity assumed	652.655	98	6.728		
		Greenhouse-Geisser	652.655	98.000	6.728		
		Huynh-Feldt	652.655	98.000	6.728		
		Lower limit	652.655	98.000	6.728		
	ISBF	Sphericity assumed	2507.505	98	25.851		
		Greenhouse-Geisser	2507.505	98.000	25.851		

	Huynh-Feldt	2507.505	98.000	25.851
	Lower limit	2507.505	98.000	25.851
Stress Management	Sphericity assumed	396.597	98	4.089
	Greenhouse-Geisser	396.597	98.000	4.089
	Huynh-Feldt	396.597	98.000	4.089
	Lower limit	396.597	98.000	4.089

**Levene test for equality of error variances <sup>a</sup>**

	F	df1	df2	Sig.
Pre-SCI	1.714	1	98	.194
Post-SCI	1.044	1	98	.309
Pre-ISBF	.643	1	98	.425
Post-ISBF	.139	1	98	.710
Pre-Stress Management	.395	1	98	.531
Post-Stress Management	.086	1	98	.770

Tests the null hypothesis that the error variance of the dependent variable is the same across groups.

a. Design: Constant term + Group; Inner-subject Design: Time

*Paired T-Tests*

**Correlation for paired samples**

		N	Correlation	Significance
<b>Control Group</b>				
Pairs 1	Pre- & Post-SCI	52	.699	.000
Pairs 2	Pre- & Post-ISBF	52	.796	.000
Pairs 3	Pre- & Post-Stress Management	52	.580	.000
<b>Course Participants</b>				
Pairs 1	Pre- & Post-SCI	48	.064	.670
Pairs 2	Pre- & Post-ISBF	48	.222	.134
Pairs 3	Pre- & Post-Stress Management	48	-.034	.817

**Test for paired samples**

		Paired Differences				
		Mean	Standard Deviation	Standard error of the mean value	95% Confidence interval of the difference	
					Lower	Upper
<b>Control Group</b>						
Pairs 1	Pre- & Post-SCI	.077	2.291	.318	-.561	.715
Pairs 2	Pre- & Post-ISBF	-.115	4.993	.692	-1.505	1.275
Pairs 3	Pre- & Post-Stress Management	-.481	2.245	.311	-1.106	.144
<b>Course Participants</b>						
Pairs 1	Pre- & Post-SCI	-3.447	4.749	.693	-4.841	-2.052

Pairs 2	Pre- & Post-ISBF	-10.468	9.021	1.316	-13.117	-7.819
Pairs 3	Pre- & Post-Stress Management	-3.625	3.400	.491	-4.612	-2.638

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**Test for paired samples**

		T	df	Sig. (2-sided)
<b>Control Group</b>				
Pairs 1	Pre- & Post-SCI	.242	51	.810
Pairs 2	Pre- & Post-ISBF	-.167	51	.868
Pairs 3	Pre- & Post-Stress Management	-1.544	51	.129
<b>Course Participants</b>				
Pairs 1	Pre- & Post-SCI	-4.975	47	.000
Pairs 2	Pre- & Post-ISBF	-7.955	47	.000
Pairs 3	Pre- & Post-Stress-Management	-7.387	47	.000

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## Appendix 11: Output for Hypotheses 3: Building Resilience

*MANOVA repeated measures*

### Inner subject factors

Measure	Time	Dependent Variable
Resilience	1	Pre-Resilience
	2	Post-Resilience

### Between subject factors

	N
Control group = 0	52
Course Participants = 1	48

### Box-Test on equality of the covariance matrices <sup>a</sup>

Box-M-Test	27.473
F	8.953
df1	3
df2	2544863.318
Sig.	.000

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a: Design: Constant term + group; Inner-subject design: Time

**Multivariate Tests <sup>b</sup>**

Effect		Value	F	Hypothesis df	Error df	Sig.
Time	Pillai-Trace	.058	5.938 <sup>a</sup>	1.000	97.000	.017
	Wilks-Lambda	.942	5.938 <sup>a</sup>	1.000	97.000	.017
	Hotelling-Trace	.061	5.938 <sup>a</sup>	1.000	97.000	.017
	Largest characteristic root after Roy	.061	5.938 <sup>a</sup>	1.000	97.000	.017
Time * Group	Pillai-Trace	.064	6.654 <sup>a</sup>	1.000	97.000	.011
	Wilks-Lambda	.936	6.654 <sup>a</sup>	1.000	97.000	.011
	Hotelling-Trace	.069	6.654 <sup>a</sup>	1.000	97.000	.011
	Largest characteristic root after Roy	.069	6.654 <sup>a</sup>	1.000	97.000	.011

a. Exact Statistic

b. Design: Constant term + Group; Inner-subject Design: Time

**Mauchly-Test on Sphericity <sup>b</sup>**

Inner-subject effect	Measure	Mauchly-W	Approximate chi-quadrat	df	Sig.
Time	Resilience	1.000	.000	0	.

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variable is proportional to the unit matrix.

**Levene test for equality of error variances <sup>a</sup>**

	F	df1	df2	Sig.
Pre-Resilience	.349	1	98	.556
Post-Resilience	.693	1	98	.407

Tests the null hypothesis that the error variance of the dependent variable is the same across groups.

a. Design: Constant term + Group; Inner-subject Design: Time

*Paired T-Tests*

**Correlation for paired samples**

		N	Correlation	Significance
<b>Control Group</b>				
Pairs 1	Pre- & Post-Resilience	52	.780	.000
<b>Course Participants</b>				
Pairs 1	Pre- & Post-Resilience	48	.083	.579

**Test for paired samples**

		Paired Differences				
					95% Confidence interval of the difference	
		Mean	Standard Deviation	Standard error of the mean value	Lower	Upper
<b>Control Group</b>						
Pairs 1	Pre- & Post-Resilience	.173	7.438	1.031	-1.898	2.244
<b>Course Participants</b>						
Pairs 1	Pre- & Post-Resilience	-6.085	15.655	2.284	-10.682	-1.489

**Test for paired samples**

		T	df	Sig. (2-sided)
<b>Control Group</b>				
Pairs 1	Pre- & Post-SCI	.168	51	.867
<b>Course Participants</b>				
Pairs 1	Pre- & Post-SCI	-2.665	47	.011

**Appendix 12:** Output for Hypotheses 4: Correlation of Stress and Happiness

*Linear Regression: Pre-Perceived Stress and Pre-Happiness*

**Model Summary**

Model	R	R-squared	Corrected R-squared	Estimator standard error
1	.466 <sup>a</sup>	.218	.210	31.858

a. Influence variable: (constant), Pre-Perceived Stress

**Coefficients <sup>a</sup>**

Model		non-standardized coefficients		standardized coefficients		Sig.
		Regression coefficient B	Standard error	Beta	T	
1	(constant)	191.186	15.210		12.569	.000
	Pre-Perceived Stress	-2.662	.510	-.466	-5.221	.000

a. Dependent variable: Pre-Happiness

*Linear Regression: Post-Perceived Stress and Pre-Happiness*

**Model Summary**

Model	R	R-squared	Corrected R-squared	Estimator standard error
1	.563 <sup>a</sup>	.317	.309	33.834

a. Influence variable: (constant), Post-Perceived Stress

**Coefficients <sup>a</sup>**

Model		non-standardized coefficients		standardized coefficients		
		Regression coefficient B	Standard error	Beta	T	Sig.
1	(constant)	219.730	14.320		15.344	.000
	Post-Perceived Stress	-3.608	.538	-.563	-6.702	.000

a. Dependent variable: Post-Happiness

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