Induction of a Stress-is-Enhancing Mindset and the Moderating Effects of Age

Jan-Niklas Girnth
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University of Twente

First Supervisor: Dr. Pelin Gül
Second Supervisor: Dr. Marijke Schotanus-Dijkstra
Positive Psychology and Technology
Department of Behavioral Sciences

Abstract

Without a doubt, stress can influence health negatively. Yet, individuals' "stress mindset" (beliefs about the nature of stress) can yield beneficial consequences for their health, well-being, and performance, if they approach stress through a "stress-is-enhancing (SIE) mindset" (belief that stress has enhancing consequences) rather than a "stress-is-debilitating (SID) mindset" (belief that stress has debilitating consequences). The present study examines the short-term effectiveness of a novel manipulation to induce a SIE mindset, and whether the manipulation's effects are moderated by age. A randomized controlled trial was conducted within a convenience sample of 99 German-speaking respondents. The participants in the experimental condition watched a four-minute video that presented information about the benefits of viewing stress positively and the performance-enhancing properties of stress. A sham video was administered in the control condition. The stress mindset was assessed through an online questionnaire one week before the manipulation (baseline), immediately after the manipulation (post-test), and one-week after the manipulation (follow-up). Results showed that the manipulation shifted the baseline SID mindset of the experimental condition to a significantly stronger SIE mindset at post-test and follow-up. The intensity of the SIE mindset in the experimental condition diminished significantly from post-test to follow up, but despite this, compared to the control condition, the experimental condition exhibited a significantly stronger SIE mindset at the post-test (after controlling for baseline differences). Age was a marginally significant moderator, indicating that the effect of the manipulation was especially strong for older individuals both at the post-test and follow-up. These results suggest that a single four-minute educational video manipulation can effectively induce a higher SIE mindset that maintains (with diminished intensity) up to a week. Hence, stress mindsets are malleable through a cost- and time-efficient manipulations, especially for older adults. The present study contributes with its results and solid study design a valuable starting point for future research in the novel branch of stress mindsets.

“Stress is a factor that can influence the development and growth of cancer” is one of the phrases that appear when typing “stress is” on Google search. This phrase captures the widespread negative connotation associated with the word “stress”, which can also be observed in the news, health classes, entertainment media, and the workplace (Crum, Salovey, & Achor, 2013). As a consequence, the majority of laypeople believe that the effects of stress are debilitating (Crum & Lyddy, 2014). Even within research settings, a negative connotation of stress is implicated, for instance, Carver and Connor-Smith (2010) define stress as “the experience of anticipating or encountering adversity in one’s goal- related efforts" (p. 684).

The true nature of stress is not solely negative but more complex. Selye (1975) distinguishes between two opposing conceptualizations of stress. On the one hand, there is distress -literally “bad stress” - which engenders negative feelings and disturbing bodily states (Lazarus, 1993). On the other hand, eustress - literally “good stress” - engenders positive feelings and healthy bodily states (Lazarus, 1993). Research findings support the ambivalent notion of stress on a range of outcomes. For example, stress can be both beneficial and detrimental for health and wellbeing. Chronic stress is associated with a weakened immune system (Glaser & Kiecolt-Glaser, 2005), hypertension (Schneiderman, Ironson, & Siegel, 2005), neuroendocrine diseases (Quick, Horn, & Quick, 1987) and as the Google search bar suggests: the growth of cancer (Quick et al., 1987). Moreover, stress is related to depression (Hammen, 2005), burnouts (Etzion, 1984), eating disorders, and anxiety disorders (Schneiderman et al., 2005). In contrast, eustress can improve the immune system (Lazarus, 1993) and thereby enhance general health. Moreover, eustress is related to an enhanced wellbeing as it yields positive affect, hope, and meaningfulness (Lazarus, 1993). These examples demonstrate the paradoxical nature of stress: experiencing stress can be debilitating and experiencing stress can be enhancing (Crum et al., 2013). The question arises, which underlying factors influence whether an individual is affected by stress in a positive or negative way.

Part of the answer can be found in the concept of a mindset. It is difficult for the human mind to understand an inherently paradoxical phenomenon like stress. To simplify its complexity, the mind employs mindsets, which are, “evaluative viewpoints or mental frames that focus attention and organize information in a manner allowing for simplified and automatic functioning in the presence of contradictory or uncertain information” (Crum & Lyddy, 2014, p. 950). Thus, mindsets are high-order processes that orient individuals in the midst of complex experiences and guide them to corresponding responses (Dweck, 2008).

In the context of stress, a mindset is the mental frame through which the paradoxical features of stress are evaluated. The stress mindset theory differentiates between two antagonistic mindsets. The stress-is-enhancing (SIE) mindset is characterized by the "belief that stress has enhancing consequences for various stress-related outcomes such as performance and productivity, health and wellbeing, and learning and growth" (Crum et al., 2013, p. 716). On the contrary, the stress-is-debilitating (SID) mindset captures "the belief that stress has debilitating consequences for these outcomes" (Crum et al., 2013, p. 716). Depending on the mindset an individual adopts, an expectancy for stressful situations is created that affects the stress experience in such a way that it tends to confirm the expectation - such that stress mindsets operate as a self-fulfilling prophecy (Crum & Lyddy, 2014). Individuals who uphold a SIE mindset are more likely to perceive stressful experiences as enhancing while individuals who uphold a SID mindset are more likely to perceive stressful experiences as debilitating (Crum & Lyddy, 2014). Thereby, the stress mindset shapes the stress experience.

Research findings support the notion that one's stress mindset influences the stress response, particularly the performance, health, and wellbeing of individuals. On a behavioral level, the belief that stress has enhancing consequences makes one more likely to utilize the enhancing properties of stress as a boost for performance. Specifically, Casper, Sonnentag, and Tremmel (2017) found that employees who endorse a dispositional SIE mindset are displaying more approach coping efforts when anticipating a high workload, which in turn enhances their engagement and performance, as compared to employees who hold a SID mindset. Moreover, when individuals who naturally hold a SIE mindset are expecting a stressful situation, they are more likely to seek feedback on their performance than individuals who believe that stress is debilitating (Crum et al., 2013). Crum et al. (2013) theorize that the desire for feedback reflects the intention to utilize the stressful experience as an opportunity for future growth and enhancements in performance. Indeed, Crum, Akinola, Martin, and Fath (2017) and Crum et al. (2013) showed that an experimentally induced shift towards a SIE mindset is accompanied by improvements in work performance and cognitive flexibility. In addition, the dispositional belief that stress is enhancing might indirectly boost performance as it is associated with higher levels of self-reported energy and vigor in comparison to individuals that hold a dispositional SID mindset (Casper et al., 2017; Crum et al., 2013).

Furthermore, stress mindsets influence the stress response on a physical level. More precisely, individuals who endorse a dispositional SIE mindset tend to report better physical health than individuals with a SID mindset (Crum et al., 2013). Especially when under acute

stress, individuals with a natural SIE mindset tend to exhibit more adaptive physiological responses, as indicated by better-adjusted cortisol reactivity in comparison to individuals who believe that stress is debilitating (Crum et al., 2013).

Moreover, individuals with a dispositional SIE mindset tend to report better wellbeing. Compared to individuals with a SID mindset, individuals who hold the dispositional belief that stress is enhancing indicate greater satisfaction with their life, regardless of the actual amount of stress experienced and the habitual coping strategy (Crum et al., 2013). In addition, holding a SIE mindset is associated with fewer symptoms of anxiety and depression, as well as more dispositional resources such as optimism, resilience, and mindfulness (Crum et al., 2013). Interestingly, Crum et al. (2017) showed that individuals who participate in a mock job interview do experience more positive moods when they are primed with a SIE mindset, regardless of the feedback they receive on their performance. However, if individuals with an experimentally induced SIE mindset receive positive feedback on their performance, they exhibit in a dot-probe task a stronger bias towards happy faces as compared to individuals with an experimentally induced SID mindset (Crum et al., 2017). Hence, believing that stress has enhancing consequences contributes to benefits in health, wellbeing, and performance.

To enable individuals to profit from the beneficial influence that holding a SIE mindset has on the stress response, it is of vital importance to promote SIE mindsets in the general public, especially since the SID mindset is more prevalent among laypeople (Crum & Lyddy, 2014). Therefore, the present study investigates whether stress mindsets can be changed through manipulations.

The Malleability of Stress Mindsets

In general, mindsets can be altered through manipulations. Past research demonstrated the successful modification of mindsets in the domains of exercise (Crum & Langer, 2007), nutrition (Crum, Corbin, Brownell, & Salovey, 2011), aging (Levy, Slade, Kunkel, & Kasl, 2002), and intelligence (Aronson, Fried, & Good, 2002; Burnette, Russell, Hoyt, Orvidas, & Widman, 2018). In the domain of intelligence, mindset manipulations aim at engendering a growth mindset. A growth mindset consists of the idea that intelligence is malleable and as such can change with effort and time, as opposed to being a fixed entity (Dweck, 1999). Aronson et al. (2002) presented selective information about the malleable nature of the brain and intelligence in text and video form to college students who participate in a pen-pal program. Afterwards, he instructed them to advocate the growth mindset information to a pen pal, which in turn, elicited a growth mindset in the advocating students themselves and this mindset change maintained for at least seven weeks. Moreover, Burnette et al. (2018) induced

through a single online session a growth mindset in high-school students that maintained for at least four months after the intervention. The online session took 45 minutes and included the presentation of selective information on the malleability of intelligence. Hence, in the domain of intelligence, mindsets were successfully manipulated through interventions that included the presentation of selective information.

More recently, the effectiveness of mindset manipulations was examined in the domain of stress. Ad hoc, two studies have investigated whether exposure to selective information on stress in the form of video clips can alter stress mindsets. For this purpose, Crum et al. (2013) created six videos in total. The SIE condition watched three 3-minute long videos that presented biased information on the enhancing effects of stress by showing research, anecdotes, and examples on three topics such as health, performance, and growth. Each video was dedicated to one of these topics. Similarly, the SID condition watched three videos on the same topics, but for them, the video clips conveyed biased information on the debilitating effects of stress on health, performance, and growth. A no-treatment control condition was included. Within this three-arm (SIE condition, SID condition, control condition) experimental study design, the videos were administered separately, in two- to three-day intervals, to a very large sample of employees in the US. The stress mindset was measured via the Stress Mindset Measure (SMM) before watching the first video clip (baseline) and after watching the third video clip (post-test). Through calculations that compared the baseline stress mindset scores to the post-test stress mindset scores, it was demonstrated that watching three video clips about the enhancing effects of stress led to a significant shift to a higher SIE mindset in the SIE condition. In contrast, watching three video clips on the debilitating effects of stress led to a significant shift to a higher SID mindset in the SID condition. Thus, exposure to approximately 10 minutes of video material that contains selective information over the course of less than two weeks did successfully manipulate stress mindsets.

A follow-up study extended this finding by investigating whether exposure to a single video clip is sufficient to manipulate stress mindsets. Therefore, Crum et al. (2017) included only those two video clips from the previous study by Crum et al. (2013) that cover the topic performance. Within an experimental study design, a large sample of US college students was exposed to either a three-minute video about the beneficial effects of stress on performance (SIE condition) or to a three-minute video about the debilitating effects of stress on performance (SID condition). The stress mindset was measured by the SMM before and immediately after watching the video clip. Again, the exposure to selective information about

the consequences of stress created a significantly stronger SIE mindset in the SIE condition and a significantly stronger SID mindset in the SID condition in the post-test compared to the pre-test. Hence, time-limited video manipulations, that present selective information on stress, even if as short as three minutes, can create profound alterations in stress mindset.

Previous research did not investigate the progress of experimentally induced changes in stress mindsets after the manipulation period ended. If the shift towards a SIE mindset maintains, it would suggest that individuals gain long-term profits from the relative benefits associated with a SIE mindset, such as better performance, health, and wellbeing. In the domain of intelligence mindsets, Aronson et al. (2002) induced a mindset change that maintained for seven weeks, and Burnette et al. (2018) induced a mindset change that maintained for four months after the intervention period ended. The long-term effects of interventions in the domain of intelligence suggest that the effects of stress mindset manipulations might also maintain beyond the manipulation period.

Furthermore, it is unknown whether inter-individual differences make specific subgroups particularly responsive to mindset manipulations. For example, individuals with greater openness for change might be altering their mindsets more readily. From a demographic perspective, older individuals have greater attitude stability, while younger individuals are more prone to change their attitudes (Alwin & Krosnick, 1991). Especially individuals in early adulthood, up to the age of 30 tend to switch their political attitude the most frequently (Krosnick & Alwin, 1989). Differences in value systems can explain the age-related contrast with regard to attitude change. Tulviste, Kall, and Rämmer (2017) found that younger individuals are not only more open to change, but also tend to value change more strongly compared to older individuals across seven countries. Since younger individuals are particularly prone to change their attitudes and tend to value change more strongly, they might change their stress mindset more readily than older individuals. Thus, age might be a demographic factor that influences the efficacy of stress mindset manipulations.

The Present Study

This study aims to contribute to the stress mindset theory by examining the extent to which watching a short video clip that presents selective information on stress can induce a shift towards a higher SIE mindset and whether the shift towards a higher SIE mindset maintains up to one week. As a second aim, it is examined whether age moderates the efficacy of the video manipulation. Therefore, a RCT is conducted in which participants in the experimental condition receive the video manipulation and participants in the control condition receive a sham video. It is expected that participants who watch the video

manipulation exhibit a significantly higher SIE mindset in comparison to participants who watch a sham video. In addition, it is expected that the shift towards a higher SIE mindset maintains for up to one week in participants who watched the video manipulation. Five specific hypotheses are tested:

H1a: *Participants in the experimental condition are expected to have significantly greater SIE mindset scores than the control condition in the post-test measurement.*

H1b: *Significant differences between the experimental and the control condition are expected to remain in the follow-up measurement such that participants in the experimental condition will have significantly greater SIE mindset scores than the control group in the follow-up measurement.*

H1c: *Participants in the experimental condition are expected to have significantly greater SIE mindset scores in the post-test compared to the baseline measurement.*

H1d: *Participants in the experimental condition are expected to have significantly greater SIE mindset scores in the follow-up measurement compared to the baseline measurement.*

H1e*: Significant differences between the baseline and post-test measurement for the experimental group are expected to extend into the follow-up measurement, meaning that no significant difference in the SIE scores is expected between the post-test and follow-up measurement for the experimental group.*

With regard to the second aim, it is expected that the efficacy of the video manipulation is greater for younger individuals in comparison to older individuals. The two specific hypotheses tested are:

H2a*: Younger participants in the experimental condition are expected to have a significantly stronger SIE mindset as compared to older participants at the post-test measurement.*

H2b*: Younger participants in the experimental condition are expected to have a significantly stronger SIE mindset as compared to older participants at the follow-up measurement.*

Method

Participants

A power analysis conducted in G*Power yielded a total required sample size of 74 for a power of .80 and alpha of .05 to detect a medium effect size of $d = .30$ ($f = .15$) for a 2x3 mixed design ANOVA test. Due to the longitudinal study design, high dropout rates were anticipated. Hence, to compensate for possible dropouts, 182 German-speaking participants

were recruited for an online questionnaire in October 2019. The final analytical sample consisted of the 99 participants who filled out all measures at each measurement point (see Figure 1). The mean age of the analytical sample was 36.25 years (*SD* = 16.18) with an age range from 19 to 74 years. Sixty participants were female, 38 male and one did not indicate their gender. This convenience sample was recruited via personal invitations, social media, and e-mails. No compensation for participation was offered. All participants gave their informed consent after receiving general information about the study and being clarified about their right to withdraw at any moment. The study was approved by the Ethics Committee of the Behavioral, Management, and Social science faculty in the University of Twente.

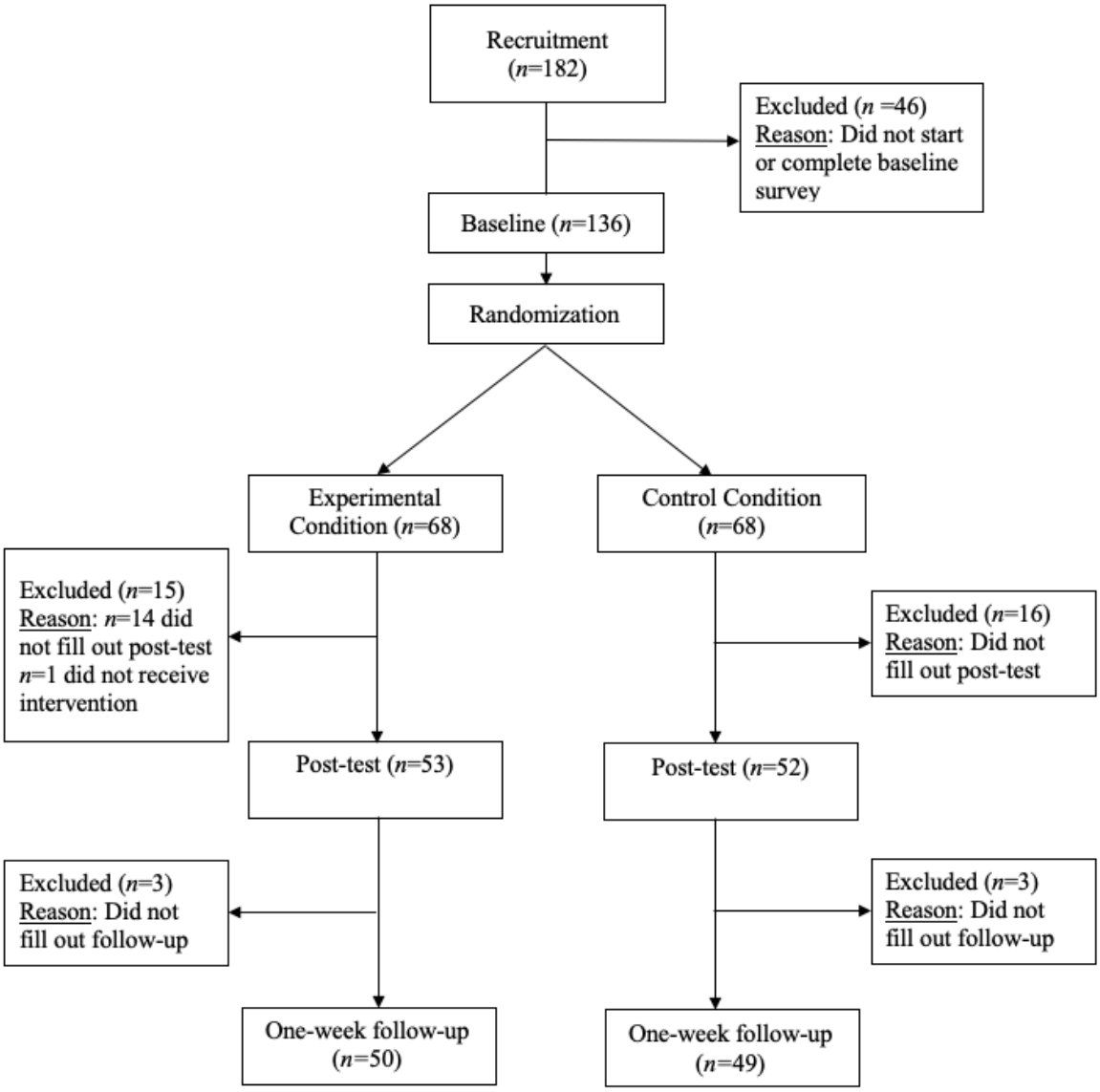

Figure 1. Flow chart of the participants. For each measurement point it is indicated how many participants of the control and experimental condition completed the corresponding survey. In total, 37 participants were excluded from the analytical sample. For the 36 participants who have not filled out the survey, no dropout bias was evident in terms of gender, age, and stress

mindset score, as indicated by the non-significant test of Little's Missing Completely at Random (MCAR), $\chi^2(8, N = 136) = 14.13$, $p = .078$.

Design and Procedure

As part of an undergraduate research project at the faculty of *Positive Psychology and Technology* of the University of Twente, a parallel double-blind RCT with two conditions (experimental and control) and three points of measurement (baseline, post-test, and follow-up) was conducted. Participants in the experimental condition watched a video that presented information about the benefits of viewing stress positively and the enhancing effects of stress on performance. Participants in the control condition received a sham video with neutral information.

An online survey was constructed to assess the stress mindsets and to administer the videos. Respondents were contacted at least three times via e-mail over a period of three weeks ranging from October 2019 to November 2019. Each e-mail contained a personalized invitation to fill out an online survey until a specific date, indicated the approximate duration of the survey and a link that grants access to the corresponding Qualtrics survey. Respondents who did not fill out the survey within three days received a reminder via e-mail. The first link directed the participants to the informed consent and the baseline assessment. Within the informed consent participants were declared about the procedure of the study, such as the timeline and the time they would need for filling out each survey. To avoid subject biases, the true research purpose was disguised by a cover-up story which declared that the study investigates the processing of new information. This was plausible since both conditions watched a video that presents informative contents.

The baseline measurement started on the 18th of October and closed on the 28th of October. At the beginning of the questionnaire, the participants' demographic characteristics (including age) were gathered, followed by the SMM which assessed the level of stress mindset. The SMM was introduced by a brief instruction about how to answer the questions and use the scales. As this study was part of a larger project, the online surveys have also measured wellbeing, perceived amount of stress, locus of control, positive and negative affect, and state and trait anxiety which were not included in the present study. On the 29th of October, participants were randomly assigned by an independent researcher to the experimental or control condition (allocation ratio 1:1). Almost two weeks after the baseline measurement, on the 30th of October, the post-test measurement started. First, participants received the video and immediately afterward they filled out the SMM. Both videos were

embedded in Qualtrics to ensure that participants watch the video. One week after the post-test, on the 6th of November, participants received the follow-up survey to fill out the SMM for a third time.

Moreover, a fourth measurement point, that is not included in the present study took place six weeks after the post-test, on the 11th of December. At the end of this survey, the participants received a debriefing about the true purpose of the study, namely, the investigation of a stress mindset manipulation.

Measure

Stress mindset measure. The 8-item SMM developed by Crum et al. (2013) was administered to evaluate whether participants uphold a stress-is-debilitating (SID) or a stress-is-enhancing (SIE) mindset. Ratings were done on a five-point Likert scale ranging from 0=*strongly disagree* to 4=*strongly agree*, with higher scores indicating a stronger SIE mindset. The SMM captures the beliefs about the nature of stress in general (e.g. "the effects of stress are negative and should be avoided.") and the beliefs concerning the effects of stress on health, productivity and growth (e.g. "Experiencing stress inhibits my learning and growth."). After reverse coding four negatively worded items, the items were averaged to create a composite score, ranging from 0 to 4. A score smaller than 2 indicates a SID mindset and a score equal to or greater than 2 indicates a SIE mindset (Park et al., 2017). The psychometric properties were good, with an internal consistency of .86 (Crum et al., 2013). In the present sample the SMM was administered three times with good to excellence internal consistency values of .89 at baseline, .91 at post-test, and .90 at follow-up, which is even better than the internal consistency value of .86 which Crum et al. (2013) measured. Evidence for the SMM's discriminant validity to other stress measures and evidence for its criterion validity in terms of predicting variability of health and life satisfaction was found (Crum et al., 2013). The SMM was translated into German and can be found in Appendix B.

Manipulation Conditions

Experimental condition. The original English video used by Crum et al. (2013), which presents research findings, examples, and anecdotes about the beneficial effects of stress on performance and productivity (e.g. "Scientists have found out that the body's stress response enhances memory and cognitive performance.") was translated into German and extended by additional information. The additional information explained that viewing stress positively can improve health, physical responses, satisfaction, success and dealing with challenges (e.g. "People who consider stress as a necessary and positive aspect of life are, on average, more successful and happier.") The video was four minutes long and comprised text

excerpts that were underlined by animations and corresponding images. Soothing music was played in the background. A link to the manipulation video and its script in the English and German version can be found in Appendix C.

Control condition. In the control condition, participants watched a sham video of equal length, which did not contain any stress-related information. The sham video presented informative content about a philosophical concept, namely the categorical imperative by Immanuel Kant. A link to the sham video and its script in the English and German version can be found in Appendix C.

Results

All analyses were conducted in SPSS version 24. P-values lower than .05 were considered statistically significant, and *p*-values between .05 and .10 were considered marginally significant.

Baseline Differences in Age and Gender

To examine whether the conditions differed at baseline in age or gender an independent sample t-tests with condition (experimental or control) as the independent variable and age as the dependent variable and a chi-square test with the variables gender (male, female, or gender not indicated) and condition (experimental or control) was conducted. The conditions did not differ in age, $t(97) = -.66$, $p = .510$. and gender, $\chi^2(2, N = 99) = 1.10$, $p = .578$.

Induction of a Stress-is-Enhancing Mindset

Means for the experimental and control condition at each measurement point are indicated in Table 1 and illustrated in Figure 2. The total sample exhibited a SID mindset at baseline (see Table 1).

Table 1

Means and standard deviations for stress mindset scores on the three measurement points for the experimental condition, the control condition, and the total sample (N=99).

	Experimental condition *M* (*SD*)	Control condition *M* (*SD*)	Total *M* (*SD*)
Baseline	1.73 (.82)	2.01 (.56)	1.86 (.71)
Post-test	2.54 (.77)	2.16 (.59)	2.35 (.71)
Follow-up	2.21 (.80)	2.10 (.60)	2.16 (.71)

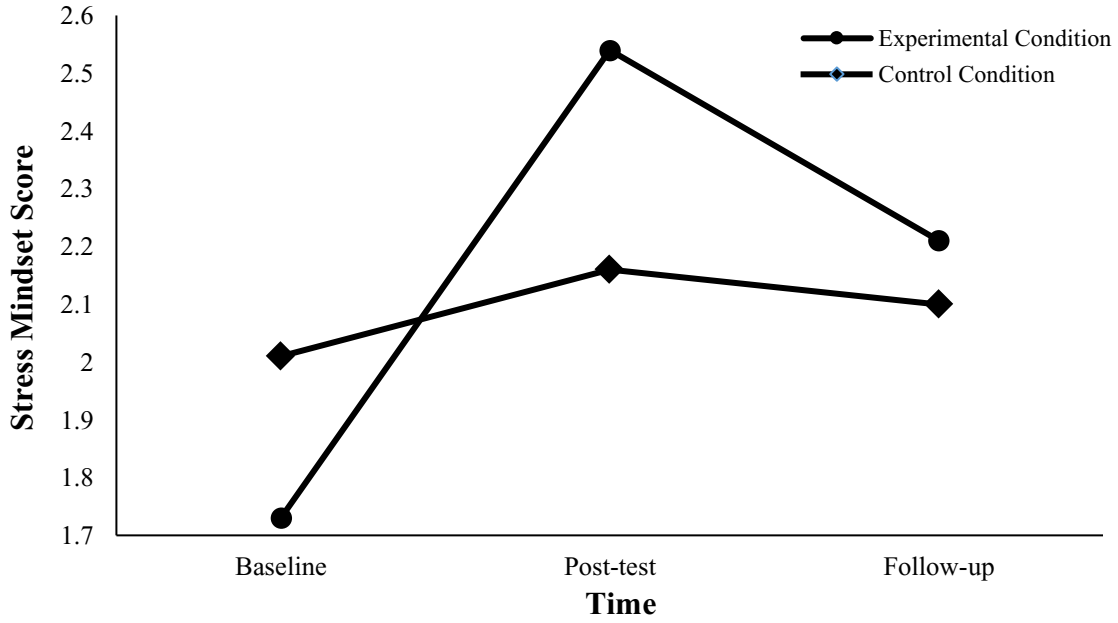

Figure 2. Stress mindset scores of the experimental and control condition at baseline, post-test, and follow-up.

To examine whether participants in the experimental condition reported greater SIE mindset scores at the post-test (H1a) and follow-up (H1b) as compared to the control group, and to examine whether the experimental condition shifted significantly from baseline to post-test (H1c), from baseline to follow-up (H1d), and maintained a stable level of SIE mindset from post-test to follow-up (H1e), a two-way mixed-design ANOVA was conducted on stress mindset scores as the dependent variable with condition (2 levels: experimental or control) as the between-subjects factor and measurement point (3 levels: baseline, post-test or follow-up) as the within-subjects factor. Mauchly's test of sphericity was significant ($p < .001$), indicating that the assumption of sphericity has been violated. Therefore, the Huynh-Fieldt correction was used. A significant main effect of time, $F(1.79, 175.32) = 42.5$, $p < .001$, $\eta_{p2} = .40$, and a significant condition × time interaction effect, $F(1.79, 175.32) = 19.37$, $p < .001$, $\eta_{p2} = .23$, were observed, indicating that the stress mindset scores changed across time within each condition.

The condition × time interaction effect was followed up with simple effect post-hoc analyses using Bonferroni corrections to control for the familywise error rate that may arise from multiple significance testing on one data set. To test for baseline differences in stress mindset, H1a, and H1b, simple effects between the conditions at each measurement point were calculated. The simple effect between the conditions revealed a marginally significant

baseline difference, $F_{Baseline}(1, 97) = 3.92$, $p = .050$, $d_{Cohen} = .40$, indicating that the experimental condition held a significantly lower SIE mindset than the control condition. The experimental condition held a SID mindset at baseline and the control condition held a SIE mindset at baseline. The simple effect between the conditions was also significant at post-test, $F_{Post\text{-}test}(1, 97) = 7.61$, $p = .007$, $d_{Cohen} = .56$, indicating that the experimental condition exhibited a significantly stronger SIE mindset as compared to the control group at post-test. Therefore, H1a was supported. The simple effect between the conditions was not significant at follow-up, $F_{Follow\text{-}up}(1, 97) = .677$, $p = .449$, $d_{Cohen} = .15$ indicating that the experimental and the control condition exhibited no difference in SIE mindset at follow-up. However, this non-significant difference at the follow-up is likely due to the observed baseline difference between the experimental and control condition. Another simple effect test was calculated to examine the differences between the conditions in the follow-up while accounting for the baseline difference. When baseline stress mindset scores were controlled, the experimental condition did exhibit a significantly stronger SIE mindset as compared to the control condition at follow-up, $F(1, 96) = 9.06$, $p = .003$. Therefore, H1b was accepted.

To test H1c, H1d, and H1e, simple effects between the time points within the experimental condition were calculated. All three simple were significant, *baseline vs. post-test:* $p < .001$, $d_{Cohen} = 1.07$; *baseline vs. follow-up*: $p < .001$, $d_{Cohen} = .80$; *post-test vs. follow-up*: $p < .001$, $d_{Cohen} = .65$, which indicates that the stress mindset increased significantly towards a SIE mindset from baseline to post-test and from baseline to follow-up within the experimental condition. Therefore, H1c and H1d were supported. Contrary to the expectation, the stress mindset scores in the experimental condition decreased from post-test to follow-up, and therefore, H1e was not supported. Thus, the shift towards a SIE mindset within the experimental condition maintained with decreased intensity.

Moderation by Age

To test whether age moderates the effect of the condition on the stress mindset score at post-test (H2a) and at follow-up (H2b), moderation analyses were performed using the PROCESS tool by Hayes (2018). Stress mindset score at post-test (controlled for stress mindset score at baseline) or at follow-up (controlled for stress mindset score at baseline) were entered in the regression analyses as dependent variables. The grand centered mean of the potential moderator age and the condition × age interaction term were entered as independent variables. The Johnson-Neyman test was conducted to examine the moderating function of age for separate age groups.

Results show that age was a marginally significant moderator on the effect of condition on stress mindset scores at the post-test (see Table 2). The Johnson-Neyman test revealed that the video manipulation was effective for all age groups at post-test such that the effectiveness of the manipulation increased with the age of participants. The effectiveness increased from the youngest age group which was aged 19 years, $b = .32$, $t(94) = 2.00$, $p = .048$, up to the oldest age group which was 74 years old, $b = 1.03$, $t(94) = 3.73$, $p < .001$ (see Figure 3).

Moreover, the results show that age was also a marginally significant moderator for the effect of condition on stress mindset scores at the follow-up (see Table 3). The Johnson-Neyman test revealed that the manipulation was not effective for participants who were younger than 29 years, $b = .22$, $t(94) = 1.99$, $p = .05$. However, when the participants' age was at least 29 years, the manipulation was effective and its effectiveness increased with age, peaking at the oldest age group that was 74 years old, $b = .77$, $t(94) = 3.01$, $p = .003$ (see Figure 4).

The marginally significant moderation effects of age indicate that the manipulation was more effective for older people at the post-test and at the follow-up. This is different from H2a and H2b, which predicted that the moderation effect would operate in the opposite direction, namely, that the manipulation would be more effective for younger people. Hence, H2a and H2b were rejected.

Table 2

Linear model of age as a predictor of stress mindset scores at the post-test measurement.

	b	*t(*94)	*95% CI*	*p*
Constant	1.23	7.99	.93, 1.54	<.001
Condition	.54	4.93	.32, .76	<.001
Age	.00	.60	-.01, .01	.550
Age × Condition	.01	1.93	.00 .03	.057
Baseline	.60	7.74	.45, .75	<.001

Note. PROCESS output with 5000 bootstrapped samples. The overall model was significant, $F(4, 94) = 19.01$, $R^2 = .45$

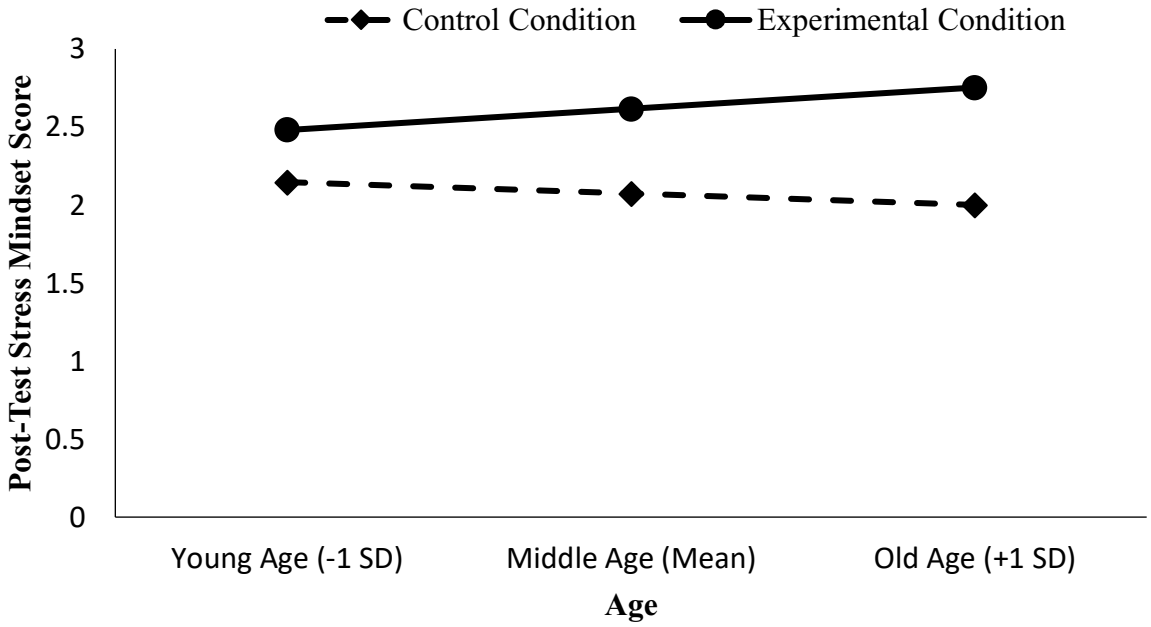

Figure 3. The moderating effect of age on the relationship between condition and stress mindset at the post-test measurement. The label 'young age' represents the age of 20.07 years which is equivalent to 1 *SD* below the mean age. The label ‘middle age' represents the age of 36.25 years which is equivalent to the mean age. The label ‘old age' represents the age of 52.43 years which is equivalent to 1 *SD* above the mean age.

Table 3

Linear model of age as a predictor of stress mindset scores at the follow-up measurement.

	b	*t(94)*	*95% CI*	*p*
Constant	.81	5.72	.53, 1.09	<.001
Condition	.31	3.09	.11, .52	.003
Age	.00	-.58	-.01, .00	.561
Age × Condition	.01	1.94	.00, .02	.056
Baseline	.72	10.07	.68, .86	<.001

Note. PROCESS output with 5000 bootstrapped samples. The overall model was significant, $F(4, 94) = 26.48$, $R^2 = .53$

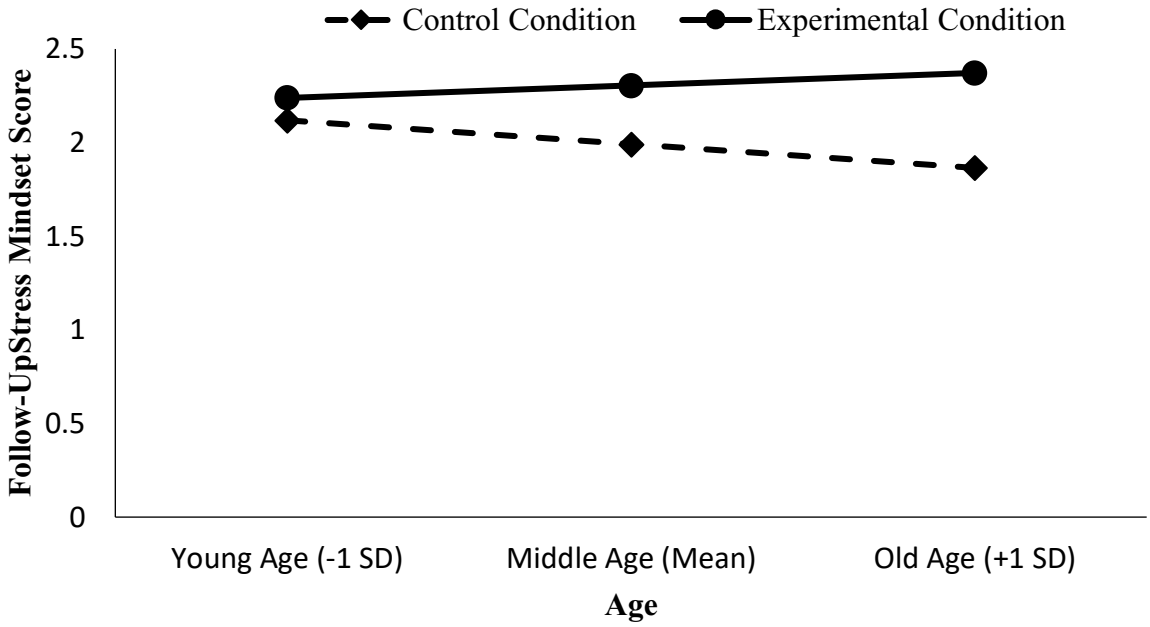

Figure 4. The moderating effect of age on the relationship between condition and stress mindset at the follow-up measurement. The label 'young age' represents the age of 20.07 years which is equivalent to 1 *SD* below the mean age. The label ‘middle age' represents the age of 36.25 years which is equivalent to the mean age. The label ‘old age' represents the age of 52.43 years which is equivalent to 1 *SD* above the mean age.

Discussion

The present study investigated whether a time-limited manipulation in the form of a video that presents selective informative about stress can induce a shift towards a higher stress-is-enhancing (SIE) mindset and the endurance of this shift up to one week. Moreover, it was examined whether age moderates this relationship. Therefore, a RCT with a sham video in the control condition was conducted within a convenience sample of 99 German-speaking respondents.

The Malleability of Stress Mindsets

The present study demonstrates that a four-minute video manipulation which conveys selective information about the benefits of viewing stress positively and the performance-enhancing effects of stress can change the stress mindset. Participants who watched the video manipulation shifted to a significantly higher SIE mindset, and this shift maintained for up to one week as compared to participants who watched a video that presented information about a philosophical concept. Although the shift from a stress-is-debilitating (SID) mindset to a SIE mindset maintained in participants who watched the video manipulation, the intensity of the

shift decreased within the period from immediately after watching video manipulation to the one-week follow-up measurement. In addition, the efficacy of the video manipulation in eliciting a SIE mindset increased with the age of the participants.

These results replicate the findings from previous research and support the notion that stress mindsets are malleable and can be modified by time-limited video manipulations that present selective information on stress (Crum et al., 2017; Crum et al., 2013). Specifically, the finding that the SID mindset prevails in the general public and that a single video manipulation is sufficient to induce a shift towards a higher SIE mindset was replicated (Crum et al., 2017; Crum & Lyddy, 2014). The present study extends the existing body of knowledge by investigating the progression of a manipulated stress mindset after a period of no treatment. It was shown that the efficacy of the video manipulation in inducing a SIE mindset was at its greatest immediately after watching it, but that the effects maintained with diminished intensity up to at least a week. Therefore, one can argue that a non-recurrent and time-limited video manipulation does induce a moderately stable SIE mindset.

It is worth to mention that the medium through which selective information on stress is delivered appears to influence the effectiveness of the manipulation in changing stress mindsets. Wellinger (2019) exposed a German convenience sample of 103 participants to a text excerpt that presented selective information about the beneficial aspects of stress. The text manipulation induced a slightly stronger SIE mindset in the experimental condition as compared to a sham text in the control condition with a small effect size. In contrast, the video manipulation of the present study induced a shift of large effect size towards a SIE mindset, which suggests that the presentation of selective information on stress is more effective via video clips than via text excerpts.

Moderation by Age

Although watching the video manipulation demonstrated an immediate effect in inducing a SIE mindset for all participants, it was more effective for older individuals and did not remain effective for young individuals after one week. This finding is in contrast with the prediction that the manipulation should display a greater effect on younger individuals. The prediction was based on survey studies which found that younger individuals tend to value change more strongly and are more likely to change their attitude while older individuals show the greatest attitude stability (Alwin & Krosnick, 1991; Krosnick & Alwin, 1989; Tulviste et al., 2017). While survey studies measure natural changes in attitude, the present study administered a video manipulation that contained legitimate arguments that specifically aimed at changing the mindset. One can speculate that older individuals are generally less

likely to change their attitudes, but when they are confronted with convincing information, as presented in the manipulation video, they might be more susceptible to adopt the according mindset and to integrate such information in daily practice. Thus, targeting older segments of society bears particularly great potential for stress mindset changes.

Strengths and Limitations

The present study has several methodological strengths as it is one of the few available studies that examined the changeability of stress mindset within a RCT. First, a sham video that presents non-stress-related information blinded participants from guessing that they are allocated to the control condition. Second, a cover-up story disguised the purpose of the study as being about 'the processing of information'. Thereby it controlled for possible recruiting bias of participants that are interested in the domain of stress and blinded participants from guessing whether they are in the experimental or control condition. Third, the SMM is a validated questionnaire that demonstrated good to excellent reliability in the present study. These methodological strengths allow the inference that the shift towards the SIE mindset was caused by the video manipulation.

However, the present study also has several limitations. Although randomly allocated, the control condition held a significantly stronger SIE mindset as compared to the experimental condition at baseline. It was necessary to control statistically for the baseline difference in stress mindsets. Second, as the follow-up measurement occurred one week after the manipulation, it is not possible to make predictions about the progression of the stress mindset change beyond one week. Third, the results of the present study have poor generalizability to the general German-speaking population as a convenience sample was recruited and convenience sampling often yields to biased estimates of the target population (Jager, Putnick, & Bornstein, 2017). Fourth, the video manipulation designed for this study was not pretested, and therefore, it cannot be traced which specific elements of the manipulation were effective in inducing a SIE mindset.

Implications

Currently, the belief that stress is debilitating prevails in the general public (Crum & Lyddy, 2014). The present study demonstrated that watching a single video clip does successfully induce a lasting shift towards a SIE mindset. Hence, exposure to the video manipulation might enable individuals to profit from the benefits in health, wellbeing, and performance that are associated with holding a SIE mindset (Casper et al., 2017; Crum et al., 2017; Crum et al., 2013). Video manipulations can easily reach large audiences through online platforms as only a good internet connection and corresponding devices such as

smartphones are required. Therefore, video manipulations are relatively cost- and time-efficient while also being easily accessible. Thus, the successful induction of a SIE mindset through a single video manipulation promises a handy mean to improve the lives of many individuals.

Future Research

Future research is needed to examine whether the effect of a time-limited video manipulation in inducing a SIE mindset maintains beyond one week. Since the intensity of the stress mindset change tended to decrease over time, the question emerges whether periodical exposure to stress mindset manipulations results in a more sustainable long-term effect. Generally, the long-term effectiveness of various forms of stress mindset manipulations needs to be compared to identify optimal techniques for the induction of SIE mindsets. Specifically, the suggestion that the delivery of selective information is more powerful in video form than in text form needs to be tested. Furthermore, manipulations that present selective information might become more effective in changing stress mindsets if combined with other techniques. For example, Aronson et al. (2002) demonstrated that advocating a specific mindset to a pen pal can induce a long-term mindset change. Future research could realize these suggestions by adding study arms to the present study design in combination with later measurement points that track the long-term progress of stress mindset changes.

The finding that older individuals are more receptive to video manipulations requires replication as the effect was only marginally significant. Similarly, the finding that the manipulation ceased to be effective for younger individuals after one week requires replication. More research is neeeded to uncover how individual characteristics influence the efficacy of stress mindset manipulations.

Besides investigating the changeability of stress mindsets, future research should aim at expanding the knowledge on how a stress mindset change influences the stress response of individuals. Therefore, future study designs should examine the effects of an experimentally induced stress mindset change on various outcome variables such as emotional wellbeing and physical health.

Conclusion

The present study demonstrated that watching a four-minute video intervention which presents selective information on the enhancing effects of stress did induce a shift towards a higher SIE mindset that maintained with diminished intensity for up to one week and was marginally more efficient for older participants. These findings support the notion that stress mindsets can be modified through time-limited manipulations. Spreading this video

manipulation might enable large groups of individuals to profit from the beneficial influence that holding a SIE mindset has on stress responses. Future research can build on the findings of the present study and should aim at examining the long-term effects of stress mindset manipulations, comparing various forms of stress mindset manipulations, and investigating how changes in stress mindsets influence the stress response.

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Appendices

Appendix A: Informed Consent and Debriefing

English Version of the Informed Consent

Welcome to the study!

The purpose of this study is to investigate how people perceive new information. This study consists of four parts. The first part starts after you have read and agreed to this informed consent. If you agree with the conditions to participate in this study, you will be automatically redirected to the first survey. This first survey will take approximately 20 minutes. Please complete this survey at least on October 28th, to be able to participate in this study.

On Wednesday, 30th of October - you will receive an email with a link to the second survey. You will also receive additional information. This survey (including the reading and watching a video) will take approximately 20 minutes.

You will receive the final two questionnaires on the following two dates:

Wednesday, 6th of November - duration: 15 minutes

Wednesday, 11th of December - duration: 20 minutes.

Please complete each survey within 3 days. Each survey contains some questions about your wellbeing and attitude.

Your data will be collected entirely online and treated confidentially. Therefore, we use your name and email address only for sending you surveys. To ensure anonymity, all materials will be identified by an assigned participant number, not by your name. During the research period, your data will be treated with great confidentiality and only be accessible by the main researcher dr. Marijke Schotanus-Dijkstra. Your individual privacy will be maintained in all published and written data resulting from this study.

Participation in this study is voluntary. If you decide to participate, you will be asked to agree to the informed consent. After that, you are still free to withdraw at any time and without giving a reason for your withdrawal.

If you have any comments or questions regarding this study, please contact Jan-Niklas Girnth (j.girnth@student.utwente.nl).

I have read and I understand the provided information. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason. I voluntarily agree to take part in this study.

Principal Investigators

Jan-Niklas Girnth, Marleen Jansen, Kathi Meyer, Sâre Danaci, Clemens Cholewa, Nils Hatger

Under supervision of dr. Marijke Schotanus-Dijkstra

University of Twente

German Version of the Informed Consent

Herzlich Willkommen!

Das Ziel unserer Studie ist zu untersuchen, wie Menschen neue Informationen wahrnehmen. Diese Studie besteht aus vier Teilen. Der erste Teil beginnt, nachdem Sie diese Einverständniserklärung gelesen und ihr zugestimmt haben. Wenn Sie der Teilnahme zustimmen werden Sie automatisch zu der Studie weitergeleitet. Der erste Fragebogen wird etwa 20 Minuten dauern. Bitte füllen Sie diese Studie bis zum 28. Oktober 2019 aus, um an der Studie teilnehmen zu können.

Am Mittwoch, den 30. Oktober werden Sie eine E-Mail mit dem Link für den zweiten Fragebogen erhalten. Sie werden ebenfalls Informationen zum Lesen oder ein Videomaterial erhalten. Dieser Fragebogen (inklusive des Lesens) wird etwa 20 Minuten dauern.

Die letzten beiden Fragebögen erhalten sie an folgenden Tagen:

Mittwoch, 6. November - Dauer: etwa 15 Minuten

Mittwoch, 11. Dezember - Dauer: etwa 20 Minuten.

Bitte füllen Sie jeden Fragebogen innerhalb von 3 Tagen aus. Jeder Fragebogen enthält einige Fragen über Ihr Wohlergehen und Ihre Einstellung.

Ihre Daten werden ausschließlich online erfasst und vertraulich behandelt. Ihr Name und Ihre E-Mail Adresse werden lediglich zum Versenden der Fragebögen genutzt. Alle Ihre Daten werden durch eine Teilnehmernummer identifiziert, um Ihre Anonymität sicherzustellen. Während der Forschungsperiode sind Ihre Daten ausschließlich der Hauptforscherin Dr. Marijke Schotanus-Dijkstra zugänglich. Ihre Daten unterliegen dem Datenschutzgesetz.

Die Teilnahme an dieser Studie ist freiwillig. Wenn Sie sich dazu entscheiden teilzunehmen, werden Sie gebeten, dieser Einverständniserklärung zuzustimmen. Auch danach steht Ihnen jederzeit die Möglichkeit offen, diese Studie ohne Angabe eines Grundes zu beenden. Wenn Sie Fragen oder Anmerkungen zu der Studie haben, kontaktieren Sie bitte Jan-Niklas Girnth (j.girnth@student.utwente.nl).

Ich habe die oben genannten Informationen gelesen und zur Kenntnis genommen. Ich weiß, dass meine Teilnahme freiwillig ist und dass ich die Studie jederzeit ohne der Angabe von Gründen beenden kann. Ich stimme freiwillig zu, an dieser Studie teilzunehmen.

Forscher

Jan-Niklas Girnth, Marleen Jansen, Katharina Meyer, Sâre Danaci, Clemens Cholewa, Nils Hatger

Unter der Leitung von Dr. Marijke Schotanus-Dijkstra

University of Twente

English Version of the Debriefing

Dear participant,

In the past six weeks, you took part in the study investigating how people perceive new information. We sincerely thank you for your invested time to participate! We are very happy with the way in which everyone was involved and has done their best to complete all surveys. With the data from this study, we can find answers to important scientific questions and we hope to gain more insight into how people perceive and react to new information. Now, we inform you about the real set-up of the study and its aim.

Set-up of the study. In total, 136 people participated in the study. They were divided into two different groups of equal size. Before the second survey, every group received either one of our two videos. If you are interested, you can watch the videos on the following pages (or skip these by clicking on the arrow to go to the next page).

The videos conveyed different information. The first video was about how people perceive stress, the other was about “the categorical imperative” by Kant. The latter video was used as a control condition, we expected no change in your perceptions or beliefs after watching the control video. However, we did expect that the so-called 'stress mindset" would change in a beneficial way, by watching the stress video.

Aim of the study. The aim of this study was to analyze whether the different mindsets about stress could be changed through exposure to appropriate information. We also tested whether such information influences your mental well-being in a beneficial way. The used video conforms to current scientific knowledge and we were curious whether people perceive, believe or act differently after watching some latest insights from science.

In order to not bias or distort the results, we held back the true aim of the study. We expect some first results in a few months, although a scientific paper about the results will probably take more than a year until publication. If you want to read more about the scientific insights we used as input for the texts about the stress mindset, we give you a reading tip below.

Again, we thank you very much for your invested time and participation!

Reading tips. https://www.tandfonline.com/doi/abs/10.1080/10615806.2016.1275585 (about stress)

German Version of the Debriefing

Liebe/r Teilnehmer/in,

In den letzten sechs Wochen haben Sie an dieser Studie teilgenommen, welche untersucht, wie verschiedene Personen neue Informationen wahrnehmen. Insbesonders waren wir daran interessiert Ihre Denkweise zum Thema Stress zu untersuchen und gegebenenfalls positiv zu verändern (siehe Ziel der Studie). Wir danken Ihnen herzlich, für die Zeit, welche Sie sich genommen haben. Wir sind sehr zufrieden mit dem Verlauf der Studie. Mit den Daten dieser Studie können wir Antworten auf wichtige wissenschaftliche Fragen finden und wir hoffen, neue Erkenntnisse über die Wahrnehmungen und Reaktionen auf neue Informationen zu generieren. Hiermit informieren wir Sie über den wahren Aufbau und das Ziel der Studie.

Aufbau der Studie. Insgesamt haben 136 Personen an der Studie teilgenommen. Diese wurden in zwei verschiedene, gleichgroße Gruppen eingeteilt, wobei jede Gruppe verschiedene Videos vor der zweiten Umfrage erhalten hat. Wenn Sie Interesse haben, können Sie sich auf den folgenden Seiten diese Videos ansehen (Sie können diese auch überspringen, indem Sie auf den Pfeil klicken, der Sie zur nächsten Seite führt). Unterschiedliche Informationen wurden durch Video Materialien vermittelt. Die Kontrollgruppe schaute ein Video über den “kategorischen Imperativ” von Kant.
Die Interventionsgruppe schaute ein Video über das menschliche Empfinden von Stress. Genauer gesagt, beinhaltete das Video Informationen über die positiven, leistungsfördernden Effekte von Stress.

Ziel der Studie. Das Ziel der Studie war es zu untersuchen, ob bestimmte Denkweisen über Stress mithilfe geeigneter Informationen geändert werden können. Wir untersuchen ebenfalls, ob solche Informationen ihr mentales Wohlergehen positiv beeinflussen. Die Videos, die dafür verwendet wurden, entsprechen dem aktuellsten wissenschaftlichen Stand und wir sind gespannt, ob Personen anders wahrnehmen, denken oder handeln, nachdem sie über einige der neuesten Erkenntnisse in der Wissenschaft informiert wurden.
Um die Ergebnisse nicht zu verfälschen, wurde Ihnen das eigentliche Ziel der Studie am Anfang vorenthalten. Wir erwarten erste Ergebnisse in einigen Monaten, wobei eine wissenschaftliche Arbeit oft mehr als ein Jahr bis zur Veröffentlichung braucht. Wenn Sie

mehr über die wissenschaftlichen Erkenntnisse erfahren möchten, über Stress verwendet haben, geben wir Ihnen einen Lesetipp weiter unten.

Nochmals möchten wir Ihnen herzlich für Ihre Zeit und Teilnahme an der Studie danken.

Lesetipps. https://www.tandfonline.com/doi/abs/10.1080/10615806.2016.1275585 (über Stress)

Appendix B: Stress Mindset Measure

English version of the Stress Mindset Measure - General

Please rate the extent to which you agree or disagree with the following statements. For each question choose from the following alternatives:

0 = Strongly Disagree

1 = Disagree

2 = Neither Agree nor Disagree

3 = Agree

4 = Strongly Agree

1. The effects of stress are negative and should be avoided.
2. Experiencing stress facilitates my learning and growth.
3. Experiencing stress depletes my health and vitality.
4. Experiencing stress enhances my performance and productivity.
5. Experiencing stress inhibits my learning and growth.
6. Experiencing stress improves my health and vitality.
7. Experiencing stress debilitates my performance and productivity.
8. The effects of stress are positive and should be utilized.

German Version of the Stress Mindset Measure

Im Folgenden finden Sie acht Aussagen zu Stress. Bitte beurteilen Sie inwiefern Sie diesen Aussagen zustimmen oder nicht zustimmen:

0 = Stimme überhaupt nicht zu

1 = Stimme überwiegend nicht zu

2 = Teils – Teils

3 = Stimme überwiegend zu

4 = Stimme ganz zu

1. Die Auswirkungen von Stress sind negativ und sollten vermieden werden.
2. Das Erleben von Stress fördert mein Lernen und meine Weiterentwicklung.
3. Das Erleben von Stress erschöpft meine Gesundheit und Vitalität.
4. Das Erleben von Stress steigert meine Leistung und Produktivität.
5. Das Erleben von Stress hemmt mein Lernen und meine Weiterentwicklung.
6. Das Erleben von Stress verbessert meine Gesundheit und Vitalität.
7. Das Erleben von Stress schwächt meine Leistung und Produktivität.
8. Die Auswirkungen von Stress sind positiv und sollten genutzt werden.

Appendix C: Video Scripts

Experimental Condition

Link and script of the intervention video.

Link. https://www.youtube.com/watch?v=R-x0AMOS4g0

English Version of the Script. Most people assume that in order to perform at the highest level, you need to be calm and free of stress.

But in reality, it is pressure that fuels peak performance.

The stress response pumps adrenaline throughout your body. Fueling the brain and body with blood and oxygen.

Increasing focus and heightening alertness.

This stress response is designed to enhance your focus, decision making, memory, performance.

Consider the following examples:

under normal conditions the brain processes 40 frames of information per second.

Under stress, processing speed increases, given the experience of slowing time.

The most skilled performances can occur during moments of great stress:

Surgery, Fighter pilots.

Ordinary people can do extraordinary things when put to the test.

Research shows that the body's stress response increases memory and improves cognitive performance [Cahill et al. (2003) Journal of Learning and Memory]

Harvard research shows that increased physiological arousal during testing improves performance on graduate school entry exams.

The most influential leaders made their greatest decisions int the greatest crises:

Lincoln, Ghandi, Churchill.

Think about your own life.

When your performed at your highest level.

Was it not stress that fueled your performance?

The stress response is designed to enhance cognitive performance.

Especially when it matters most.

Stress is enhancing.

Utilize it.

Let it improve your performance.

This research means that feeling anxious while engaging in cognitive performance tasks can help your performance.

Stress responses enhance your cognitive performance.
A study from Yale and Cambridge has shown that when people know about the positive effects of stress, these effects become even greater.
The conviction that stress is positive can improve:
Performance, Health, Satisfaction.
If you view stress as a positive challenge, then your body will produce a more optimal amount of the stress hormone cortisol.
Thereby your performance gets enhanced.
This is better for your health.
If you see stress as a positive challenge, you will master that challenge better instead of avoiding it.
You will probably also enjoy it more.

German Version of the Script. Die meisten Menschen nehmen an, dass sie um auf höchstem Niveau funktionieren zu können, ruhig und stressfrei sein müssen.
Aber tatsächlich treibt uns Druck zu Bestleistungen an
Stressreaktionen pumpen Adrenalin durch den Körper
Sie versorgt das Gehirn und den Körper mit Blut und Sauerstoff
Sie erhöht die Konzentration und die Aufmerksamkeit
Stressreaktionen verbessern Ihre: Konzentration, Entscheidungsfindung, Erinnerungsvermögen, Leistungsfähigkeit
Denke über folgende Beispiele nach:
Unter normalen Umständen verarbeitet das Gehirn 40 Bilder pro Sekunde
Unter Stress steigert sich die Verarbeitungsgeschwindigkeit, wodurch ein verlangsamtes Zeitempfinden entsteht oder: die Zeit als langsamer wahrgenommen wird
Die beeindruckendensten Leistungen werden in den stressigsten Momenten vollbracht: Operationen, Kampffliegen
Gewöhnliche Menschen können außergewöhnliche Dinge vollbringen wenn sie auf die Probe gestellt werden.
Forschungsergebnisse zeigen, dass die Stressreaktionen des Körpes das Erinnerungsvermögen und die kognitive Leistungsfähigkeit steigern [Cahill et al. (2003). Journal of Learning and Memory]
Studien aus Harvard zeigen, dass die erhöhte physiologische Erregung während Abschlussprüfungen, die Endnote verbessert.
Die einflussreichsten Anführer trafen ihre besten Entscheidungen während großen Krisen.

Lincoln, Ghandi, Churchill
Denk über dein eigenes Leben nach:
Wann hast du persönliche Bestleistungen erbracht?
Wurde diese Leistungsfähigkeit nicht durch Stress angetrieben?
Die Stressreaktionen erhöhen deine kognitive Leistungsfähigkeit.
Insbesonders, wenn es drauf ankommt.
Stress ist Leistungsfördernd.
Nutze es.
Lass Stress deine Leistungen verbessern
Die Forschungsergebnisse zeigen, dass die Nervosität welche während kognitive anspruchsvollen Herausforderungen empfunden wird, die Leistungsfähigkeit steigern kann.
Eine Studie aus Yale und Cambridge zeigt:
Wenn Menschen von den positiven Effekten von Stress wissen, sind diese Effekte noch größer.
Die Überzeugung, dass Stress positiv ist, verbessert die Leistung, Gesundheit, Zufriedenheit
Menschen, die Stress als einen notwendigen und positiven Aspekt des Lebens betrachten, sind im Durchschnitt erfolgreicher und glücklicher.
Sehen Sie Stress als positive Herausforderung, dann produziert Ihr Körper eine optimalere Menge des Stresshormons Kortisol.
Das ist besser für Ihre Gesundheit.
Und dadurch können Sie mehr leisten.
Sehen Sie Stress als positive Herausforderung, werden Sie die Herausforderung besser meistern, als wenn Sie Ihr aus dem Weg gehen.
Wahrscheinlich haben Sie dabei auch mehr Freude.

Control Condition

Link and script of the sham video.

Link. https://www.youtube.com/watch?v=w91P_m1203Q&t=79s

English Version of the Script. The categorical imperative is an answer or rather an attempt to fix a problem. This problem, generally speaking, is the question of how to act rightfully. More precisely, how can I act right in a particular situation?

Immanuel Kant formulated the categorical imperative as follows: "Act only according to that maxim by which you can at the same time will that it should become a universal law." For example, should you peach on somebody whom you caught stealing? May I lie in order to avoid trouble? Should I confess to my boyfriend or girlfriend that I don't like him/her

anymore? People around the world encounter these and similar questions frequently. They are called moral questions/issues. If we were animals, we probably wouldn't think about this and instead, act upon instinct.

However, since we are rational beings who generally want to do good, but frequently get distracted by our own wishes or other influences, we need guidance so that we can be good and act accordingly. Kant says: if you think about what you should do, then proceed as follows: For example, if you ruminate about whether you may lie in order to avoid trouble, you should ask yourself whether lying in general is okay and whether it would become a problem if everyone is lying.

You could respond: "yes, lying is fine for everyone, and I don't have any problems being lied to, no matter which truth is being withheld from me. I don't have any remorse, but lying is, for me, the general way of communication if I can avoid problems with it. Moreover, you may propose that people, in general, should lie to each other, for example, to make a conversation easier or to gain an advantage on something.

On the other hand, you can say that lying, in general, is not okay. Then you are not allowed to lie in any situation even if it would suit you at that moment. You ought to be thinking about what would happen if everyone would be lying all the time. You come to the conclusion that you wouldn't be able to trust anyone anymore because the person in front of you might not be telling the truth for any reason. You would always expect others to be lying, and you don't want that. So you say: if I want to be able to trust the people around me, then I, myself, am never allowed to lie in the same way I expect others not to lie."

That's why it is named 'the categorical imperative.' Categorical means valid in any situation without premises. Imperative means a demand, a law, or an instruction. This doesn't refer to orders or laws which are imposed by an outside entity but rather chosen by ourselves.

German Version of the Script. Was ist der Kategorische Imperativ? Der kategorische Imperativ ist die Antwort auf eine Frage. Oder besser, der Versuch ein Problem zu lösen. Das Problem heißt, allgemein formuliert, wie handle ich richtig?Genauer gesagt: Wie verhalte ich mich in bestimmten Situationen richtig?

Immanuel Kant hat den kategorischen Imperativ unter anderem so formuliert: „Handle nur nach derjenigen MAXIME, durch die du zugleich wollen kannst, dass sie ein allgemeines Gesetz werde.“ Beispiele für solche Situationen wären: Soll ich jemanden verpetzen, den ich beim Stehlen beobachte? Oder nicht? Soll ich lügen, damit ich keinen Ärger bekomme? Soll ich meinem Freund oder meiner Freundin sagen, dass ich ihn oder sie nicht mehr mag?

Diese und ähnliche Fragen beschäftigen Menschen überall auf der Welt immer wieder.

Man nennt sie moralische Fragen. Wenn wir Tiere wären, würden wir vermutlich nicht darüber nachdenken, sondern instinktiv dieses oder jenes tun. Weil wir aber vernünftige Wesen sind, die prinzipiell das Gute wollen, aber immer wieder abgelenkt werden durch unsere Wünsche oder andere Einflüsse, brauchen wir ein Rezept, eine Handlungsanleitung oder eine Merkhilfe, damit wir gut sein und das Richtige tun können.

Kant sagt, wenn Du überlegst, was Du tun sollst, dann mach das so: Überlegst Du Dir beispielweise ob Du lügen sollst um Ärger zu vermeiden, dann frage Dich, ist Lügen grundsätzlich in Ordnung und gibt es für alle Menschen keinerlei Schwierigkeiten wenn alle lügen? Also auch Du? Du könntest sagen: „Ja. Lügen ist für alle in Ordnung. Ich habe keinerlei Probleme angelogen zu werden, egal welche Wahrheit mir verschwiegen wird. Ich habe auch keine Gewissensbisse, sondern Lügen ist für mich eine übliche Art zu reden, wenn ich damit Schwierigkeiten vermeiden kann. Ich finde es auch gut, dass sich Menschen grundsätzlich anlügen sollten, zum Beispiel um die Kommunikation zu erleichtern oder sich irgendwie einen Vorteil zu verschaffen“.

Oder aber Du findest: „Lügen ist grundsätzlich nicht in Ordnung“. Dann darfst Du in keiner Situation lügen, auch wenn es Dir gerade passen würde. Du überlegst Dir, was passieren würde, wenn alle ständig lügen würden und kämst zu dem Ergebnis dass Du niemandem mehr trauen könntest, weil er Dir aus irgendwelchen Gründen nicht die Wahrheit sagt, sondern eine Lüge erzählt. Ständig musst Du damit rechnen, dass Du belogen wirst. Das willst Du nicht und deswegen sagst Du: „Wenn ich diese Lügerei nicht will, dann darf ich auch nicht selbst lügen und zwar niemals. Genauso, wie ich das von anderen erwarten würde“.

Deswegen heißt der kategorische Imperativ auch so. Kategorisch heißt soviel wie: „unbedingt, immer, in jeder Situation gültig“. Imperativ heißt: „Anforderung, Befehl oder Anweisung“. Es handelt sich dabei aber nicht um irgendwelche Befehle oder Gesetze von außen, sondern um solche, die wir uns selbst ausgesucht haben.