MDPI

Article

Effectiveness of Digital and Analog Stress Management Interventions within Occupational Health Management in the Public Sector

Runa Maj Fasthoff [1], Lea Nolte [1,*] and Timo Kortsch [2]

1   Institute of Psychology, Technische Universität Braunschweig, 38106 Braunschweig, Germany;
     runa.fasthoff@outlook.de
2   Department of Health and Social Work, IU International University, 99084 Erfurt, Germany; timo.kortsch@iu.org
*   Correspondence: l-nolte@gmx.net

Abstract: Stress increases among the working population in Germany. Workplace stress management interventions are therefore becoming increasingly important, especially in the public sector, which has a higher structural risk for work-related stress than other organizations. Currently, face-to-face formats dominate, but promising digital offerings are being developed. The aim of this study was to investigate the effectiveness of a stress management intervention as a face-to-face and self-guided digital format, referring to the Job Demands-Resources Model. The preregistered study applied a randomized control group design in which $N = 65$ public service employees were assigned to face-to-face training, an online course, or waitlist control group. Participants completed online questionnaires before the intervention, shortly after the intervention, and six weeks later. Although trends for reductions in emotional exhaustion and perceived stress were evident among the intervention groups, mixed analyses of variance showed no interaction effects between the time and group on the outcomes. The main effects showed a significant decrease in stress levels regardless of the group and significant differences between intervention groups, with the online course reporting the lowest stress level. The results indicate that digital and analog stress management interventions can have desired effects within occupational health management. However, many unpredictable events (e.g., illness, vacation during the intervention) seem to influence the effectiveness in the workplace setting, and so further research is needed.

Keywords: stress management; work engagement; online course; face-to-face training; public sector; workplace prevention; Job Demands-Resources Model

1. Introduction

The major stressors in life can be found in the world of work [1]. This is particularly noticeable in industrialized nations such as Germany, where work densification has increased in recent years due to digitalization [2]. Two thirds of the German population reports stress-related impairments [3]. Especially in public service organizations, work-related stressors are more likely to appear, and the structural level of the risks of work-related stress is higher than in other organizational settings [4]. Characteristics such as a high level of bureaucracy, the lack of structured HR systems, regulated and institutionalized frameworks, as well as top–down processes offer an explanation for the increased stress levels [4]. As a result, this occupational group will show an increase in demands and burnout symptoms over time [5]. However, public service employees are an occupational group that has not been well researched and, at the same time, is particularly vulnerable to stress [6,7]. Prolonged stress can have negative effects on physical health, e.g., immune suppression [8] and high blood pressure [9], and mental illnesses can be a consequence, e.g., depression [10]. In addition to physical and mental health impairments, chronic stress can weaken the economic success of companies through absenteeism, presenteeism,

or terminations [11,12]. Thus, stress management and occupational health management are becoming increasingly important. Previous studies showed that digital and analog stress management interventions are effective in reducing stress, burnout, and anxiety symptoms as well as promoting satisfaction, resilience, and mindfulness [13,14]. However, there is a discrepancy between the high demand and low utilization of stress management interventions [15]. In our current era of digitalization, digital formats have become increasingly more attractive as they are more accessible, available at any time, and are cost saving [16]. Nevertheless, face-to-face interventions are often preferred because of the personal interaction between the trainer and participants along with the high degree of task clarity [17]. Varying research findings on the effectiveness of face-to-face and online formats exist [17]. Some studies postulate face-to-face training as being more effective [18], while others prefer online courses [19]. Equivalence cannot be ruled out for either formats, however [20].

The purpose of this study is to evaluate the effectiveness of different formats of a stress management intervention in the public sector to reduce participants' stress levels and burnout symptoms as well to increase participants´ work engagement over time. The Job Demands-Resources Model [21] provides the theoretical foundation for the present study, according to which, stress, emotional exhaustion, and work engagement arise from the (im)balance of demands and resources [21,22]. Moreover, underlying mechanisms such as job crafting, personality, and baseline stress will be investigated to improve stress prevention offers for occupational health management in organizations.

2. Theoretical Background

2.1. Stress Prevention and the Job Demands-Resources Framework

The effectiveness of stress management interventions has been shown in numerous meta-analyses [23–29]. Empirically, it has been demonstrated that stress management interventions can lead to a reduction in perceived stress. For example, in a meta-analysis, stress management interventions were shown to reduce stress with a medium effect size ($g = 0.54$) [23]. This also fits with the findings that the overall medium to large effect sizes were found in a meta-analysis [27]. This clearly emphasizes the benefits of stress management interventions. In addition to meta-analytic findings, numerous randomized controlled trials also showed that stress management interventions can reduce perceived stress [30–34]. Studies analyzing both face-to-face and online formats found that the randomized controlled design showed a significant reduction in perceived stress compared with a waitlist control group [31,34].

Stress is defined as an unpleasant state of tension resulting from the apprehension of not being able to fully control a highly aversive situation that is close in time or has already occurred and is subjectively long-lasting; the professional and private factors that promote the development of stress are referred to as stressors [35].

According to the Job Demands-Resources Model [21,36] (JD-R), stress arises from the interaction of the stressors and resources present in the situation [37]. While job demands require a physical and/or psychological effort and are accompanied by physiological and/or mental impairments, e.g., time pressure, excessive demands, or technical problems [21], resources, in turn, are those features of work that can facilitate goal achievement and learning success as well as promote personal growth, well-being, and health among employees, e.g., autonomy, social support, and transparency [21,22,38]. Resources are understood as a counterweight to job demands as they can reduce the negative impacts of job demands [39,40].

A meta-analysis of the JD-R model [41] confirmed the positive relationship between demands and burnout symptoms as well as the positive relationship of resources and work engagement. Resources also showed a negative relationship with burnout symptoms. Burnout is a syndrome characterized by emotional exhaustion, depersonalization, and a lack of personal accomplishment [42]. Emotional exhaustion is the central dimension of

burnout [36]. Work engagement, instead, is defined as a positive work-related state of satisfaction characterized by vigor, dedication, and absorption [43].

In addition to a reduction in perceived stress, stress management interventions can—referring to the JD-R [21]—lead to a reduction in burnout symptoms and an increase in work engagement. This was shown, for example, in the randomized longitudinal study with a waitlist control group, which tested the effectiveness of the digital stress management intervention "GET.ON Stress" for workers [33]. Participants reported lower emotional exhaustion and higher work engagement after the intervention. Even 6 months after the intervention, there was a large effect on emotional exhaustion and a small effect on work engagement. Other randomized controlled trials of the digital stress management intervention confirmed the positive effects on emotional exhaustion and work engagement [32,44]. Again, moderate to large effects on emotional exhaustion and small effects on work engagement were found 6 months after the intervention. Stress management interventions in face-to-face format showed similar effects. In a pre–post design, a stress management intervention showed reductions in three of the four burnout facets that were measured [45]. Furthermore, nurses showed lower levels of stress, anxiety, and burnout after a face-to-face stress and resilience training [14]. In addition to reducing negative symptoms such as stress, burnout, or depression, face-to-face and online stress management interventions can promote positive outcomes such as increased happiness, resilience, and mindfulness [14]. Studies also showed similar effects regarding work engagement. A stress management intervention at work, that focused on promoting resources, was examined in a quasi-experimental longitudinal study and revealed—six months after the intervention—a higher work engagement for employees in the intervention group, while the control group's scores decreased over time [46].

We therefore assume:

Hypothesis 1: *Participants of the two intervention groups (face-to-face; online) show significantly reduced (a) perceived stress and (b) emotional exhaustion and (c) significantly more work engagement from baseline to post-treatment shortly after the intervention and at a six-week follow-up compared to the waitlist control group.*

2.2. Effectiveness of Different Formats of Stress Management Interventions

Stress management interventions can be offered in a variety of formats. The most common format is the face-to-face format [27]. Stress management interventions are usually conducted in small groups and led by trainers [31]. Traditional formats such as face-to-face training allow for an interactive setting and can provide social support and feedback through the group or the trainers [47]. This allows trainers to personally guide participants through the stress management intervention and address participants' needs. A clarity of instructions and the participants´ understanding are therefore high [17]. On one hand, the fixed dates in the face-to-face format can help reduce procrastination among participants [48]. Furthermore, the group context causes a higher threshold to drop out of the intervention [47]. On the other hand, the training is less flexible due to the time and place commitment. It is also assumed that participants are willing to work on personal issues in the group. This could be a barrier for some individuals [47].

In addition to the face-to-face format, stress management interventions are increasingly available in online format. Examples include online courses such as "GET.ON Stress" [49] or "Einfach weniger Stress" [37]. While in face-to-face trainings, the content is taught by trainers, in digital formats, the information is transmitted via e-mails, smartphones, or the Internet [44,50–52]. Digital interventions have the advantage that they can be used flexibly in terms of time and place [48]. Trainers do not need to be physically present. This makes them more accessible and cost-saving [16,25], e.g,. travel and accommodation costs are eliminated [31,53]. Due to their scalability, online formats offer the potential to meet the large demands of the population [44]. In addition, anonymity is guaranteed, participants can work at their own pace, and relevant topics can be repeated as needed [25,47]. On one hand, digital interventions benefit from a low-access threshold [47]. On the other

hand, this low-access threshold is also associated with higher dropout rates compared to face-to-face format [31,47]. Furthermore, for some employees, flexible working is a great advantage in that they can work independently of time and location; for other employees, however, the high degree of flexibility makes it difficult to commit to working on the course content [31]. Despite many positive aspects, digital interventions experience a reluctance in their use [54]. An explanation lies in the disadvantages associated with digital interventions. The absence of trainers and a lack of clarity of the teaching material are key barriers [55]. These may create stress and frustration among participants due to a lack of communication and technical issues [56]. In addition, the success of digital prevention programs often depends on individuals' self-motivation and self-discipline [57]. Established learning routines and habits [58], self-directed learning [59], and functioning time management [60] are prerequisites for individual success in online formats. Another significant disadvantage is the lack of social support and interaction—both with trainers and with other participants.

In terms of effectiveness, initial studies indicate that both formats can be effective [31,34]. However, there are mixed findings related to the effectiveness of different formats [16]. For example, stress management interventions in the face-to-face format achieved a slightly greater stress reduction compared to the online format [31]. Another study confirms similar results for employees who felt less stressed after a traditional stress management intervention than after an online course [16], whereas others found no relevant differences between the groups [34]. After reviewing the existing literature, a slight superiority of face-to-face training over online courses emerges, despite the ambivalence regarding the effectiveness of both formats [16,31]. A pilot study showed stronger effects in the face-to-face format compared with the online format or an app-based solution when examining the effectiveness of the stress management intervention "Einfach weniger Stress" [61]. Further studies analyzing the effectiveness of stress management interventions in direct comparison are needed to verify the results and help employers identify the best method of stress reduction for their employees. Therefore, this study examines the effectiveness of a stress management intervention in both face-to-face and online formats compared to a waitlist control group.

We therefore assume:

Hypothesis 2: *Participants of the face-to-face intervention show a stronger (a) decrease in perceived stress and (b) increase in work engagement compared to participants of the online course.*

2.3. Moderators of the Effects

As little research has been conducted on who benefits most from stress management interventions and for whom a particular type of intervention is most appropriate [62,63], the present study examines potential moderators.

One potential moderator of the effectiveness of stress management interventions could be baseline stress. Empirical evidence already showed that baseline stress can moderate the effectiveness of Internet-based interventions [64,65]. Moreover, initial empirical studies have shown that baseline stress can also moderate the effects of stress management interventions [30,62]. Several moderators of the effectiveness of a web-based stress management intervention were examined in college students [62]. Baseline symptom severity moderated the effect of the intervention on all variables surveyed. Thus, higher baseline symptoms were also associated with a higher efficacy for participants. The results may suggest that the use of stress management interventions depending on baseline stress may be useful to ensure better efficacy. Another study examined the effectiveness and moderators of a web-based stress management intervention, where psychological distress on the baseline measure was a significant moderator [30]. The intervention studied was not effective for individuals who exhibited low psychological distress. However, perceived baseline stress was not a moderator of intervention effectiveness in the study. Accordingly, this may have been because the baseline stress of the sample was higher than the average of the working population [30]. Further studies could therefore provide valuable information on whether stress management interventions should be adapted for individuals with low

stress experience or whether the interventions are also effective in heterogeneous samples that were not preselected because of high baseline stress. Baseline stress is therefore included in the analysis as a potential moderator. Participants with a higher baseline stress presumably show a greater effect of the intervention on the outcome variables than participants with a lower baseline stress.

Another potential moderator of the effectiveness of stress management interventions could be personality. In theory, personal demands and resources are frequently mentioned as influencing factors related to stress and burnout [66–68]. In addition, personal characteristics are also mentioned as a moderator in the effectiveness of stress management interventions [69]. In addition to environmental influences, personal characteristics also influence how a person responds to demands and whether he or she benefits from appropriate stress management interventions [69]. Empirically, initial findings support personality as a possible influencing factor in this context. In a study referring to the JD-R, the personality factors neuroticism and extraversion were included in the JD-R model [39]. Neuroticism showed an effect on health impairment, while extraversion showed an effect on participants' work engagement. Similar results were shown in relation to stress experience, as personality traits were examined in relation to occupational stress and strain in managers [70]. Neuroticism showed a positive relationship with stress experience and was a positive predictor of physical illness. Extraversion was shown to be a negative predictor of illness. Similarly, neuroticism was associated with a negative stress response and extraversion with potential benefits in coping with stress [71]. Furthermore, personality and stress experience were examined during the COVID-19 pandemic [72]. Here, higher scores in neuroticism and extraversion were associated with higher stress levels. These results indicated that personality may be an important factor in identifying stress-prone individuals during a pandemic and that stress management measures may need to be personality-specific.

To gain further insight on personality as a determinant in this context, the personality dimensions extraversion and neuroticism were included in the analysis as potential moderators of the stress management intervention effectiveness. This should provide further insights into whether individuals with certain personality traits particularly benefit from stress management interventions and whether such interventions should therefore be offered in a personality-specific manner.

We therefore assume:

Hypothesis 3: *Participants' levels of baseline stress moderate the effect of the stress management intervention (face-to-face, online) on (a) perceived stress, (b) emotional exhaustion and (c) work engagement.*

Hypothesis 4: *Participants' levels of (a) extraversion and (b) neuroticism moderate the effect of the stress management intervention (face-to-face, online) on perceived stress.*

2.4. Mediators

A well-known model extension of the JD-R model with complex gain and loss spirals includes job crafting [66,73]. As a crafting skill, employees can use job crafting to actively influence their working conditions to perform meaningful work [74,75]. Individual needs, motives, and passions of the person are incorporated into this process, which can optimize the individual person–job fit [75,76]. For example, employees can change their work environment and experience by asking for support from colleagues or supervisors (increasing resources) or avoiding spontaneous work interruptions using time blockers (reducing demands). Job crafting directly interacts with resources, so both variables drive each other [66]. At the same time, job crafting promotes the reduction in burnout and emotional exhaustion [77–79]. Dimensions of increasing structural job resources (IStrJR), increasing social job resources (ISocJR), and increasing challenging job demands (ICJD) can be distinguished [80]. With IStrJR, employees increase their structures at work. This is accomplished by reorganizing working conditions, seeking out learning opportunities, or expanding their scope of action. The ISocJR facet enables employees to expand their social

resources. For example, this is achieved by actively seeking support from colleagues and/or superiors, feedback, or supervisor coaching. Managers in particular have a role model function for their employees, which should be filled with well-considered responsibility. With the help of ICJD, the pool of challenging requirements at work can be expanded. With this strategy, employees can, for example, choose to work on interesting projects, take on new tasks, and thus expand their usual scope of activity.

These strategies have been shown to be effective in previous studies [81], with IStrJR, ISocJR, and ICJD being associated with increased employee work engagement and performance [80]. Beyond these findings, new research on the effectiveness of stress management interventions indicates job crafting to be a significant mediator [82]. Therefore, participants of the "Einfach weniger Stress" online course showed more IStrJR and ICJD after the intervention, with IStrJR additionally mediating indirect effects. ISocJR, on the contrary, did not show to be a mediator, nor did this dimension of job crafting increase significantly in the sample after the intervention. It can be presumed that ISocJR might play a more central role in the face-to-face format than in the online course, as the latter is characterized by less social interaction [55]. Hence, the specific dimensions of job crafting are interposed between the stress management intervention (face-to-face/online format) and the future stress level of the employees in order to test whether job crafting acts as an underlying mechanism for the face-to-face training as well as for the online course.

We therefore assume:

Hypothesis 5: *The effect of the online course on perceived stress is mediated by (a) IStrJR, and not by (b) ICJD and (c) ISocJR.*

Hypothesis 6: *The effect of the face-to-face training on perceived stress is mediated by (a) IStrJR, (b) ICJD, and (c) ISocJR.*

3. Materials and Methods

3.1. Design and Procedures

A randomized waitlist-controlled design was conducted with two conditions, an intervention condition that consists of participation in either the face-to-face training or online course and a waitlist control condition (WLC), and three scheduled times of measurement: the first (T1) at baseline before the intervention, the second (T2) shortly after the intervention, and the third (T3) at a follow-up six weeks after T2. These three times of measurement allowed for conclusions about short-term and long-term effects. The self-reported data were assessed via online questionnaires using LimeSurvey Version 5.3.19 [83]. Overall, the study is based on a randomized 3 (face-to-face training vs. online course vs. control group) $\times$ 3 (pre vs. post vs. follow-up)-mixed design, which consists of the within-factor time and the between-factor group. Prior to data collection, the study was pre-registered on the Open Science Framework (https://osf.io/ecfhr/ (accessed on 29 September 2023)) and approved by the ethical review board of the Technische Universität Braunschweig (grant no. MA_2022-07). In the research process, an adjustment was made to the preregistered data (i.e., randomization could not be maintained continuously due to absences of participants related to illness and vacation of the participants) because the preregistration was created at an early stage within the research project. Data collection took place between June and September 2022. Upon registration, subjects confirmed their informed consent, and agreement with the privacy policy by checking the corresponding boxes. Furthermore, the project has been given approval by the General Staff Council and Data Protection Officer.

3.2. Participants

The study was conducted in a medium-sized company from the German public sector in the division of economic affairs and energy and involved $N = 65$ participants, both employees and managers. Acquisition took place via intranet, email distribution lists, and flyers. Participation was voluntary, free of charge, and accessible to all employees. Participants did not receive any compensation, but free access to the stress management

course. They received the online questionnaires via email. Participation in the training and the online course took place during working hours. There was no special treatment for participants who dropped out and these participants were not replaced.

3.3. Study Conditions and the Intervention

The participants were assigned to one out of three groups by randomization: Face-to-face training (Group 1), online course (Group 2), and waitlist control group (Group 3). Group 1 participated in a face-to-face stress management training for one day. Group 2 participated in an online stress management course for five weeks. Participants of Group 3 received no intervention at first but received free access to the face-to-face training or the online course, as they wished, once the last survey was conducted.

The intervention investigated is the stress management concept "Einfach weniger Stress (Simply less stress)" (EWS) [37], which has been tested and certified by the Zentrale Prüfstelle Prävention. The intervention is addressed to adults without medical conditions requiring treatment who experience stress due to demands of work and personal life. Theoretically integrating assumptions of the transactional stress model [84] and the JD-R model [22], it aims at promoting skills for functional stress management and the prevention of work-related stress. EWS is a scientifically evaluated stress prevention program. Originally developed as a face-to-face training, an online version has since been developed to facilitate accessibility and increase reach. So far, both formats have been scientifically evaluated in separate studies. EWS consists of five main modules, which have been supplemented by an introductory module and a closure module for the online course. The five main modules build on each other but are self-contained in terms of content and focus on (1) Understanding Stress, (2) Recognizing Stressors, (3) Awakening Resources, (4) Planning Implementation, and (5) Acting Calmly (see Table 1). Each module provides learning objectives, knowledge inputs, exercises, and supplemented for the online course—quiz questions at the end delivered via text or audio files. Participants were recommended to complete an online module within one week rather than over several weeks. Overall, the online course should be completed in a maximum of five weeks. The completion time of the online modules varied on average between 90 and 115 min, so that the completion of a module was possible within one day. The face-to-face training was held for seven hours in one day. In addition, the intensity of use of the subjects was increased by e-mail reminders, personalized flowcharts, certificates, and a kick-off and voluntary meetings were offered at T1, T2, and T3, respectively, to all participants of the three groups to provide a space for questions, exchange opportunities, and to reduce the drop-out rate. Participants who could not be present at the reflection meeting received all necessary information by email. No content aspects of stress management interventions were discussed.

Table 1. Intervention contents.

Module	Learning Objective	Content
Introduction	Participants understand what to expect in the course.	• Welcome and introduction of the course and the "Einfach weniger Stress" concept • Information on the structure of the modules and relevance of stress prevention
1. Understanding Stress	Participants understand how stress arises and how it affects their thoughts and actions.	• Theory/Input: Information on stress, the Transactional Stress Model and coping [84], the Job Demands-Resources Model [21], and biological consequences of stress • Practice: Exercises on the individual stress process, reflecting on positive and negative stress, recovery strategies, stress symptoms, and constant availability

Table 1. *Cont.*

Module	Learning Objective	Content
2. Recognizing Stressors	Participants understand triggers of stress and the interaction of situations and personality.	• Theory/Input: Information on typical (work-related) stressors and stress-promoting cognitions • Practice: Exercises on classifying own stressors, recognizing own stress-promoting cognitions, developing alternative functional cognitions
3. Awakening Resources	Participants activate their resources.	• Theory/Input: Information on resources and techniques for resource activation • Practice: Relaxation exercise, exercises on reflection of resources, and techniques for resource activation
4. Planning Implementation	Participants develop strategies to master future stressful situations.	• Theory/Input: Information on the Rubicon model [85] and crafting strategies • Practice: Exercises on planning the use of new resources and applying crafting strategies *
5. Acting Calmly	Participants remain calm even in stressful situations.	• Theory/Input: Information on the WOOP technique [86], mental access to experiences of serenity. and establishment of new habits • Practice: Exercises on developing strategies to overcome potential obstacles, reflecting own experiences of calmness, applying, and reflecting of the coffee bean method
Closure	Participants reflect on the course and solidify transfer.	• Review of modules • Reflections on transfer to everyday life

Note: The web-based version of the course contains a reflection exercise at the beginning of modules 1 to 5 to refer to the previous week and a knowledge quiz at the end of these modules as well as an observation task for the coming week. * This is only part of the web-based version.

3.4. Measures

Perceived stress was measured using the German version of the Perceived Stress Scale (PSS-10) [87,88]. Based on the frequency (rated on a 5-point Likert scale from 1 = never to 5 = very often) of ten thoughts or feelings within the last month (e.g., " In the last month, how often have you felt nervous and "stressed"?", $\alpha = 0.87$), the instrument assesses the extent to which one's life is perceived as stressful and uncontrollable. Furthermore, perceived stress at T1 was examined as a moderator.

Emotional exhaustion was assessed as an indicator of burnout by the subscale of the German version of the Maslach Burnout Inventory (MBI-D) [89]. The subscale contains nine items (e.g., "I feel burned out by my work.", $\alpha = 0.82$) and the items were answered on a 5-point Likert scale (ranging from 1 = very weak/very rarely to 5 = very strong/very often).

Work engagement was assessed using the German and validated version of the Utrecht Work Engagement Scale-9 (UWES-9) [43,90]. The economic and internationally validated short version contains nine statements about the extent to which employees experience their work motivationally (e.g., " I am enthusiastic about my job.", $\alpha = 0.92$). These were answered on a 7-point Likert scale, ranging from 0 = never to 6 = always/every day. Thus, high scores indicate high levels of work motivation, all items are worded positively [90].

Three subscales of the German version of the Job Crafting Scale [80,91] were employed to capture the behavior of increasing structural job resources, increasing social job resources, and increasing challenging job demands. Respondents expressed the frequency of their job crafting behaviors on a 5-point Likert scale (1 = does not apply at all to 5 = fully applies).

The three subscales consist of 15 items in total (e.g., IStrJR: "I decide on my own how I do things.", α = 0.66; ISocJR: "I ask my supervisor to coach me.", α = 0.68; ICJD: "When an interesting project comes along, I offer myself proactively as project coworker.", α = 0.80).

Extraversion and neuroticism were both assessed as personality dimensions by the German version of the Big Five Inventory-10 [92]. The scale of the personality dimensions consists of 2 items each (e.g., "I see myself as someone who is outgoing, sociable." or "I see myself as someone who gets nervous easily.") and the items were answered on a 5-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree). The intercorrelation of the items for extraversion was r = 0.69 and for neuroticism r = 0.43.

Furthermore, satisfaction with the stress management format by a self-constructed one-item-measure (1 = very dissatisfied to 5 = very satisfied) and sociodemographic data including gender, age, group, and an anonymous participant code were assessed.

All reported Cronbach's alpha values were based on T1 data.

3.5. Data Analyses

Statistical analyses were conducted using IBM SPSS Statistics 28.0 [93] and R 4.2.1. [94]. Reported *p*-values are two-sided and a significance level of 0.05 was applied. To examine intervention effectiveness, 3 × 3-mixed analysis of variance (ANOVA) with the repeated within-factor time (T1 vs. T2 vs. T3) and the between-factor group (face-to-face training vs. online course vs. control group). In case of non-significant interaction, the main effects and their Bonferroni-corrected post hoc tests were considered, as they are more conservative—compared to the Scheffé test—and correct for α-error accumulation [95]. Path analysis and multiple regressions were conducted to test indirect mediating effects. In a model with group, job crafting, and perceived stress, mediations were tested separately for each dimension of job crafting. The categorical predictor group was dichotomized to relate the intervention group to the control group. Bootstrapping was chosen for statistical testing of indirect effects, which is more robust compared to the commonly used Sobel test and does not rely on a normal distribution assumption [96]. A total of 5000 bootstrap samples were drawn by default and the conventional confidence level of 95% was used [96,97]. Multiple linear regression was used to examine the moderators extraversion, neuroticism, and baseline stress regarding the effect of the stress management intervention on the respective outcomes. For this purpose, difference values at T2 (T1–T2) and T3 (T1–T3) were considered and the WLC was used as a reference level. All analyses to test the hypotheses are based on fully complete cases (completer-only analysis).

Concerning assumptions for the statistical procedures, even though the Shapiro–Wilk test indicated violations of the assumption of normality (e.g., for Work Engagement at T1 in the WLC, the regression model of baseline stress and motivation at work at T2 and T3, ISocJR at T1 in the WLC, and ICJD at T3 in the online course), multiple regression models and mixed ANOVA were used because these procedures have been shown to be robust to violations of the normal distribution [98–100]. The bootstrapping procedure also counts as robust because it is free of distributional assumptions [101].

Also, for the moderation analyses, even though the Durbin–Watson (DW) test indicated violations of the assumption of independence of the residuals for models with the difference values of perceived stress at T2 (DW-values between 2.49 and 2.81), the values are within the acceptable limits of 1 to 3 [102], and therefore, the moderation analyses for extraversion, neuroticism, and baseline stress were still calculated.

4. Results

4.1. Flow of Participants

The flow of participants throughout the study is summarized in Figure 1. Of the N = 65 subjects, all subjects participated in the baseline assessment at T1, n = 54 participated in the post-test assessment at T2 and n = 47 participated in the follow-up assessment at T3. An a priori power analysis conducted in G*Power 3.1.9.6 indicated that the present sample size of N = 65 was adequate to examine medium-sized effects using mixed analysis

of variance (f = 0.25), paired *t*-tests (dz = 0.5), and mediation analysis (f^2 = 0.15 [103]). Accordingly, the recommended minimum sample sizes for the mixed variance analysis of N = 36 (12 participants per group), the paired *t*-tests of N = 34, and the mediation analysis of N = 55 were met (α = 0.05, 1-β = 0.80).
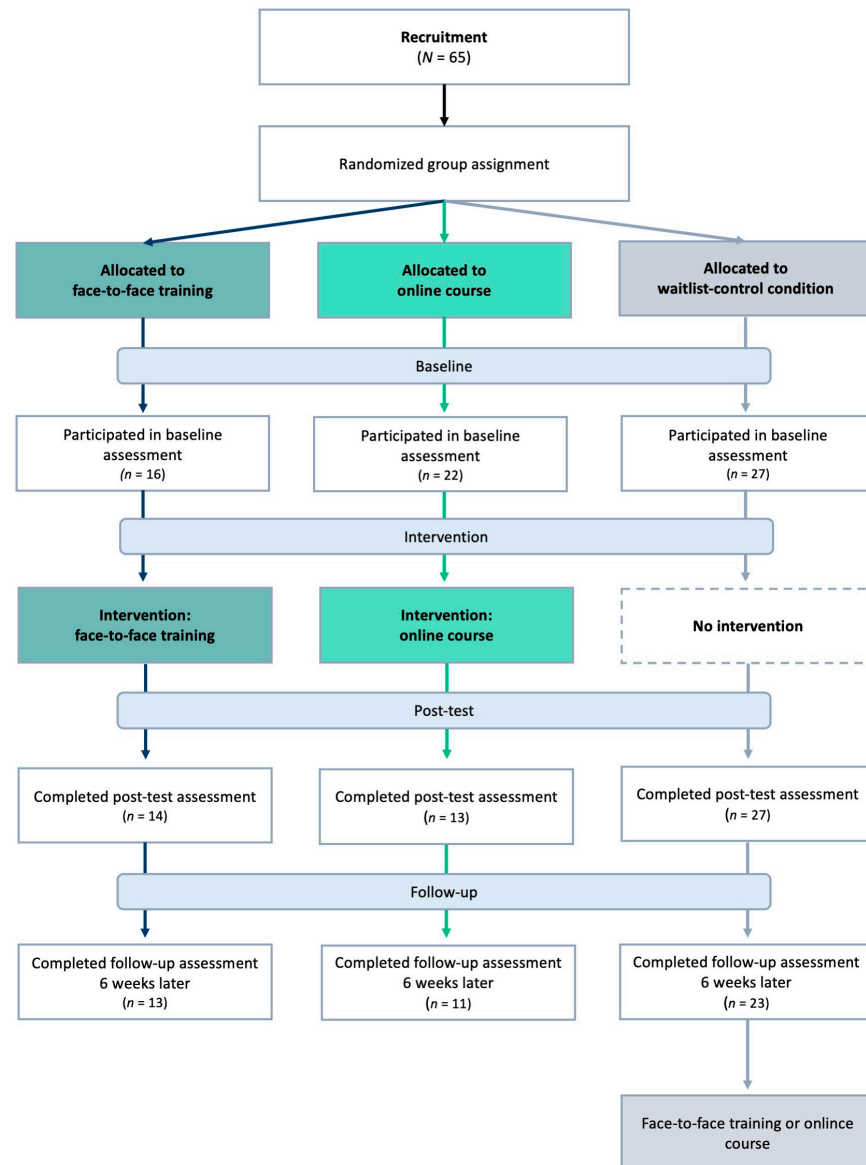
Figure 1. Flow of participants.

4.2. Sample Characteristics

The sociodemographic characteristics provided by study participants at T1 are summarized in Table 2. Sixteen employees took part in the face-to-face training, 22 employees completed the online course, and 27 employees were assigned to the WLC. Prior to the stress management, 10 people changed their group due to vacation or illness of the participants. The age range was 19 to 62 years with a mean age of 39.95 years (SD = 11.32). Two participants in the online course did not provide valid information for age. The largest proportions of participants were female (61.5%).

In addition, the groups did not differ significantly from the total sample in terms of demographic characteristics such as age or gender. Consequently, the sample examined was assumed to be representative and significant demographic group differences that might account for later results were rejected. The means and standard deviations for the

study variables for all groups and times of measurement are summarized in Table 3. The correlation matrix can be found in Table 4.

Table 2. Distribution of sample on gender and age at T1 (N = 65).

Variable	Face-to-Face Training (*n* = 16)	Online Course (*n* = 22)	WLC (*n* = 27)
Gender [1]	75.0% Female 25.0% Male	59.1% Female 40.9% Male	55.6% Female 44.4% Male
Age [2]	*M* = 42.69 *SD* = 13.20	*M* = 39.00 *SD* = 10.89	*M* = 39.04 *SD* = 10.66

Note: M = mean; SD = standard deviation; n = sample size [1] 0 = female, 1 = male, 2 = non-binary, 3 = no information. [2] Years in whole numbers.

Table 3. Means and standard deviations for the study variables at the three times of measurement for the three groups.

Variable	F2F			Online Course			WLC		
	M	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*
Perceived stress T1	3.33	0.53	16	2.91	0.65	22	3.20	0.63	27
Perceived stress T2	3.33	0.48	14	2.66	0.54	13	3.01	0.57	27
Perceived stress T3	3.12	0.57	13	2.35	0.49	11	3.07	0.69	23
Work engagement T1	3.48	1.02	16	2.86	1.27	22	3.72	0.98	27
Work engagement T2	3.25	1.05	14	2.87	0.93	13	3.44	1.13	27
Work engagement T3	3.37	0.99	13	2.75	0.94	11	3.20	1.06	23
IStrJR T1	3.89	0.44	16	3.63	0.63	22	3.85	0.71	27
IStrJR T2	3.84	0.45	14	3.52	0.62	13	3.84	0.62	27
IStrJR T3	3.91	0.56	13	3.58	0.60	11	3.66	0.71	23
ISocJR T1	2.68	0.72	16	2.47	0.71	22	2.77	0.86	27
ISocJR T2	2.84	0.95	14	2.28	0.61	13	2.79	0.78	27
ISocJR T3	2.97	0.76	13	2.45	0. 59	11	2.77	0.80	23
ICJD T1	3.18	0.85	16	3.05	0.87	22	3.56	0.89	27
ICJD T2	3.27	0.84	14	2.75	0.79	13	3.36	0.82	27
ICJD T3	3.20	0.73	13	2.87	0.73	11	3.31	0.82	23
Emotional exhaustion T1	22.56	6.13	16	23.27	7.66	22	22.74	6.97	27
Emotional exhaustion T2	23.57	6.61	14	21.38	8.87	13	22.19	6.49	27
Emotional exhaustion T3	22.23	5.75	13	19.82	8.28	11	24.78	6.55	23
Extraversion T1	3.13	1.12	16	2.82	1.09	22	3.35	1.00	27
Neuroticism T1	3.47	0.85	16	3.48	0.97	22	3.56	0.91	27

Note: M = mean; SD = standard deviation; n = sample size; F2F = face-to-face training.

Table 4. Means, standard deviations, and correlations of the study variables.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 Stress T1	3.14	0.63																			
2 Stress T2	3.01	0.58	0.81 ***																		
3 Stress T3	2.92	0.68	0.68 ***	0.72 ***																	
4 WE [1] T1	3.37	1.14	−0.26 *	−0.07	0.13																
5 WE [1] T2	3.26	1.07	−0.24	−0.17	0.07	0.71 ***															
6 WE [1] T3	3.14	1.02	−0.31 *	−0.08	−0.17	0.60 ***	0.67 ***														
7 IStrJR T1	3.79	0.63	−0.23	−0.09	−0.04	0.58 ***	0.42 ***	0.20													
8 ISocJR T1	2.65	0.78	−0.11	0.07	0.10	0.39 ***	0.60 ***	0.42 **	0.29 *												
9 ICJD T1	3.29	0.89	−0.11	0.08	0.12	0.54 ***	0.34 **	0.34 *	0.53 ***	0.39 ***											
10 IStrJR T2	3.77	0.59	−0.15	−0.06	−0.05	0.51 ***	0.49 ***	0.31 *	0.60 ***	0.41 **	0.38 **										
11 ISocJR T2	2.68	0.81	−0.12	0.03	0.08	0.45 ***	0.57 ***	0.50 ***	0.16	0.80 ***	0.42 **	0.33 *									
12 ICJD T2	3.19	0.84	−0.13	0.03	0.12	0.58 ***	0.51 ***	0.53 ***	0.42 ***	0.48 ***	0.80 ***	0.42 ***	0.62 ***								
13 IStrJR T3	3.71	0.64	−0.10	0.02	−0.11	0.35 *	0.30 *	0.26	0.46 ***	0.30 *	0.26	0.78 ***	0.21	0.31 *							

Table 4. *Cont.*

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
14 ISocJR T3	2.75	0.75	−0.10	0.15	0.11	0.34 *	0.42 **	0.58 ***	0.09	0.67 ***	0.35 *	0.17	0.83 ***	0.51 ***	0.17						
15 ICJD T3	3.18	0.78	−0.07	0.06	0.07	0.52 ***	0.39 **	0.53 ***	0.38 **	0.35 *	.83 ***	0.31 *	0.50 ***	0.89 ***	0.33 *	0.52 ***					
16 EE ^{2} T1	22.88	6.92	0.45 ***	0.45 ***	0.30 *	−0.26 *	−0.25	−0.12	−0.04	−0.16	0.15	−0.14	−0.21	0.12	0.13	−0.11	0.25				
17 EE ^{2} T2	22.35	7.06	0.50 ***	0.51 ***	0.07	0.35 *	0.34 *	0.52 ***	0.23 *	0.42 **	0.39 **	0.26	0.58 ***	0.53 ***	0.03	−0.11	0.17	0.46 ***			
18 EE ^{2} T3	22.92	6.94	0.78 ***	0.49 ***	0.56 ***	0.05	−0.10	−0.16	0.06	−0.02	0.39 **	0.03	−0.04	0.31 *	0.08	0.07	0.36 *	0.73 ***	0.09		
19 Extraversion T1	3.12	1.07	−0.17	−0.04	0.09	0.18	0.25	0.15	0.17	0.37 **	0.36 **	0.11	0.34 *	0.32 *	0.06	0.33 *	0.19	−0.01	0.38 **	0.11	
20 Neuroticism T1	3.51	0.90	0.37 **	0.38 **	0.20	−0.15	−0.23	−0.35 *	−0.24	−0.10	−0.36 **	−0.27 *	−0.24	−0.39 **	−0.06	−0.16	−0.34 *	0.04	0.30 *	0.21	−0.29 *

Note: M = mean; SD = standard deviation; [1] WE = Work engagement; [2] EE = Emotional exhaustion; * $p \leq 0.05$. ** $p \leq 0.01$. *** $p \leq 0.001$.

4.3. Effectiveness of the Stress Management Intervention

4.3.1. Perceived Stress

The test of the assumption of sphericity revealed that sphericity was not given for perceived stress (Mauchly's M = 0.863, df = 2, $p = 0.043$). Accordingly, the degrees of freedom in the ANOVA were corrected for the within-factor time according to the procedure by Huynh–Feldt [104].

Mixed ANOVA (N = 47) revealed a significant main effect of *time* ($F(1.91, 84.07) = 7.18$, $p = 0.002$, $\eta_p^2 = 0.14$), indicating different levels of perceived stress regardless of the study group. It is a large effect with $\eta_p^2 = 0.14$ [105].

The Bonferroni-corrected post hoc test found significant differences between T1 and T3; thus, employees, regardless of their study groups, showed significantly less stress at follow-up than at the first time of measurement ($M_{\text{Diff}} = 0.27$, $p = 0.006$); see Table 5. Perceived stress decreased significantly over time.

There was also a significant main effect of *group* ($F(2, 44) = 5.44$, $p = 0.008$, $\eta_p^2 = 0.20$), indicating different levels of perceived stress regardless of the time of measurement. It is a large effect with $\eta_p^2 = 0.20$ [105]. The Bonferroni-corrected post hoc test showed that participants of the online course always had the lowest perceived stress level compared to employees of the face-to-face training ($M_{\text{Diff}} = -0.69$, $p = 0.009$) and the WLC ($M_{\text{Diff}} = -0.54$, $p = 0.028$)—see Table 5—which is contrary to the postulated Hypothesis 2(a).

Statistically, there was no statistically significant interaction between time and group in terms of perceived stress, $F(3.82, 84.07) = 1.16$, $p = 0.335$, $\eta_p^2 = 0.05$. Participants in the stress management intervention in both face-to-face and online course did not show significantly lower stress experience shortly and 6 weeks after the intervention than before the intervention and compared to the WLC. Thus, Hypothesis 1(a) could not be confirmed.

The mean values and standard errors in perceived stress are shown in Figure 2 as a function of group over time. In the figure, trends for the reduction in perceived stress in the intervention groups could be seen.

Table 5. Bonferroni-corrected post hoc tests for the variable perceived stress.

		Mean Value Difference	p
Factor Group			
F2F	Online	0.69 **	0.009
	WLC	0.15	1
Online	F2F	−0.69 **	0.009
	WLC	−0.54 *	0.028
WLC	F2F	−0.15	1
	Online	0.54 *	0.028

Table 5. *Cont.*

		Mean Value Difference	p
Factor Time			
T1	T2	0.13	0.105
	T3	0.27 **	0.006
T2	T1	−0.13	0.105
	T3	0.14	0.159
T3	T1	−0.27 **	0.006
	T2	−0.14	0.159

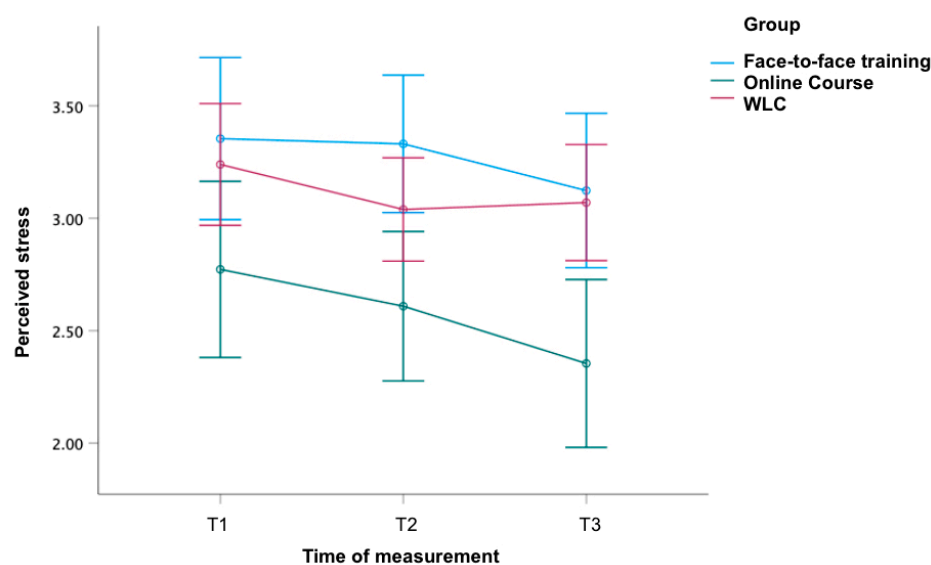Note: * $p \leq 0.05$. ** $p \leq 0.01$.; F2F = Face-to-face training.

Figure 2. Mean changes of perceived stress in the three groups over time (95% CI).

4.3.2. Emotional Exhaustion

Statistical analysis with mixed ANOVA (*N* = 47) showed no significant main effect of *time*, $F(2, 88) = 0.11$, $p = 0.892$, $\eta_p^2 = 0.0003$, and *group*, $F(2, 44) = 0.50$, $p = 0.612$, $\eta_p^2 = 0.02$. The groups as well as the times of measurement did not differ significantly.

Statistical analysis revealed no statistically significant interaction between *time* and *group* in terms of emotional exhaustion, $F(4, 88) = 2.08$, $p = 0.091$, $\eta_p^2 = 0.02$. Participants in the stress management intervention in both face-to-face and online formats did not show significantly lower emotional exhaustion shortly and 6 weeks after the intervention than before the intervention and compared to the WLC. Hypothesis 1(b) could not be confirmed. The mean values of emotional exhaustion show trends for the reduction of emotional exhaustion in the intervention groups (see Table 3).

4.3.3. Work Engagement

Statistical analysis using mixed ANOVA (*N* = 47) revealed no significant main effect of *time*, $F(2, 88) = 2.49$, $p = 0.089$, $\eta_p^2 = 0.05$, and *group*, $F(2, 44) = 2.44$, $p = 0.099$, $\eta_p^2 = 0.10$. The groups as well as the times of measurement did not differ significantly. Statistical analysis showed no statistically significant interaction between *time* and *group* in terms of work engagement, $F(4, 88) = 0.71$, $p = 0.586$, $\eta_p^2 = 0.03$. Thus, Hypotheses 1(c) and 2(b) could not be confirmed.

4.4. Moderators and Mediators

Results on the moderators baseline stress, extraversion, and neuroticism are presented first, and then results on the mediation effects of job crafting are reported.

4.4.1. Moderators

Baseline stress. Regarding perceived stress, multiple regression with baseline stress as moderator revealed that the model significantly predicted the change in perceived stress at T2, $F(5, 48) = 4.58$, $p = 0.002$, and T3, $F(5, 41) = 3.04$, $p = 0.02$. The model had a high goodness of fit for T2 with $R^2 = 0.32$ (corrected $R^2 = 0.25$) and medium to high goodness of fit for T3 with $R^2 = 0.27$ (corrected $R^2 = 0.18$) [106]. Baseline stress was the only predictor that significantly predicted change in perceived stress at T2 ($p = 0.002$). Baseline stress had an effect on change in perceived stress regardless of group membership. At T3, baseline stress was not a significant predictor, but showed a statistical tendency ($p = 0.077$). Multiple linear regression revealed no statistically significant interactions between baseline stress and face-to-face training (T2: $p = 0.713$; T3: $p = 0.413$) and online course (T2: $p = 0.964$; T3: $p = 0.392$) in terms of change in perceived stress, with WLC as the reference value. Thus, Hypothesis 3(a) could not be confirmed.

The model with baseline stress as a moderator for change in emotional exhaustion was not significant for T2, $F(5, 48) = 0.30$, $p = 0.91$ and T3, $F(5, 41) = 1.52$, $p = 0.206$. Multiple linear regression revealed no statistically significant interactions between baseline stress and face-to-face training (T2: $p = 0.564$; T3: $p = 0.952$) and the online course (T2: $p = 0.421$; T3: $p = 0.244$) on change in emotional exhaustion, with WLC as the reference value. Hypotheses 3(b) could therefore not be confirmed. There were also no significant predictors.

The model with baseline stress as a moderator for change in work engagement was not significant for T2, $F(5, 48) = 0.15$, $p = 0.979$ and for T3, $F(5, 41) = 0.68$, $p = 0.644$. Multiple linear regression revealed no statistically significant interactions between baseline stress and face-to-face training (T2: $p = 0.546$; T3: $p = 0.321$) and the online course (T2: $p = 0.633$; T3: $p = 0.708$) on change in work engagement, with WLC as the reference value. Thus, Hypothesis 3(c) could not be confirmed. There were also no significant predictors.

Extraversion. Multiple regression with extraversion as a moderator showed that the model significantly predicted the change in perceived stress at T3, $F(5, 41) = 3.60$, $p = 0.009$. The model had a high goodness of fit for T3 with $R^2 = 0.30$ (corrected $R^2 = 0.22$) [106]. For T3, multiple linear regression revealed a significant interaction between the face-to-face training ($p = 0.018$) as well as online course ($p = 0.001$) and extraversion in terms of change in perceived stress, with WLC as the reference value. Extraversion moderated the effect of the stress management intervention in both formats on perceived stress. Therefore, Hypothesis 4(a) could be confirmed for T3. At T2, extraversion was the only predictor that significantly predicted change in stress experience ($p = 0.039$). Extraversion thus had an effect on change in perceived stress at T2 regardless of group membership. The model was not significant, $F(5, 48) = 1.41$, $p = 0.238$, and multiple linear regression for T2 revealed no significant interaction between face-to-face training ($p = 0.139$) as well as online course ($p = 0.328$) and extraversion in terms of change in perceived stress with WLC as the reference value.

Neuroticism. The model with neuroticism as a moderator of change in perceived stress was not significant for T2, $F(5, 48) = 0.73$, $p = 0.608$, and T3, $(F(5, 41) = 1.12$, $p = 0.364$. Multiple linear regression revealed no statistically significant interactions between neuroticism and the face-to-face training (T2: $p = 0.852$; T3: $p = 0.682$) and the online course (T2: $p = 0.485$; T3: $p = 0.283$) in terms of change in perceived stress, with WLC as the reference value. Hypothesis 4(b) could not be confirmed. There were also no significant predictors.

4.4.2. Mediators

The indirect effects between participation in the stress management intervention and perceived stress (T3), mediated by job crafting (T2), did not reach statistical significance. The bounds of the bootstrap confidence intervals included a value of zero for all three facets of job crafting; ergo, job crafting is dismissed as a mediator. This is valid for both the face-to-face training (e.g., IStrJR: B = −0.01, 95% CI[−0.16, 0.05]) and online course (e.g., ICJD: B = 0.10, 95% CI[−0.07, 0.36]). Consequently, Hypotheses 5(a) and 6(a–c) must be rejected

because the postulated job crafting facets did not significantly explain the relationship between participation in the intervention and future stress. Meanwhile, Hypotheses 5(b,c) are corroborated by the present data, as ICJD and ISocJR were not expected to be mediators of the online course. The indirect effects, including their bootstrap confidence intervals, are summarized in Table 6.
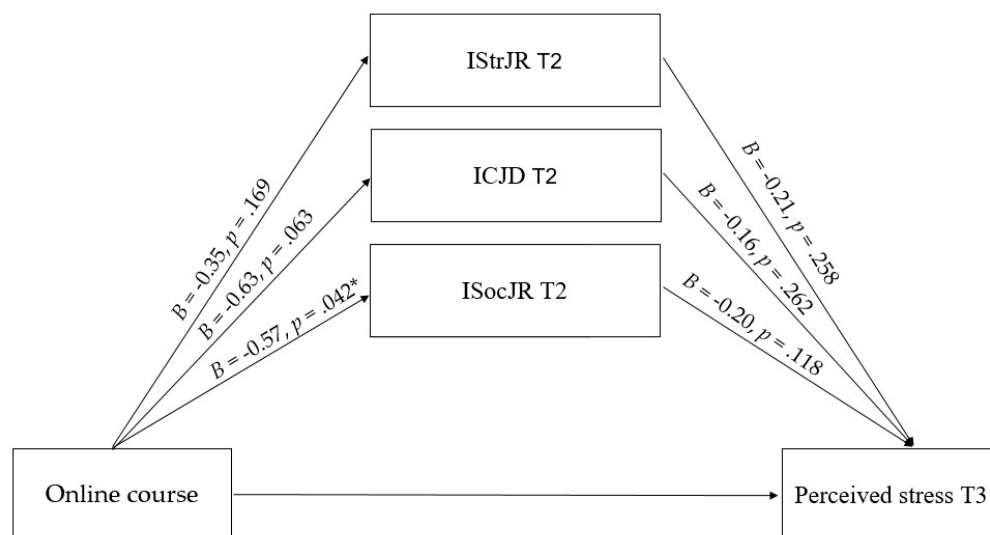
Figure 3. Direct effects between stress management interventions and job crafting, as well as between job crafting and future perceived stress. *B* = Unstandardized regression coefficient; * $p \leq 0.05$.

Table 6. Indirect effects between stress management interventions and perceived stress mediated by three job crafting facets.

Predictor	Mediator	Criterion	95% CI Lower 2.5%	*B*	95% CI Upper 2.5%
	F2F IND Stress				
F2F	IStrJR T2	Stress T3	−0.16	−0.01	0.05
F2F	ISocJR T2	Stress T3	−0.10	−0.01	0.10
F2F	ICJD T2	Stress T3	−0.13	−0.001	0.07
	Online course IND stress				
online course	IStrJR T2	Stress T3	−0.11	0.07	0.21
online course	ISocJR T2	Stress T3	−0.04	0.12	0.33
online course	ICJD T2	Stress T3	−0.07	0.10	0.36

Note: F2F = Face-to-face training; *B* = unstandardized regression coefficientAdditionally, the direct effects between predictor, mediator, and criterion were analyzed. All direct paths yielded nonsignificant results except for the path between the online course and ISocJR (see Figure 3). Participation in the online course significantly predicted ISocJR (B = −0.57, *p* = 0.042). Hence, participants in the online course showed significantly less ISocJR compared to the WLC at the second time of measurement.

4.5. Exploratory Analysis

In addition to the quantitative results, participants were given the opportunity to provide feedback on the intervention in a free text field in the questionnaire. At the end of each questionnaire, participants were asked "What else would you like to tell us?". In total, there were 30 personal messages from 21 people. Due to data protection, the statements were anonymized, the content analyzed and divided into categories. An overview can be found in Table 7. Examples of qualitative feedback categorized as "Influence of other factors on the results" are "Just got back from a long vacation and still a little more relaxed than usual." or "The questions just make me think about whether the work I'm doing here is right for me at all". An example of the category "Reasons for stress" is "I feel that negative stress has increased for me in the last two years, as part of the transition to

digital formats". An example for the category "Criticism of the questionnaire" is "There are big differences between the technical work and the administrative work. It is often not clear what is meant. Therefore, these answers are to be evaluated very differently". An example for qualitative feedback categorized as "Positive feedback" is "I found it really very good and helpful". An example for the category "Dissatisfaction with current situation and job" is "I am severely frustrated with my performance at work and believe I have chosen the wrong job". An example for the category "Stress in private life" is "I currently feel stressed/overloaded for personal rather than professional reasons". An example for qualitative feedback categorized as "Suggestions for improvement" is "An exchange with other online course graduates about the content would be nice".

Table 7. Qualitative feedback from the *n* = 21 participants (multiple answers were possible).

Category	Examples of Content	No. of Mentions
Influence of other factors on the results	Vacation, reflection due to the questionnaire, mental illness	6
Reasons for stress	Change to digital formats, supervisor, colleagues, part-time work	6
Criticism of the questionnaire	Lack of clarity about the concept of work or concept of stress, specific questions, scales	6
Positive feedback	Face-to-face training, effects of the online course, questionnaire	6
Dissatisfaction with current situation and job	Frustration, exhaustion, doubts about the job, lack of free time	5
Stress in private life	Lack of time, reduced work–life balance, many private commitments	5
Suggestions for improvement	Exchange with others, more literature recommendations	2

5. Discussion

To counteract increased stress and strain on employees, preventive measures at work are becoming increasingly important [107]. One measure can be stress management interventions, which are offered in different formats. Evaluation and reviews of these interventions are essential to ensure effectiveness. Therefore, the aim of this study was to evaluate the effectiveness of the stress management intervention "Einfach weniger Stress" [37] in face-to-face and online format in the workplace context.

With regard to the effectiveness, the results of the study did not show the expected interaction between the time of measurement and group membership on the outcome variables studied. This is contrary to prior studies [23,30,32]. However, tendencies in the postulated direction became visible. In the intervention groups, there was evidence of reduction in perceived stress and emotional exhaustion, as well as a lower decrease in work engagement compared to the WLC. These results emphasize the positive effect of stress management trainings and are in line with the JD-R, which postulates that stress trainings on one hand can reduce job demands, stress, and burnout symptoms and on the other hand can enhance work engagement by activating resources [41].

In general, the missing effects on work engagement are contrary to our expectations and prior studies [13,46]. Complex mechanisms might have caused the same stress management intervention to have differential effects on varying outcome variables. Accordingly, the EWS intervention was associated with reduced stress but not with increased work engagement in the present study. Although modern research recommends the inclusion of health-promoting variables [32], these results show a discrepancy between the current work and prior studies that did find evidence for positive-psychological variables [33,46]. Another reason might be that participants found it easier to reduce strain, such as stress, than to increase resources, such as work engagement. This assumption is in line with stress prevention interventions being particularly effective when building health-promoting strategies rather than reducing health-damaging strategies [108].

Regarding perceived stress, a significant main effect revealed a decrease in perceived stress over time, regardless of group. While the decreased perceived stress in the interventions groups is in line with expectation, the decrease in the WLC is not as expected. External influences in the organizational environment might have affected all groups. Since the entire survey took place from July to October, which collides with the main holiday season in Germany [109], seasonal effects cannot be ruled out [110]. This is also shown in the qualitative feedback (Table 7) from the participants, as two persons of the WLC explicitly pointed out a vacation before the post-intervention measurement. Another person from the WLC mentioned that vacations can have positive effects for him/her, but that these would quickly subside. Prior studies also emphasize that vacations can have positive effects on health and well-being, but with a return to baseline levels after 2 to 4 weeks [111–113]. This fading of the vacation effects could explain why evidence of the intervention's effectiveness was largely not apparent until the follow-up measurement. At the same time, the reduction in perceived stress between T1 and T3 indicates that stress management interventions may require some time to develop measurable effects. These findings are consistent with longitudinal studies that postulate long-term effectiveness of stress management interventions [32,49].

Another reason for the effects in the WLC could be that expectations may have already had effects in terms of a minimal intervention: participants develop expectations, which may lead to change [97,110], especially if the stress management intervention was previously touted as effective, which was given in the present study (e.g., at the kick-off event). Although the exchange meetings, that were offered to promote adherence of participants in all groups, did not relate to the content of the interventions but exclusively to organizational issues, an influence on the WLC cannot be excluded. As the participation was voluntary, the employees who registered for the stress management program may have high personal interest and sensitivity to the issue of stress, which in turn might have masked or weakened the effectiveness of the stress training. Evidence of this is also shown in the qualitative feedback (Table 7) of the participants, as one person from the WLC shared that the questions made him/her think and reflect.

In addition, a second main effect found that participants in the online course reported the lowest perceived stress regardless of the measurement time, which might indicate the online course as more effective. This result contradicts the postulated predominance of face-to-face training but is in line with the assumption that significant format differences prevail per se. Voluntary exchange meetings, regular reminder emails, personalized certificates, and constant contact with trainers may have counteracted typical disadvantages of online courses. Another explanation would be that participants of the online course had more capacity—due to their low stress level—to absorb the content of the stress management intervention in depth and to successfully integrate their learnings into everyday life. It might be the case that stress management interventions are less effective for people who are severely stressed, supported by the finding that more employees drop out of stress prevention programs if they have the highest (work-related) stress level [31]. Another reason for the results of the online course could be dropout. The online course had the largest dropout at 50% compared to the other groups. In a review comparing stress management interventions in different formats, it was pointed out that future studies need to be aware of the risk of dropout in computer-based interventions [16]. Overall, dropout is comparable to similar interventions, as adherence to web-based health interventions is typically 50% [114]. Although, the present study could indicate a higher effectiveness of the online course compared to face-to-face formats, there were no statistically significant differences. The present study adds to the mixed findings on differences in effectiveness in face-to-face and online formats [31,34].

In line with prior studies [69,71], the present study also provided some evidence on the influence of the personality dimension extraversion on the effect of the intervention in the face-to-face and online format on perceived stress. At the follow-up, higher levels of extraversion in the intervention groups tended to be associated with higher reductions

in perceived stress, whereas the opposite effect was found in the WLC. However, the results should be interpreted with caution because the moderating effect was not found at post-measurement. Furthermore, a moderating effect of neuroticism on the effectiveness of the stress management intervention was not found on perceived stress. Baseline stress was also not a significant moderator in the context but proved to be a significant predictor of change in perceived stress in all groups. A higher baseline stress was associated with a higher reduction in perceived stress. Thus, it seems that particularly stressed people benefit more from the intervention.

Job crafting in all its three facets did not mediate the postulated indirect effects between participation in the stress management intervention and perceived stress. This result is consistent with the sparse research on job crafting [115], but contrary to our expectations and new research that postulates job crafting as a potential mediator. The missing results may be explained by the fact that in previous research, mediations were modeled without temporal precedence [82], but are now being looked at with longitudinally paths and a time lag. The simple mediation provides another explanation. Due to sample size the facets of job crafting were tested in separate models, each consisting of only three variables (predictor, mediator, criterion). This simple mediation does not cover all potential influencing factors that exist in the complex, real world. It is possible that other more meaningful mechanisms were overlooked that have a stronger or concurrent effect on job crafting.

Additionally, the direct effect between the online course and ISocJR indicated that participants showed significantly less ISocJR compared to the WLC. Participants might not have been able to generate sufficient social resources in the online course to in turn use the strategy of ISocJR. This explanation is in line with the sparse social exchange and support that are common in online courses, compared to face-to-face trainings [55].

5.1. Theoretical and Practical Implications

This study has several implications for theory and practice. First, related to theory and research the study expands the understanding of the effectiveness of stress management interventions in the context of work. It questions whether interventions can simply be applied unchanged in the workplace context or whether it is much more important to think about situational prevention together with behavioral prevention interventions. Even though, interventions that directly target individual behavior—e.g., the EWS concept—were found to be most effective [116], research on organizational interventions showed mixed findings. In a meta-analysis, organizational interventions had a little or no effect [27], while workplace changes had a positive impact on employees' mental health in another review if they were actually implemented [117]. Future research in the public sector could examine whether stress management interventions at the organizational level are more effective than individual measures. In addition, a combination of individual and organizational interventions would also be imaginable, as behavioral as well as situational prevention are among the essential components of occupational health management [118]. Complementing these measures should be aimed for in terms of a holistic health management [119].

Second, the present study provides new insights into the role of waitlist control groups in modern stress management research. The question arises how control groups can be modeled in the best possible way to unfold their high methodical impact in randomized control trails. The effects in the WLC, that were found in the present study (e.g., decrease in perceived stress), suggest that more attention needs to be paid to expectancy effect, which could weaken the effects of an intervention [110]. Future research should focus on different stress management interventions for control groups in terms of content. In order to differentiate better between intervention groups and WLC, the participants would not have to wait weeks for their upcoming course and build up their expectancies but could receive a different stress management training at the same time as the intervention group—but with different content. In addition, adherence-promoting formats should be looked at closely in future research, whether they might act as an unwanted and distorting minimal intervention. Referring to the present study, offers such as exchange meetings

should be examined, if they already have effects, even though only organizational questions were discussed.

The study also has implications for practice. First, the present study revealed that many unplanned events (e.g., illness, vacation of the participants) can occur when implementing stress management trainings in the workplace health management. Those unplanned events seem to weaken the desired intervention effects on decreased stress or increased work engagement. Since workplace health management brings health-promoting programs to employers, employees and society [120], a successful implementation of stress management interventions should be assured. For example, a meta-analysis of 72 studies [121] showed that occupational health management can reduce health care costs and sickness-related absences. In addition, an appropriate occupational health management can prevent 30–40% of sick days with its interventions and save up to EUR 19.6 billion annually in Germany [122]. In order to increase the effectiveness of stress management interventions, unplannable events should be considered in advance of implementation. For example, stress management intervention in organizations should be offered outside of peak holiday periods to reduce the loss of participants. Enough capacities for stress management trainings and alternative dates should also be available if for example participants get ill in order to make sure that stress management trainings do not need to be cancelled.

Furthermore, the high dropout in the online course (50%) compared to the other groups (face-to-face training: 18.75%; WLC: 14.81%) might impede the effectiveness of digital stress management trainings in organizations. As a dropout rate of 50% is common [16,114,123], the question arises how participants will use digital stress management trainings more often and how they will commit better to them. The main reason cited was that participants lose interest over time [123]. In this study, the participants reported a lack of time (e.g., due to high job demands or holidays) and a lack of clarity about the concept and the instructions as the biggest obstacles to using the online course. Additional measures to promote adherence and clarity could therefore be beneficial: exchange meetings, regular reminder emails, personalized certificates, and constant contact to the trainers were already used in the present study. However, organizations should extend and integrate more or other measures to strengthen the commitment to complete digital stress trainings. As the desire for an exchange among participants was also expressed in the qualitative feedback of this study (see Table 7), the personal support or accompaniment of the digital intervention seems to be especially important. Prior studies also reported that online courses with support elements are more effective than non-supported online courses [124,125]. In the present study, these elements were not included in order to better compare the effects of a self-learning online course with face-to-face training. In practice, however, more supporting elements could be beneficial. The integration of even more supporting elements might also promote the transfer into daily life, as positive effects may fail to emerge if employees participate in a stress management intervention without subsequently integrating the new findings into their everyday lives [31]. Follow-up sessions may strengthen the long-term preservation of intervention effects [126]. These could be programs from workplace health promotion, that have been adapted to the public sector, e.g., methods for improved work–life balance, analyses of public sector-specific stressors and resources, trainings on coping with bureaucracy, and high-structured workplaces as well as elements from positive psychology and mindfulness [127].

5.2. Limitations and Future Directions

One limitation of the study is the dropout rate of 27.69%, which was distributed differently among the groups. The online course had the highest dropout of 50%. Future studies should increase the sample size, especially for digital interventions. Conducting the intervention in an organizational context also brought with it further implementation challenges (e.g., absences due to sickness or vacation, change of group membership), which in some cases required an adjustment of the study design. Therefore, randomization could not be fully adhered to in the present study, which may have led to a bias. Other researchers also

emphasize this difficulty of implementing control group designs in the workplace [110,128]. Interventions in an organizational context must simultaneously combine the demand for methodologically sound implementation and pragmatic considerations [110]. To ensure that the results were not biased by the limited randomization, the results should be verified in subsequent studies. Nevertheless, stress management research in the workplace setting is a core strength of the present study, as it is explicitly needed [32]. With the public sector, a under-researched [6] and stress-prone occupational group [4] was addressed.

Another limitation could be the time period of the longitudinal study. Since the effectiveness of the stress management intervention was mostly evident only at the follow-up measurement 6 weeks after the intervention, the question arises whether longer time intervals would have been needed to identify significant effects of the stress management intervention in the workplace context. Stress management interventions vary in the amount of time they take to have a measurable effectiveness on health [129]. It can take more than 3–12 months for the actual impact of complex interventions to be measurable at the organizational and individual levels [129]. In future studies, a longer time interval of the longitudinal study should therefore be aimed at to examine whether this effect can be confirmed for the present stress management intervention. At the same time, the three times of measurement in the present study contribute to longitudinal stress management research, which is strongly recommended [19], and extend beyond short-term follow-ups with a maximum of one month [16].

Moreover, all instruments used are based on self-report, which makes it possible to depict subjective experience but does not allow any conclusions to be drawn about objective conditions [130]. It should be kept in mind that the response formats were chosen in such a way that there was a middle option with which participants could increasingly position themselves neutrally or abstain. This tendency toward the middle could mask the intervention effects [131]. Effects could have been also hidden by agreement tendencies, which cannot be excluded due to identically poled items in UWES-9 and the Job Crafting Scale [80,90].

Lastly, the largest proportions of participants were female (61.5%), which is in line with current statistics from the public health insurance providers on the uptake of stress prevention services in Germany, according to which 87% of participants were female in 2021 [132]. However, studies had also shown that women experience significantly more stress and that this pattern continued to emerge as a result of additional stress in the COVID-19 pandemic [133]. In this respect, women may benefit even more from such offers, especially since baseline stress also proved to be a significant predictor in this study.

5.3. Conclusions

The present study supplemented the previous state of research on the comparison of stress management interventions in face-to-face and online formats. There were indications that the use of stress management measures as part of occupational health management could have positive effects in the long term. However, many expected effects were not significant or also found in the WLC, but this could be due to the methodological challenges of conducting the study in a real workplace context. In this regard, a larger sample size and a longer-term study with a lower drop out rate should be considered in order to understand more deeply the effects of stress management interventions in the workplace. In addition, the challenges associated with the survey in the occupational environment of public service employees were highlighted and possible implications were derived. The public sector was confirmed as an important target group in this context, as employees had on average a high baseline scores in perceived stress. The study also provided further evidence on the influence of personality dimensions and baseline stress on the effect of stress management interventions. Thus, the present study contributes to previous findings on the differential effectiveness and potential influencing factors of stress management interventions in the workplace setting and can be seen as a step toward a better understanding of stress management interventions in the important context of public service.

References

1. European Foundation for the Improvement of Living and Working Conditions & International Labour Office. *Working Anytime, Anywhere: The Effects on the World of Work*; Publications Office of the European Union: Luxembourg, Luxembourg, 2017; Available online: https://data.europa.eu/doi/10.2806/372726 (accessed on 29 September 2023).
2. Bundesministerium für Arbeit und Soziales. BMAS—Weißbuch Arbeiten 4.0. 2017. Available online: https://www.bmas.de/DE/Service/Publikationen/Broschueren/a883-weissbuch.html (accessed on 16 March 2023).
3. Techniker Krankenkasse. *'Entspann Dich, Deutschland'—TK-Stressstudie 2021*; Die Techniker: Hamburg, Germany, 2021; Available online: https://www.tk.de/resource/blob/2116464/d16a9c0de0dc83509e9cf12a503609c0/2021-stressstudie-data.pdf (accessed on 29 September 2023).
4. De Simone, S.; Cicotto, G.; Pinna, R.; Giustiniano, L. Engaging public servants: Public service motivation, work engagement and work-related stress. *Manag. Decis.* **2016**, *54*, 1569–1594. [CrossRef]
5. Ravalier, J.M.; McVicar, A.; Munn-Giddings, C. Public service stress and burnout over 12 months. *Occup. Med.* **2014**, *64*, 521–523. [CrossRef] [PubMed]
6. Bartlett, L.; Lovell, P.; Otahal, P.; Sanderson, K. Acceptability, Feasibility, and Efficacy of a Workplace Mindfulness Program for Public Sector Employees: A Pilot Randomized Controlled Trial with Informant Reports. *Mindfulness* **2017**, *8*, 639–654. [CrossRef]
7. Jayashree, R. Stress management with special reference to public sector bank employees in Chennai. *Int. J. Enterp. Innov. Manag. Stud.* **2010**, *1*, 34–39.
8. Rensing, L.; Koch, M.; Rippe, B.; Rippe, V. *Mensch im Stress: Psyche, Körper, Moleküle*; Springer: Berlin/Heidelberg, Germany, 2005.
9. Gehring, J.; Klein, G. *Leben Mit der Koronaren Herzkrankheit*; Urban und Vogel: Munich, Germany, 2015. [CrossRef]
10. Chen, W.-Q.; Siu, O.-L.; Lu, J.-F.; Cooper, C.L.; Phillips, D.R. Work stress and depression: The direct and moderating effects of informal social support and coping. *Stress Health* **2009**, *25*, 431–443. [CrossRef]
11. Hassard, J.; Teoh, K.R.H.; Visockaite, G.; Dewe, P.; Cox, T. The cost of work-related stress to society: A systematic review. *J. Occup. Health Psychol.* **2018**, *23*, 1–17. [CrossRef]
12. Kalia, M. Assessing the economic impact of stress [mdash] The modern day hidden epidemic. *Metabolism* **2002**, *51*, 49–53. [CrossRef]
13. Ly, K.H.; Trüschel, A.; Jarl, L.; Magnusson, S.; Windahl, T.; Johansson, R.; Carlbring, P.; Andersson, G. Behavioural activation versus mindfulness-based guided self-help treatment administered through a smartphone application: A randomised controlled trial. *BMJ Open* **2014**, *4*, e003440. [CrossRef] [PubMed]
14. Magtibay, D.L.; Chesak, S.S.; Coughlin, K.; Sood, A. Decreasing Stress and Burnout in Nurses: Efficacy of Blended Learning with Stress Management and Resilience Training Program. *JONA J. Nurs. Adm.* **2017**, *47*, 391–395. [CrossRef]
15. Präventionsbericht 2018. GKV; MDS (Eds.) 2018; Available online: https://www.gkv-spitzenverband.de/media/dokumente/krankenversicherung_1/praevention__selbsthilfe__beratung/praevention/praeventionsbericht/2018_GKV_MDS_Praeventionsbericht.pdf (accessed on 16 March 2023).
16. Kuster, A.T.; Dalsbø, T.K.; Luong Thanh, B.Y.; Agarwal, A.; Durand-Moreau, Q.V.; Kirkehei, I. Computer-based versus in-person interventions for preventing and reducing stress in workers. *Cochrane Database Syst. Rev.* **2017**, *8*(8), CD011899. [CrossRef]
17. Chen, C.C.; Jones, K.T. Blended Learning vs. Traditional Classroom Settings: Assessing Effectiveness and Student Perceptions in an MBA Accounting Course. *J. Educ. Online* **2007**, *4*, n1. Available online: https://eric.ed.gov/?id=EJ907743 (accessed on 29 September 2023).
18. Sikora, A.; Carrol, D. *Research Report, National Center for Education Statistics*; National Center for Education Statistics Office of Educational Research and Improvement U.S. Department of Education: Washington, DC, USA, 2002.

19. Melton, B.; Graf, H.; Chopak-Foss, J. Achievement and Satisfaction in Blended Learning versus Traditional General Health Course Designs. *Int. J. Scholarsh. Teach. Learn.* **2009**, *3*, 26. Available online: https://eric.ed.gov/?id=EJ1136602 (accessed on 29 September 2023). [CrossRef]

20. Fish, K.; Kang, H.G. Learning outcomes in a stress management course: Online versus face-to-face. *J. Online Learn. Teach.* **2014**, *10*, 179–191.

21. Demerouti, E.; Bakker, A.B.; Nachreiner, F.; Schaufeli, W.B. The job demands-resources model of burnout. *J. Appl. Psychol.* **2001**, *86*, 499–512. [CrossRef]

22. Bakker, A.B.; Demerouti, E. The Job Demands-Resources model: State of the art. *J. Manag. Psychol.* **2007**, *22*, 309–328. [CrossRef]

23. Amanvermez, Y.; Rahmadiana, M.; Karyotaki, E.; de Wit, L.; Ebert, D.D.; Kessler, R.C.; Cuijpers, P. Stress management interventions for college students: A systematic review and meta-analysis. *Clin. Psychol. Sci. Pract.* **2020**, e12342. [CrossRef]

24. Bhui, K.S.; Dinos, S.; Stansfeld, S.A.; White, P.D. A Synthesis of the Evidence for Managing Stress at Work: A Review of the Reviews Reporting on Anxiety, Depression, and Absenteeism. *J. Environ. Public Health* **2012**, *2012*, e515874. [CrossRef]

25. Heber, E.; Ebert, D.D.; Lehr, D.; Cuijpers, P.; Berking, M.; Nobis, S.; Riper, H. The Benefit of Web- and Computer-Based Interventions for Stress: A Systematic Review and Meta-Analysis. *J. Med. Internet Res.* **2017**, *19*, e5774. [CrossRef]

26. Kröll, C.; Doebler, P.; Nüesch, S. Meta-analytic evidence of the effectiveness of stress management at work. *Eur. J. Work. Organ. Psychol.* **2017**, *26*, 677–693. [CrossRef]

27. Richardson, K.M.; Rothstein, H.R. Effects of occupational stress management intervention programs: A meta-analysis. *J. Occup. Health Psychol.* **2008**, *13*, 69–93. [CrossRef]

28. Tetrick, L.E.; Winslow, C.J. Workplace Stress Management Interventions and Health Promotion. *Annu. Rev. Organ. Psychol. Organ. Behav.* **2015**, *2*, 583–603. [CrossRef]

29. van der Klink, J.J.; Blonk, R.W.; Schene, A.H.; van Dijk, F.J. The benefits of interventions for work-related stress. *Am. J. Public Health* **2001**, *91*, 270–276. [PubMed]

30. Ebert, D.D.; Franke, M.; Zarski, A.-C.; Berking, M.; Riper, H.; Cuijpers, P.; Funk, B.; Lehr, D. Effectiveness and Moderators of an Internet-Based Mobile-Supported Stress Management Intervention as a Universal Prevention Approach: Randomized Controlled Trial. *J. Med. Internet Res.* **2021**, *23*, e22107. [CrossRef] [PubMed]

31. Eisen, K.P.; Allen, G.J.; Bollash, M.; Pescatello, L.S. Stress management in the workplace: A comparison of a computer-based and an in-person stress-management intervention. *Comput. Hum. Behav.* **2008**, *24*, 486–496. [CrossRef]

32. Nixon, P.; Boß, L.; Heber, E.; Ebert, D.D.; Lehr, D. A three-armed randomised controlled trial investigating the comparative impact of guidance on the efficacy of a web-based stress management intervention and health impairing and promoting mechanisms of prevention. *BMC Public Health* **2021**, *21*, 1511. [CrossRef]

33. Heber, E.; Lehr, D.; Ebert, D.S.; Berking, M.; Riper, H. Web-based and mobile stress Management intervention for employees: A randomized controlled trial. *J. Med. Internet Res.* **2016**, *18*, e5112. [CrossRef]

34. Wolever, R.Q.; Bobinet, K.J.; McCabe, K.; Mackenzie, E.R.; Fekete, E.; Kusnick, C.A.; Baime, M. Effective and viable mind-body stress reduction in the workplace: A randomized controlled trial. *J. Occup. Health Psychol.* **2012**, *17*, 246–258. [CrossRef]

35. Greif, S. Stress. In *Arbeits- und Organisationspsychologie*; Internationales Handbuch in Schlselbegriffen; Greif, S., Holling, H., Nicholson, N., Eds.; Sychologie Verlags Union: Weinheim, Germany, 1997; pp. 432–439.

36. Bakker, A.B.; Demerouti, E. Job demands-resources theory. In *Work and Wellbeing*; Chen, P.Y., Cooper, C.L., Eds.; Wiley Blackwell: West Sussex, UK, 2014; pp. 37–64. [CrossRef]

37. Paulsen, H.; Kortsch, T. *Stressprävention in Modernen Arbeitswelten: Das 'Einfach Weniger Stress'-Manual*; Hogrefe Verlag GmbH & Company KG: Göttingen, Germany, 2020.

38. Göpfert, A.-L. Wie beeinflusst die Führungskraft die Mitarbeitergesundheit? Ein integrativer Ansatz zur Identifikation der Einflusswege von Führung auf die Psychische Gesundheit und der Bedeutung des Führungskontextes [Ruhr-Universität Bochum, Fakultät für Psychologie]. 2013. Available online: http://hss-opus.ub.ruhr-unibochum.de/opus4/frontdoor/index/index/docId/3602 (accessed on 29 September 2023).

39. Bakker, A.B.; Boyd, C.M.; Dollard, M.F.; Gillespie, N.; Winefield, A.H.; Stough, C. The role of personality in the job demands-resources model. *Career Dev. Int.* **2010**, *15*, 622–636. [CrossRef]

40. Bamberg, E.; Keller, M.; Wohlert, C.; Zeh, A. *Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege (BGW)*; BGW-Stresskonzept Das arbeitspsychologische Stressmodell , Ed.; Broermann Druck & Medien GmbH: Hamburg, Germany, 2012.

41. Crawford, E.R.; LePine, J.A.; Rich, B.L. Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *J. Appl. Psychol.* **2010**, *95*, 834–848. [CrossRef]

42. Maslach, C.; Jackson, S.E. Burnout in organizational settings. *Appl. Soc. Psychol. Annu.* **1984**, *5*, 133–153.

43. Schaufeli, W.B.; Bakker, A.B.; Salanova, M. The measurement of work engagement with a short questionnaire: A cross-national study. *Educ. Psychol. Meas.* **2006**, *66*, 701–716. [CrossRef]

44. Ebert, D.D.; Heber, E.; Berking, M.; Riper, H.; Cuijpers, P.; Funk, B.; Lehr, D. Self-guided internet-based and mobile-based stress management for employees: Results of a randomised controlled trial. *Occup. Environ. Med.* **2016**, *73*, 315–323. [CrossRef] [PubMed]

45. Ghannam, J.; Afana, A.; Ho, E.Y.; Al-Khal, A.; Bylund, C.L. The impact of a stress management intervention on medical residents' stress and burnout. *Int. J. Stress Manag.* **2020**, *27*, 65–73. [CrossRef]

46. Cifre, E.; Salanova, M.; Rodríguez-Sánchez, A.M. Dancing between theory and practice: Enhancing work engagement through work stress intervention. *Hum. Factors Ergon. Manuf. Serv. Ind.* **2011**, *21*, 269–286. [CrossRef]

47. Lehr, D.; Geraedts, A.C.M.; Asplund, R.P.; Khadjesari, Z.; Heber, E.; De Bloom, J.; Ebert, D.S.; Angerer, P.; Funk, B. Occupational e-mental health: Current approaches and promising perspectives for promoting mental health in workers. In *Healthy at Work*; Wiencke, M., Cacace, M., Fischer, S., Eds.; Springer: Berlin/Heidelberg, Germany, 2016. [CrossRef]

48. Hoppe, A.; Roswag, M.; Lehr, D. Digitale Interventionen in der betrieblichen Gesund-heitsförderung. In *Handbuch Gesundheitsförderung bei der Arbeit*; Michel, A., Hoppe, A., Eds.; Springer: Berlin/Heidelberg, Germany, 2021. [CrossRef]

49. Heber, E.; Ebert, D.D.; Lehr, D.; Nobis, S.; Berking, M.; Riper, H. Efficacy and cost-effectiveness of a web-based and mobile stress-management intervention for employees: Design of a randomized controlled trial. *BMC Public Health* **2013**, *13*, 655. [CrossRef]

50. Griffiths, K.M.; Christensen, H. Review of randomised controlled trials of Internet interventions for mental disorders and related conditions. *Clin. Psychol.* **2006**, *10*, 16–29. [CrossRef]

51. Ruwaard, J.; Lange, A.; Bouwman, M.; Broeksteeg, J.; Schrieken, B. E-Mailed Standardized Cognitive Behavioural Treatment of Work-Related Stress: A Randomized Controlled Trial. *Cogn. Behav. Ther.* **2007**, *36*, 179–192. [CrossRef]

52. Zetterqvist, K.; Maanmies, J.; Ström, L.; Andersson, G. Randomized Controlled Trial of Internet-Based Stress Management. *Cogn. Behav. Ther.* **2003**, *32*, 151–160. [CrossRef]

53. Dankbaar, M.E.W.; Storm, D.J.; Teeuwen, I.C.; Schuit, S.C.E. A blended design in acute care training: Similar learning results, less training costs compared with a traditional format. *Perspect. Med. Educ.* **2014**, *3*, 289–299. [CrossRef]

54. Backenstrass, M.; Wolf, M. Internet-based therapy in depressive disorders: An overview. *Z. Psychiatr. Psychol. Psychother.* **2018**, *66*, 48–60.

55. Luaran, J.E.; Jain, J.; Alias, R.; Hussin, A.A. Blended learning: Examining student satisfaction willingness and stress in learning English. In Proceedings of the 8th Annual International Conference on E-Learning, Kota Kinabalu, Sabah, Malaysia, 26–28 May 2015.

56. Bennett, J. The best way to take classes. *Wall Str. J.* **2000**, *27*, R36.

57. Daniels, H.L.; Moore, D.M. Interaction of cognitive style and learner control in a hypermedia environment. *Int. J. Instr. Media* **2000**, *27*, 369.

58. Oh, E.; Lim, D. Cross relationships between cognitive styles and learner variables in online learning environment. *J. Interact. Online Learn.* **2005**, *4*, 53–66.

59. Henderson, A.J. *The e-Learning Question and Answer Book: A Survival Guide for Trainers and Business Managers*; AMACOM Division of American Management Association: New York, NY, USA, 2003.

60. Song, L.; Singleton, E.S.; Hill, J.R.; Koh, M.H. Improving online learning: Student perceptions of useful and challenging characteristics. *Internet High. Educ.* **2004**, *7*, 59–70. [CrossRef]

61. Kortsch, T.; Paulsen, H.; Fabian, A. Analog oder digital? Vergleich der Wirksamkeit von zwei Stresspräention-interventionen füüdie digitale Aareitswelt. In Proceedings of the 11. Fachgruppentagung Arbeits-, Organisations- und Wirtschaftspsychologie, Brunswick, Germany, 25–27 September 2019.

62. Coudray, C.; Palmer, R.; Frazier, P. Moderators of the efficacy of a web-based stress management intervention for college students. *J. Couns. Psychol.* **2019**, *66*, 747–754. [CrossRef]

63. Ebert, D.D.; Erbe, D. Internetbasierte psychologische Interventionen. In *Klinische Psychologie und Psychotherapie für Bachelor*; Berking, M., Rief, W., Eds.; Springer: Berlin/Heidelberg, Germany, 2012; Volume 5024, pp. 131–140. [CrossRef]

64. Junge, M.N.; Lehr, D.; Bockting, C.L.H.; Berking, M.; Riper, H.; Cuijpers, P.; Ebert, D.D. For whom are internet-based occupational mental health interventions effective? Moderators of internet-based problem-solving training outcome. *Internet Interv.* **2015**, *2*, 39–47. [CrossRef]

65. Karyotaki, E.; Ebert, D.D.; Donkin, L.; Riper, H.; Twisk, J.; Burger, S.; Rozental, A.; Lange, A.; Williams, A.D.; Zarski, A.C.; et al. Do guided internet-based interventions result in clinically relevant changes for patients with depression? An individual participant data meta-analysis. *Clin. Psychol. Rev.* **2018**, *63*, 80–92. [CrossRef]

66. Bakker, A.B.; Demerouti, E. Job demands–resources theory: Taking stock and looking forward. *J. Occup. Health Psychol.* **2017**, *22*, 273–285. [CrossRef] [PubMed]

67. Prieto, L.L.; Soria, M.S.; Martínez, I.M.; Schaufeli, W. Extension of the Job Demands-Resources model in the prediction of burnout and engagement among teachers over time. *Psicothema* **2008**, *20*, 354–360.

68. Taris, T.W.; Ybema, J.F.; Beek, I.V. Burnout and engagement: Identical twins or just close relatives? *Burn. Res.* **2017**, *5*, 3–11. [CrossRef]

69. Günthner, A.; Batra, A. Stressmanagement als Burn-out-Prophylaxe. *Bundesgesundheitsblatt-Gesundheitsforschung-Gesundheitsschutz* **2012**, *55*, 183–189. [CrossRef]

70. Grant, S.; Langan-Fox, J. Personality and the occupational stressor-strain relationship: The role of the Big Five. *J. Occup. Health Psychol.* **2007**, *12*, 20–33. [CrossRef] [PubMed]

71. Jackson, S.; Schneider, T. Extraversion and stress. In *Psychology of Extraversion*; Haddock, A.D., Rutkowski, A.P., Eds.; Nova Science Publishers: Hauppauge, NY, USA, 2014.

72. Liu, S.; Lithopoulos, A.; Zhang, C.-Q.; Garcia-Barrera, M.A.; Rhodes, R.E. Personality and perceived stress during COVID-19 pandemic: Testing the mediating role of perceived threat and efficacy. *Personal. Individ. Differ.* **2021**, *168*, 110351. [CrossRef]

73. Lesener, T.; Gusy, B.; Wolter, C. The job demands-resources model: A meta-analytic review of longitudinal studies. *Work. Stress* **2019**, *33*, 76–103. [CrossRef]

74. Tims, M.; Bakker, A.B.; Derks, D. The impact of job crafting on job demands, job resources, and well-being. *J. Occup. Health Psychol.* **2013**, *18*, 230–240. [CrossRef]

75. Wrzesniewski, A.; Dutton, J.E. Crafting a Job: Revisioning Employees as Active Crafters of Their Work. *Acad. Manag. Rev.* **2001**, *26*, 179. [CrossRef]

76. Berg, J.M.; Dutton, J.E.; Wrzesniewski, A. Job crafting and meaningful work. In *Purpose and Meaning in the Workplace*; Dik, B.J., Byrne, Z.S., Steger, M.F., Eds.; American Psychological Association: Worcester, MA, USA, 2013; pp. 81–104. [CrossRef]

77. Demerouti, E.; Bakker, A.B.; Gevers, J.M.P. Job crafting and extra-role behavior: The role of work engagement and flourishing. *J. Vocat. Behav.* **2015**, *91*, 87–96. [CrossRef]

78. Gordon, H.J.; Demerouti, E.; Le Blanc, P.M.; Bakker, A.B.; Bipp, T.; Verhagen, M.A.M.T. Individual job redesign: Job crafting interventions in healthcare. *J. Vocat. Behav.* **2018**, *104*, 98–114. [CrossRef]

79. van Wingerden, J.; Bakker, A.B.; Derks, D. Fostering employee well-being via a job crafting intervention. *J. Vocat. Behav.* **2017**, *100*, 164–174. [CrossRef]

80. Tims, M.; Bakker, A.B.; Derks, D. Development and validation of the job crafting scale. *J. Vocat. Behav.* **2012**, *80*, 173–186. [CrossRef]

81. Lichtenthaler, P.W.; Fischbach, A. A meta-analysis on promotion- and prevention-focused job crafting. *Eur. J. Work. Organ. Psychol.* **2019**, *28*, 30–50. [CrossRef]

82. Uhlig, J. Effectiveness of a Web-Based Stress Management Intervention Results of a Randomized Controlled Trial. Master's Thesis, Universität Hildesheim, Hildesheim, Germany, 2021.

83. Limesurvey GmbH. *LimeSurvey*, Version 5.3.19+220607; Hamburg, Germany. 2022. Available online: http://www.limesurvey.org (accessed on 29 September 2023).

84. Lazarus, R.S.; Folkman, S. Transactional theory and research on emotions and coping. *Eur. J. Personal.* **1987**, *1*, 141–169. [CrossRef]

85. Heckhausen, H.; Gollwitzer, P.M. Thought contents and cognitive functioning in motivational versus volitional states of mind. *Motiv. Emot.* **1987**, *11*, 101–120. [CrossRef]

86. Oettingen, G.; Reininger, K.M. The power of prospection: Mental contrasting and behavior change: Mental contrasting and behavior change. *Soc. Personal. Psychol. Compass* **2016**, *10*, 591–604. [CrossRef]

87. Schneider, E.; Schönfelder, S.; Domke-Wolf, M.; Wessa, M. Measuring stress in clinical and nonclinical subjects using a German adaptation of the Perceived Stress Scale. *Int. J. Clin. Health Psychol.* **2020**, *20*, 173–181. [CrossRef] [PubMed]

88. Cohen, S.; Kamarck, T.W.; Mermelstein, R.J. A global measure of perceived stress. *J. Health Soc. Behav.* **1983**, *24*, 385–396. [CrossRef]

89. Büssing, A.; Perrar, K. Die Messung von Burnout. Untersuchung einer deutschen Fassung des Maslach Burnout Inventory (MBI-D). *Diagnostica* **1992**, *38*, 328–353.

90. Schaufeli, W.; Bakker, A. Utrecht Work Engagement Scale: Preliminary Manual. Occupational Health Psychology Unit. 2003. Available online: http://www.schaufeli.com (accessed on 16 March 2023).

91. Lichtenthaler, P.W.; Fischbach, A. The Conceptualization and Measurement of Job Crafting. *Z. Für Arb.-Und Organ. AO* **2016**, *60*, 173–186. [CrossRef]

92. Rammstedt, B.; Kemper, C.; Klein, M.; Beierlein, C.; Kovaleva, A. A short scale for assessing the big five dimensions of personality: 10 item Big Five Inventory (BFI-10). *Methods Data Anal.* **2017**, *7*, 17. [CrossRef]

93. IBM Corp. *IBM SPSS Statistics for Macintosh*; Version 28.0; IBM: Endicott, New York, USA, 2021.

94. R Core Team. *R: A Language and Environment for Statistical Computing*; R Foundation for Statistical Computing: Vienna, Austria, 2022. Available online: https://www.R-project.org/ (accessed on 29 September 2023).

95. Eid, M.; Gollwitzer, M.; Schmitt, M. *Statistik und Forschungsmethoden: Mit Online-Materialien*, 5th ed.; Beltz: Weinheim, Germany, 2017.

96. Hayes, A.F. Partial, conditional, and moderated moderated mediation: Quantification, inference, and interpretation. *Commun. Monogr.* **2018**, *85*, 4–40. [CrossRef]

97. Sedlmeier, P.; Renkewitz, F. *Forschungsmethoden und Statistik für Psychologen und Sozialwissenschaftler*, 2nd ed.; Pearson: London, UK, 2013.

98. Glass, G.V.; Peckham, P.D.; Sanders, J.R. Consequences of failure to meet assumptions underlying the fixed effects analyses of variance and covariance. *Rev. Educ. Res.* **1972**, *42*, 237–288. [CrossRef]

99. Lumley, T.; Diehr, P.; Emerson, S.; Chen, L. The Importance of the Normality Assumption in Large Public Health Data Sets. *Annu. Rev. Public Health* **2002**, *23*, 151–169. [CrossRef] [PubMed]

100. Wilcox, R.R. *Introduction to Robust Estimation and Hypothesis Testing*; Academic Press: Cambridge, MA, USA, 2011.

101. Preacher, K.J.; Rucker, D.D.; Hayes, A.F. Addressing Moderated Mediation Hypotheses: Theory, Methods, and Prescriptions. *Multivar. Behav. Res.* **2007**, *42*, 185–227. [CrossRef]

102. Field, A. Linear models: Looking for bias. *Discov. Stat.* **2016**, *2016*, 1–17.

103. Faul, F.; Erdfelder, E.; Buchner, A.; Lang, A.-G. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behav. Res. Methods* **2009**, *41*, 1149–1160. [CrossRef]

104. Girden, E.R. *ANOVA: Repeated Measures*; SAGE: Newcastle upon Tyne, UK, 1992.

105. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed.; Routledge: Oxfordshire, UK, 1988. [CrossRef]

106. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*; Academic Press: Cambridge, MA, USA, 2013.

107. Schütte, M.; Rothe, I. Prävention und Arbeitsgestaltung: Psychische Gesundheit in der Arbeitswelt. *Arbeitsmed Sozialmed Umweltmed* **2018**, *53*, 6–8.

108. Holton, M.K.; Barry, A.E.; Chaney, J.D. Employee stress management: An examination of adaptive and maladaptive coping strategies on employee health. *Work* **2016**, *53*, 299–305. [CrossRef]

109. Statista. *Urlaub: Beginn des Haupturlaubs der Deutschen nach Monaten 2018*; Statista: Hamburg, Germany, 2019; Available online: https://de.statista.com/statistik/daten/studie/1043362/umfrage/umfrage-zum-beginn-des-haupturlaubs-der-deutschen-nach-monaten/ (accessed on 16 March 2023).

110. Reis, D.; Meier, L.L. Interventionsdesign, Evaluationsverfahren und Wirksamkeit von Interventionen. In *Handbuch Gesundheitsförderung bei der Arbeit*; Michel, A., Hoppe, A., Eds.; Springer Fachmedien Wiesbaden: Wiesbaden, Germany, 2021; pp. 1–12. [CrossRef]

111. De Bloom, J.; Kompier, M.A.J.; Geurts, S.A.E.; De Weerth, C.; Taris, T.W.; Sonnentag, S. Do we recover from vacation? Meta-analysis of vacation effects on health and well-being. *J. Occup. Health* **2009**, *51*, 13–25. [CrossRef] [PubMed]

112. Etzion, D. Annual vacation: Duration of relief from job stressors and burnout. *Anxiety Stress Coping* **2003**, *16*, 213–226. [CrossRef]

113. Westman, M.; Etzion, D. The impact of vacation and job stress on burnout and absenteeism. *Psychol. Health* **2001**, *16*, 595–606. [CrossRef]

114. Kelders, S.M.; Kok, R.N.; Ossebaard, H.C.; Gemert-Pijnen, J.E.V. Persuasive System Design Does Matter: A Systematic Review of Adherence to Web-Based Interventions. *J. Med. Internet Res.* **2012**, *14*, e2104. [CrossRef] [PubMed]

115. Devotto, R.P.D.; Wechsler, S.M. Job Crafting Interventions: Systematic Review. *Trends Psychol.* **2019**, *27*, 371–383. [CrossRef]

116. Sonnentag, S.; Tay, L.; Shoshan, H.N. A review on health and well-being at work: More than stressors and strains. *Pers. Psychol.* **2023**, *76*, 473–510. [CrossRef]

117. LaMontagne, A.D.; Keegel, T.; Louie, A.M.; Ostry, A.; Landsbergis, P. A systematic review of the job-stress intervention evaluation literature, 1990–2005. *Int. J. Occup. Environ. Health* **2007**, *13*, 268–280. [CrossRef]

118. Kauffeld, S.; Ochmann, A.; Hoppe, D. Arbeit und Gesundheit. In *Arbeits-, Organisations- und Personalpsychologie für Bachelor*; Kauffeld, S., Ed.; Springer: Berlin/Heidelberg, Germany, 2019. [CrossRef]

119. Kauffeld, S.; Müller, A.; Schulte, E.M. Betriebliches Gesundheitsmanagement. In *Handbuch Gesundheitsförderung bei der Arbeit*; Michel, A., Hoppe, A., Eds.; Springer: Berlin/Heidelberg, Germany, 2021. [CrossRef]

120. Badura, B.; Walter, U.; Hehlmann, T. *Betriebliche Gesundheitspolitik: Der Weg zur Gesunden Organisation*; Springer: Berlin, Germany, 2010.

121. Aldana, S.G.; Pronk, N.P. Health Promotion Programs, Modifiable Health Risks, and Employee Absenteeism. *J. Occup. Environ. Med.* **2001**, *43*, 36–46. Available online: http://www.jstor.org/stable/44995791 (accessed on 29 September 2023). [CrossRef]

122. Lohaus, D.; Habermann, W. *Präsentismus: Krank zur Arbeit–Ursachen, Folgen, Kosten und Maßnahmen*; Springer: Berlin, Germany, 2018.

123. Bennett, G.G.; Glasgow, R.E. The Delivery of Public Health Interventions via the Internet: Actualizing Their Potential. *Annu. Rev. Public Health* **2009**, *30*, 273–292. [CrossRef]

124. Baumeister, H.; Reichler, L.; Munzinger, M.; Lin, J. The impact of guidance on Internet-based mental health interventions—A systematic review. *Internet Interv.* **2014**, *1*, 205–215. [CrossRef]

125. Zarski, A.-C.; Lehr, D.; Berking, M.; Riper, H.; Cuijpers, P.; Ebert, D.D. Adherence to Internet-Based Mobile-Supported Stress Management: A Pooled Analysis of Individual Participant Data From Three Randomized Controlled Trials. *J. Med. Internet Res.* **2016**, *18*, e146. [CrossRef]

126. Whisman, M.A. The efficacy of booster maintenance sessions in behavior therapy: Review and methodological critique. *Clin. Psychol. Rev.* **1990**, *10*, 155–170. [CrossRef]

127. Chartered Institute of Personnel and Development [CIPD]. Absence Management: Annual Survey Report 2016. 2016. Available online: https://www.cipd.co.uk/Images/absence-management_2016_tcm18-16360.pdf (accessed on 16 March 2023).

128. Bamberg, E.; Tanner, G. Gemeinsame Verantwortung realisieren—Betriebliches Gesundheitsmanagement in Netzwerken und in der Wertschöpfungskette. In *Digitale Arbeit Gestalten*; Bamberg, E., Ducki, A., Janneck, M., Eds.; Springer Fachmedien Wiesbaden: Wiesbaden, Germany, 2022; pp. 297–308. [CrossRef]

129. Giga, S.; Noblet, A.; Faragher, B.; Cooper, C.L. The UK perspective: A review of research on organisational stress management interventions. *Aust. Psychol.* **2003**, *38*, 158–164. [CrossRef]

130. Paulhus, D.L.; Vazire, S. The self-report method. In *Handbook of Research Methods in Personality Psychology*; The Guilford Press: New York, NY, USA, 2007; pp. 224–239.

131. Döring, N.; Bortz, J. *Forschungsmethoden und Evaluation in den Sozial- und Humanwissenschaften*; Springer: Berlin/Heidelberg, Germany, 2016. [CrossRef]

132. Schempp, N.; Kaun, L. Medizinischer Dienst Bund. Präventionsbericht 2022. Medizinischer Dienst Bund. 2022. Available online: https://www.gkv-spitzenverband.de/media/dokumente/krankenversicherung_1/praevention__selbsthilfe__beratung/praevention/praeventionsbericht/2022_GKV_MDS_Praeventionsbericht_barrierefrei.pdf (accessed on 29 September 2023).

133. Pieh, C.; Budimir, S.; Probst, T. The effect of age, gender, income, work, and physical activity on mental health during coronavirus disease (COVID-19) lockdown in Austria. *J. Psychosom. Res.* **2020**, *136*, 110186. [CrossRef] [PubMed]