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„Do not be bored, be conscientious - How conscientiousness moderates the effects of boredom on Effort Seeking. “

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Abstract

The sensation of boredom is commonly regarded as an aversive emotional state that individuals endeavor to alleviate. First, this study investigates whether boredom leads to individuals engaging in cognitively demanding tasks, thereby indicating the pursuit of effort as a potentially effective strategy for alleviating boredom. Second, given that individuals scoring high in conscientiousness tend to experience lower levels of boredom, the study will also investigate whether conscientiousness moderates the effects of boredom. 290 participants were assigned to either a boredom or control condition and their levels of Effort Seeking were assessed. Participants induced with boredom did not exhibit higher levels of Effort Seeking compared to the control group. However, conscientiousness seems to play a moderating role in the effects of state boredom as higher levels of conscientiousness lead to lower levels of Effort Seeking in the boredom condition. Also, conscientiousness negatively predicts a person's general tendency to experience boredom.

German Version

Die vorliegende Studie untersucht, ob Individuen durch das Empfinden akuter Langeweile dazu tendieren, diesem aversiven Zustand mithilfe kognitiver Denkleistung beizukommen. Es wird angenommen, dass der Einsatz kognitiver Ressourcen, welches im Rahmen dieser Arbeit als „Effort Seeking“ bezeichnet wird, als Bewältigungsstrategie gegen Langeweile fungieren kann. Die erste Hypothese besagt, dass Langeweile zu höheren Werten in Effort Seeking führt. Zusätzlich wird untersucht, ob ein hohes Ausmaß an Gewissenhaftigkeit die Effekte von Langeweile auf Effort Seeking moderiert. Da bisherige Forschungsarbeiten darauf hinweisen, dass gewissenhafte Personen weniger anfällig für das Empfinden von Langeweile sind, wird angenommen, dass hohe Werte in Gewissenhaftigkeit

dazu führen, dass die Effekte von Langeweile weniger stark ausfallen. Gewissenhafte Personen, welche Langeweile ausgesetzt sind sollten also geringere Werte in Effort Seeking aufweisen als diejenigen, mit niedrigen Werten in Gewissenhaftigkeit, da sie von sich aus mit Bewältigungsmechanismen ausgestattet sind. Für die erste Hypothese konnten keine Beweise gefunden werden. Teilnehmer*innen zeigten keine veränderten Werte in Effort Seeking in Abhängigkeit von der Empfundene Langeweile. Effort Seeking scheint daher keine Bewältigungsstrategie gegen Langeweile zu sein. Für die moderierenden Effekte von Gewissenhaftigkeit auf den Zusammenhang zwischen Langeweile und Effort Seeking konnten signifikante Beweise gefunden werden, was den Schluss zulässt, dass Menschen mit hoher Ausprägung an Gewissenhaftigkeit, andere Bewältigungsstrategien gegen Langeweile nutzen, also Menschen mit geringen Werten in Gewissenhaftigkeit.

Keywords: Boredom, Boredom Proneness, Effort Seeking, Conscientiousness

Introduction

“Boredom always precedes a period of great creativity.” – Robert M. Pirsing

As discernible from this quote by the renowned author Robert M. Pirsig, a phase of boredom is often succeeded by a phase of creation and activity. But why could that be? Boredom is generally regarded as an aversive experience. In fact, some individuals find boredom so unpleasant that they prefer to administer electric shocks to themselves rather than spending over 6 minutes alone in a room with nothing to do (Wilson, 2014). Furthermore, research findings demonstrate that Boredom Proneness, which refers to a chronic tendency to experience states of boredom (Struk et al., 2017), positively correlates with symptoms of depression, anxiety, and stress (Lee, 2017). Despite its apparent problematic nature, little research has been conducted on this subject, and there is scarce indication of effective coping strategies for boredom. In order to broaden the comprehension of this potentially destructive state of mind, it is crucial to examine the coping strategies against boredom as well as protective mechanisms that the human mind may possess to counteract the effects of boredom. This study aims to investigate, firstly, whether Effort Seeking, which is defined as the act of actively engaging in a cognitively demanding task, constitutes a potential coping strategy. Secondly, it seeks to explore the extent to which the personality trait conscientiousness may function as a protective mechanism by moderating the effects of boredom.

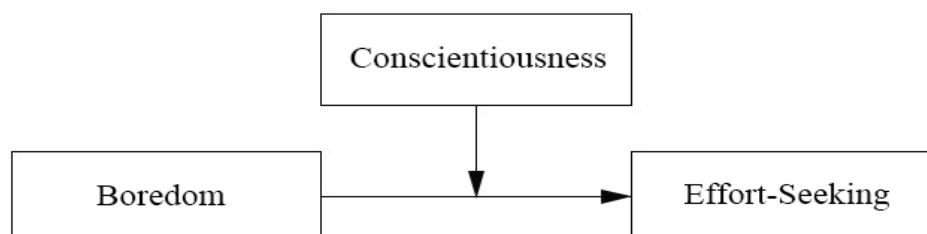
Attentional theories of boredom delve into the cognitive processes underlying this phenomenon, describing it as a perceived failure to engage in a satisfying activity and sustain attention. The ability to maintain attention relies on achieving an optimal match between available mental resources and cognitive demands (Eastwood et al., 2012; Smith & Ellsworth,

1985). It will be investigated whether individuals, who fall into a state of boredom due to a lack of external stimulation, actively seek more engaging tasks to escape acute boredom and thereby restore the balance between mental resources and cognitive demands.

Research also suggests that conscientiousness could function as a protective factor against boredom (e.g., Heslop, 2014; Skowronski, 2012). This could be due to the tendency of conscientious people to be hardworking, responsible, and self-disciplined, and to actively seek engaging and meaningful activities, which reduces the likelihood of experiencing boredom (Roberts et al., 2014). This assumption is supported by Sansone and colleagues (1999), who discovered that highly conscientious individuals persevered longer in monotonous tasks that induced subjectively aversive feelings of boredom and led to earlier task abandonment in individuals with lower conscientiousness. Therefore, this research argues that conscientiousness is a protective factor against the effects of boredom because it provides individuals with coping mechanisms that make Effort Seeking obsolete. That means that conscientiousness has a moderating effect on the relation between boredom and Effort Seeking.

Figure 1

Investigated relationships between boredom and effort-seeking and the moderating influence of conscientiousness.



Boredom

Boredom as a construct, despite its significance, still lacks a universally agreed-upon definition among scholars. Traditional characterizations of boredom depict it as a negative affective state associated with slow time perception, lack of interest, meaning, and engagement (e.g., Fahlman et al., 2013; Nett et al., 2010; Smith & Ellsworth, 1985). Environmental factors such as insufficient external stimulation and the presence of external constraints have been identified as contributors to the experience of boredom (Troutwine & O'Neal, 1981; van Tilburg & Igou, 2017). Consequently, individuals experiencing boredom may seek alternative, mentally demanding activities to alleviate it (Westgate & Wilson, 2018).

As mentioned earlier, boredom arises due to an imbalance between external stimulation and cognitive demand (Eastwood et al., 2012). If an individual finds themselves with a surplus of cognitive resources beyond what is required for a task, and no other distractions are available, boredom is likely to occur. In such cases, boredom is caused by a failure to engage the attentional system in the task, resulting in an excess of unengaged attentional resources. Overall, deviations from the optimal match between abilities and task demands can lead to states of boredom.

As previously mentioned, participants preferred subjecting themselves to electrical shocks rather than experiencing boredom (Wilson et al., 2014). This suggests that individuals primarily seek to alleviate boredom when faced with it. One strategy to restore the balance between demands and available attentional resources is to mitigate boredom by increasing the demands of the task (Westgate & Wilson, 2018). Accordingly, when presented with a choice between an equally easy task and a more challenging one, people tend to select the latter, requiring greater effort and therefore engaging the surplus of cognitive resources (Inzlicht et al., 2018). This behavioral pattern diverges from previous research on choice demands (e.g.,

Kool & Botvinick, 2014) and is driven by the motivation to overcome boredom. In this process, effort gains value and a rewarding quality, as it serves as a means to end boredom and should be perceived as intrinsically rewarding. Consequently, individuals who have been bored by an exceedingly monotonous task are motivated to engage in more demanding activities.

Effort-Seeking

In the context of this study, the previously depicted pursuit of effort to alleviate the experience of boredom is defined as *Effort Seeking*. Effort is defined as the “intensification of mental and/or physical activity in the service of meeting some goal” (Inzlicht et al., 2018). Since boredom arises due to a surplus of cognitive resources during an inadequately challenging activity, the intensification of mental and physical activity, namely effort, should provide a viable strategy against the aversive state of boredom. Consequently, the first hypothesis derived from this approach is as follows:

Hypothesis 1:

The boredom-group will exhibit a greater degree of Effort Seeking compared to the control-group.

However, this effect might be moderated by an individual's level of conscientiousness. Previous research indicates that highly conscientious individuals are, on one hand, less susceptible to experiencing boredom (Skowronski, 2012). On the other hand, they proactively engage in a range of behaviors that could positively influence their Effort Seeking-Score. For instance, they actively seek engaging and meaningful activities and exhibit elevated levels of self-discipline (Roberts et al., 2014). Therefore, the following

paragraph delves into the construct of conscientiousness and its potential moderating mechanisms.

Conscientiousness

Conscientiousness encompasses a spectrum of constructs that includes various tendencies exhibited by individuals, such as adherence to societal norms, exercise of self-control, a sense of responsibility, industriousness, perfectionism, and orderliness. (Roberts et al., 2009; De Raad & Mlačić, 2017). For example, in the widely used NEO-PI-R personality questionnaire (Costa & McCrae, 2008), the dimension of conscientiousness comprises the traits self-efficacy, orderliness, dutifulness, achievement striving, self-discipline, and cautiousness.

Conscientiousness has been established as one of the most effective preventive mechanisms against risky behaviors, both in psychological and physical aspects (Bogg & Roberts, 2004). Besides its preventive effects, conscientiousness also serves as a predictor of higher academic achievement, independent of cognitive abilities (Nottle & Robins, 2007), and better job performance (Dudley et al., 2006). Furthermore, it has been demonstrated that conscientiousness is negatively correlated with the occurrence of symptoms of major depression (Kendler & Myers, 2010). Also, research suggests that high levels of conscientiousness are associated with increased stress management, stress tolerance, and the ability to avoid stress (Besser & Shackelford, 2007).

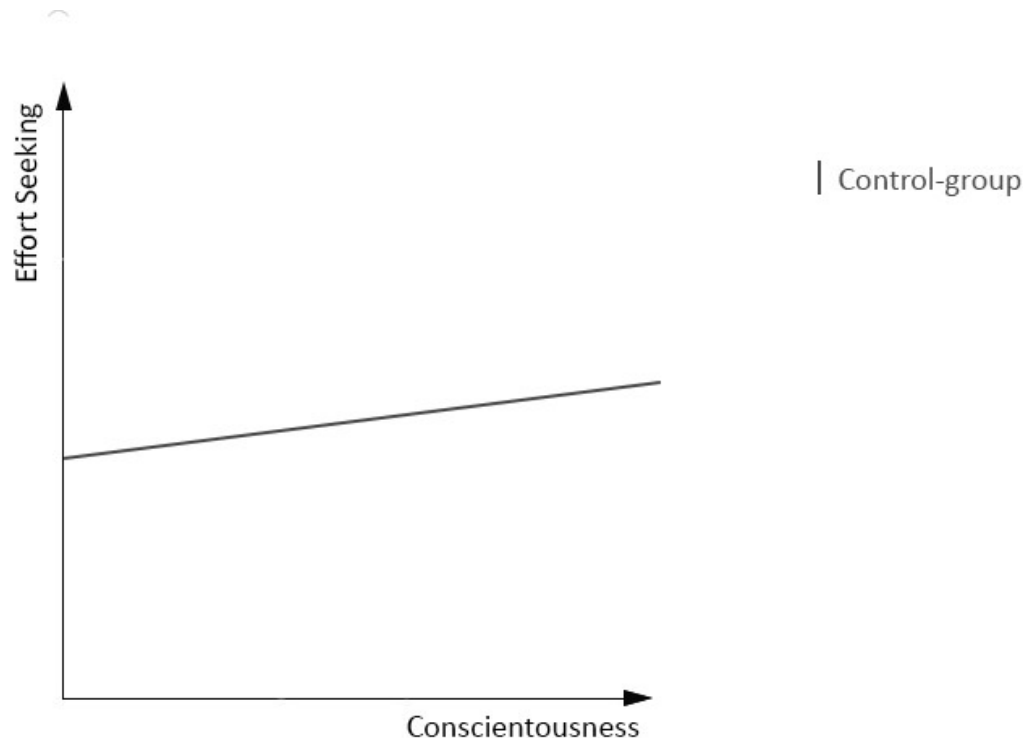
Due to the tendency of conscientious individuals to be hardworking, perfectionistic, achievement-oriented, and self-disciplined, they are expected to exhibit increased Effort Seeking autonomously. The following relationship between conscientiousness and effort-seeking is expected:

Hypothesis 2a:

Higher levels of conscientiousness lead to higher levels of effort-seeking in the control condition.

Figure 2

Expected effect of conscientiousness on Effort Seeking in the control-group.



Conscientiousness, Boredom and Effort Seeking

The following comparison highlights the contrasting effects of boredom in relation to the effects of high levels of conscientiousness and how those might relate to the participants exhibited level of Effort Seeking.

Experiencing boredom, as depicted earlier, is an individual's failure to engage in more satisfying activities and maintain attention. This loss of attention has also been deemed pertinent in prior research, which supports the idea that individuals scoring high in conscientiousness are better able to endure subjectively demanding, boring tasks and are less

likely to use interest enhancement strategies compared to less conscientious individuals (Sansone et al., 1999). This is attributed to their ability to maintain the "attentiveness" component (e.g., alert, attentive, concentrating, determined). This positive effect of attentiveness was also shown in different contexts, e.g. driving behavior: Heslop (2014) found that people scoring high in conscientiousness are better able to keep focused while driving and are less likely to suffer from driver boredom which underlines the opposing effects of the two constructs.

In the context of work, a high degree of conscientiousness also appears to mitigate an individuals' susceptibility to the effects of boredom. Boredom at work represents a state of low arousal and dissatisfaction, which is attributed to an inadequately stimulating work environment (Mikulas & Vodanovich, 1993; Reijseger et al., 2013). Boredom is associated with negative consequences, including counterproductive work behaviors, absenteeism, turnover intentions, and depressive symptoms (Bruursema et al., 2011; van Hooff and van Hooff, 2014; Wiesner et al., 2005). Conscientious individuals on the other hand are capable of making their environment and daily work more challenging by seeking new, demanding tasks and utilizing their resources more effectively, leading to better job performance and higher job satisfaction (Oprea, 2019). Therefore, conscientiousness seems to be a predictive factor against boredom at work.

Given that previous research indicates that the effects of boredom in various aspects of daily life run counter to those of conscientiousness, this research examined whether high levels of conscientiousness are a moderating factor to the direct effects of perceived boredom. As stated in Hypothesis 1, boredom is expected to positively correlate with Effort Seeking in the boredom-group since the subjectively negative experience is to be alleviated by engaging in a cognitive demanding task. Due to the above-mentioned contrasting effects of conscientiousness in comparison to boredom, it is assumed that high levels of

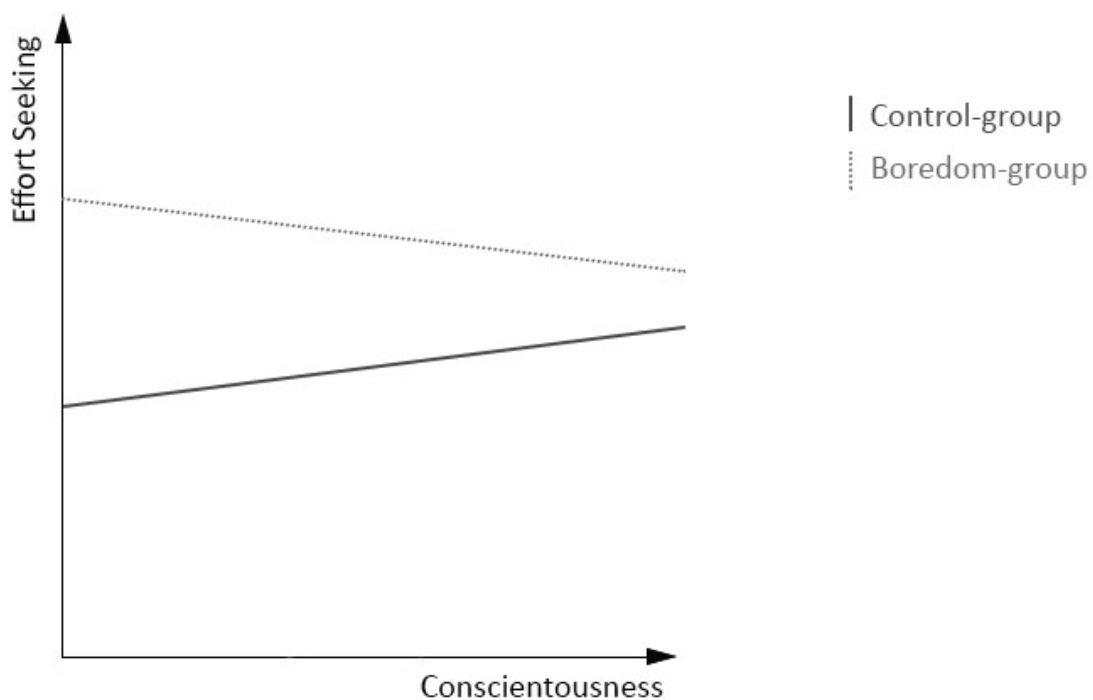
conscientiousness negatively correlate with Effort Seeking in the boredom-group because of its preventive quality against boredom (Figure 3). The third hypothesis, therefore, posits:

Hypothesis 2b:

High Levels of conscientiousness are negatively correlated with Effort Seeking in the boredom condition.

Figure 3

Expected change in effort-seeking in dependency of control or boredom condition. The boredom-group shows a higher level of Effort Seeking compared to the control group on average, but with a negative tendency as conscientiousness scores increase.



It is important to note that this hypothesis will be tested via a hierarchical linear regression model which will be controlled for a person's math-self-concept. The construct of math-self-concept will be explained in detail in the method section.

As this hypothesis relates to state boredom and its acute effects, the third hypothesis also considers boredom proneness, which relates to a person's general tendency to experience

boredom. This ensures a comprehensive examination of the moderating effects of conscientiousness on both boredom as a state and boredom as a trait.

The assumption, that high levels of conscientiousness are negatively correlated with boredom leads to the following hypothesis when regarding trait boredom:

Hypothesis 3:

High levels of conscientiousness lead to lower levels of boredom proneness.

Current Study

This research aimed to empirically investigate four hypotheses regarding the interaction between boredom, Effort Seeking, and conscientiousness. Firstly, it was posited that acute boredom would be associated with a heightened propensity for participants to engage in Effort Seeking, leading to higher Effort Seeking scores (Hypothesis 1). Secondly, it was examined whether elevated levels of the personality trait Conscientiousness would lead participants to exhibit increased Effort Seeking when boredom is not prevalent (Hypothesis 2a). Third, it was investigated, whether conscientiousness moderates the relationship between boredom and Effort seeking (Hypothesis 2b). As a fourth hypothesis, the expected negative correlation between conscientiousness and trait boredom (e.g. Boredom Proneness) was investigated.

To assess these hypotheses, a quasi-experimental design was conducted in a laboratory setting at the University of Vienna. Over an active period of 6 weeks, participants were recruited via the Universities E-mail-distributor and asked to fill out an online questionnaire which assessed sociodemographic features and relevant personality constructs

like boredom proneness and conscientiousness. After filling out the questionnaire the participants came to a computer laboratory in the University of Vienna and were randomly assigned to either a boredom condition or a control condition. The groups differed in that participants viewed different videos before being able to select which difficulty level of a cognitively demanding task they wanted to undertake. The aim of this procedure was to ensure that the two groups differed only in their state of boredom to illustrate how this might effect their Effort Seeking. The details of this procedure will be explained in the following.

Methods

Participants

The sample size calculation for this study was based on a G* Power analysis (Erdfelder, Faul, & Buchner, 1996) for multiple linear regression with one predictor under examination and a total of four predictors, assuming a potentially small effect size ($d = 0.2$), an alpha level of 0.05 (one-tailed), and a desired power of 0.80 ($1 - \beta$). This calculation suggests a total of 395 participants.

Participants were recruited through the Laboratory Administration for Behavioral Sciences of the University of Vienna. The research was funded by the Technical University of Dresden which allowed participants to be paid 8€ for their participation. Participants were required to be fluent in German. The sample size equals $N = 313$. The required number of 395 participants could not be attained due to the time constraints imposed by the limited availability of the computer lab. A total of 23 participants were excluded because they either did not finish the whole study or failed a quality check item while filling out the questionnaire. This yielded an overall sample size of 290. Of those, 219 (76%) were female

and 68 male; three participants indicated their gender as diverse. Participants were young on average: Age ranged from 18 to 63 years ($M=22.4$, $SD=5.4$).

Procedure

As mentioned earlier, the study consisted of two parts. In the first part, participants completed an online questionnaire on the survey portal Qualtrics (Qualtrics.com), which consisted of 83 questions to assess socio-demographic data, boredom proneness, conscientiousness and math self-concept. Once finished, they could choose a suitable date to come to the designated computer laboratory at the University of Vienna for the second part of the study.

The second included watching either an interesting or boring video depending on the randomly assigned group (control or boredom), a learning phase for the math effort task, and the manipulation check to confirm that the boredom manipulation worked. Afterwards, the participants were informed that the initial study is hereby finished and they will receive their promised incentive (either cash or credits). The participants were then asked to voluntarily help us work on our master's theses by completing a different study which contained the MET.

Measures

Math Self Concept

Math Self Concept was measured via the Math Self Concept scale (Benson, 1989), translated into German, assessing how participants rate their mathematical abilities and enjoyment of solving mathematical tasks (e.g. "I have the feeling that I am naturally talented in mathematics"). Seven items were rated on a five-point scale ranging from 1=*totally*

disagree to 5=*totally agree*. High scores indicate that a person perceives their own mathematical abilities as good.

Boredom Proneness

Boredom proneness was measured using the Short Boredom Proneness Scale (Struk, Carriere, Cheyne & Danckert, 2017), translated into German. The questionnaire contains eight questions (e.g. “I find it hard to entertain myself”), assessing an individual’s tendency to feel bored on a 7-point scale ranging from 1=*totally disagree* to 7=*totally disagree*. High scores indicate an individual’s tendency to feel bored more often and quickly.

Induction of State Boredom

Boredom was induced in the laboratory through videos that have been validated in a pilot study. The boredom group watched a monotonous video with little engaging content or stimuli. The video shows a young man sitting in front of a white wall and reading a text in a monotone voice. The control group watched an excerpt from an interestingly presented YouTube video (TEDx Talks, 2013). To avoid confounding input due to different content, both videos only showed a single speaking person, and the two versions contained the same informational content but differed in the tone of the presenter and the visual aids used to increase participants’ engagement in the video. By doing so, we aimed to vary boredom between our two groups through engagement while leaving the informational content identical. After watching the video, participants were asked a control questions to measure state boredom (e.g., "How bored do you feel right now?" 5-point Likert scale).

Effort-Seeking

Effort seeking was measured using the math effort task (MET) in the third phase of the study (Engel-Friedman et al., 2003). Participants chose the level of difficulty for blocks of mathematical problems from five difficulty levels (1=*easiest level* to 5=*hardest level*). Choosing high levels indicates that a person wants to engage in cognitively demanding tasks.

Conscientiousness

Conscientiousness was assessed using a 9-item subset extracted from the German version of the 44-item Big Five Inventory (BFI), which was developed by John & Srivastava in 1999. The German version is proven to be a reliable instrument to observe the Five-Factor-Model (Lang et al., 2001). The items (e.g. “I see myself as someone who is a reliable worker”) are rated on a 5-point scale ranging from 1=*totally disagree* to 5=*totally agree*. High scores indicate an individual’s tendency to be highly conscientious.

Meaning

Since participants had diverse motivations for engaging in the study, we endeavored to establish a scenario that encouraged them to voluntarily participate in the MET because it felt meaningful to them. This was achieved by seemingly dividing the study into two parts, with only the first part (involving the video and manipulation check questions) appearing to be the original study in which they initially participated. Following Part one, a message was displayed clearly stating that the study was concluded, and participants could now receive the promised credits or cash. However, an opportunity was presented to support a group of master's students by voluntarily completing an additional second part, without any further incentives. Participants opted to undertake the MET voluntarily, as it was perceived as meaningful, rather than being driven by external incentives.

Results

The effect of boredom on Effort Seeking

Analysis was carried out using R (version 4.3.2; R Core Team, 2021).

To test the various hypotheses, it was essential to preclude that the manipulation in the boredom group was effective, ensuring that participants indeed experienced noticeable boredom. The manipulation check proved to be highly effective. An unpaired t-test was conducted for the two groups, comparing the average manipulation check scores (MC-scores) of the control group ($M = -0.64$, $SD = 0.70$) with those of the boredom group ($M = 0.60$, $SD = 0.86$). The t-test yielded highly significant results ($p < 2.2e-16$, 95% CI [1.06, 1.42]). (Table 1)

Table 1.

Comparison of the mean scores of the manipulation check between control- and boredom-group via an unpaired t-test.

<i>Control-group (n = 143)</i>	<i>Boredom-group (n = 154)</i>	<i>p-value (95% CI)</i>
Mean MC-score (SD)	Mean MC-score (SD)	Unpaired <i>t</i> -test
-0.64 (0.70)	0.60 (0.86)	< .001 (1.06 to 1.42)

SD, standard deviation; CI, confidence interval

The effect of boredom on Effort Seeking

The first hypothesis states that participants experiencing boredom would afterwards be choosing higher levels of the MET, thereby showing increased levels of Effort Seeking. This hypothesis could not be confirmed. An unpaired t-test was conducted to compare the average MET-level scores between the control group ($M = 2.66$, $SD = 0.90$) and the boredom group ($M = 2.70$, $SD = 0.86$). The comparison between both groups yielded non-significant results ($p = 0.74$, 95% CI [-0.17, 0.24]). (Table 2)

Table 2.

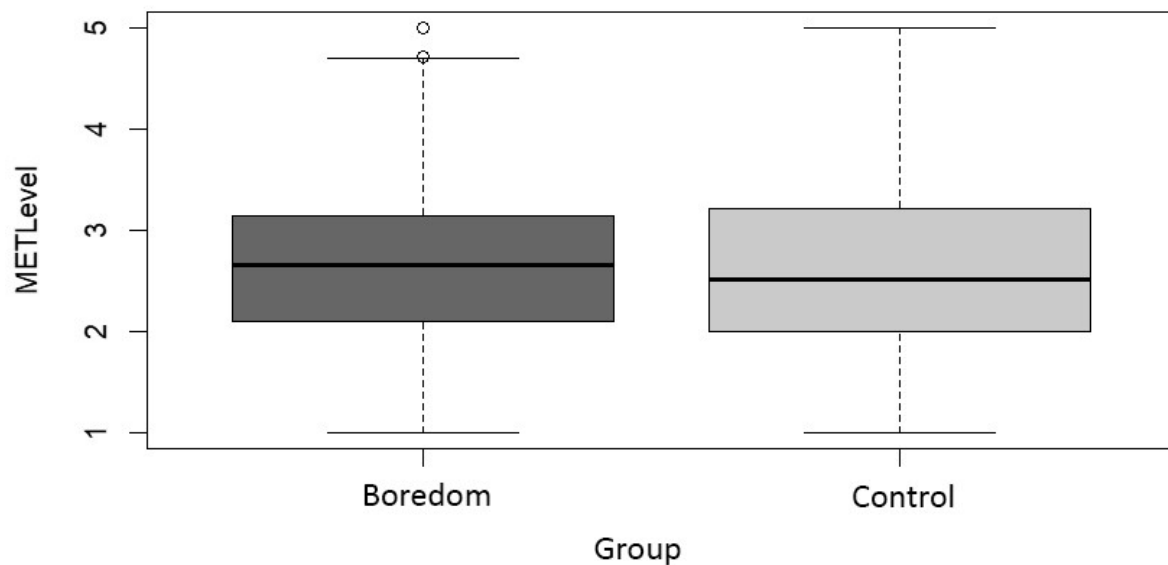
Comparison of the mean scores of the mean MET-Level-scores between control- and boredom-group via an unpaired t-test. No significant difference was found.

Control-group (n = 143)	Boredom-group (n = 154)	p-value (95% CI)
Mean MET-score (SD)	Mean MET-score (SD)	Unpaired t-test
2.66 (0.90)	2.70 (0.86)	0.74 (−0.17 to 0.24)

SD, standard deviation; CI, confidence interval

Figure 4.

No significant difference between the Mean-scores of MET-Level between boredom and control-group.



The moderating effect of conscientiousness

Hypothesis 2a and 2b focused on how a participant's level of conscientiousness moderated the link between boredom and Effort Seeking between each group. These hypotheses were tested with a hierarchical linear regression model. On the one hand the results did not confirm hypothesis 2a, that is, whether conscientiousness leads to higher MET levels in the control group. Hypothesis 2b on the other hand, that is, an expected negative correlation between conscientiousness and MET levels in the boredom-group was not confirmed but a strong trend can be observed. In the first step the base model included the grouping variable (group), the conscientiousness scores (Con) and the control variable of

Math Self Concept (MathSC). The linear regression revealed that only MathSC ($\beta = 0.15$, $p=.004$, 95% CI [0.05, -0.26]) contributed significantly to the regression model. The model overall was found to be significant $F(3,286)=3.66$, $p=.01$. and accounted for 2.7 % (adjusted $R^2 = 0.03$) of the change in average MET level. As a second step the interaction term of group and conscientiousness was added into the model which explained an additional 0.9% of variance, leading to a R^2 -Change of 0.01 which shows a strong trend for a one-tailed hypothesis ($p = .05$) The linear regression revealed that a participant's level of conscientiousness ($\beta = -0.17$, $p=.015$, 95% CI [-0.31, -0.03]) and the MET Score ($\beta = 0.15$, $p=.005$, 95% CI [0.05, -0.25]) contributed significantly to the regression model $F(4,285)=3.435$, $p<.001$ (Table 3). Simple slope analysis revealed significant effects of conscientiousness on MET-level when participants experienced boredom $\beta= -0.17$, $p=.01$. However, when students did not experience boredom (control-group) the MET-level was not impacted, $\beta = 0.00$, $p=.96$. (Figure 5)

Figure 5

Participants scoring high in conscientiousness score significantly lower in MET level when they are in the boredom-group. Conscientiousness has no effect on the participants MET level in the control-group

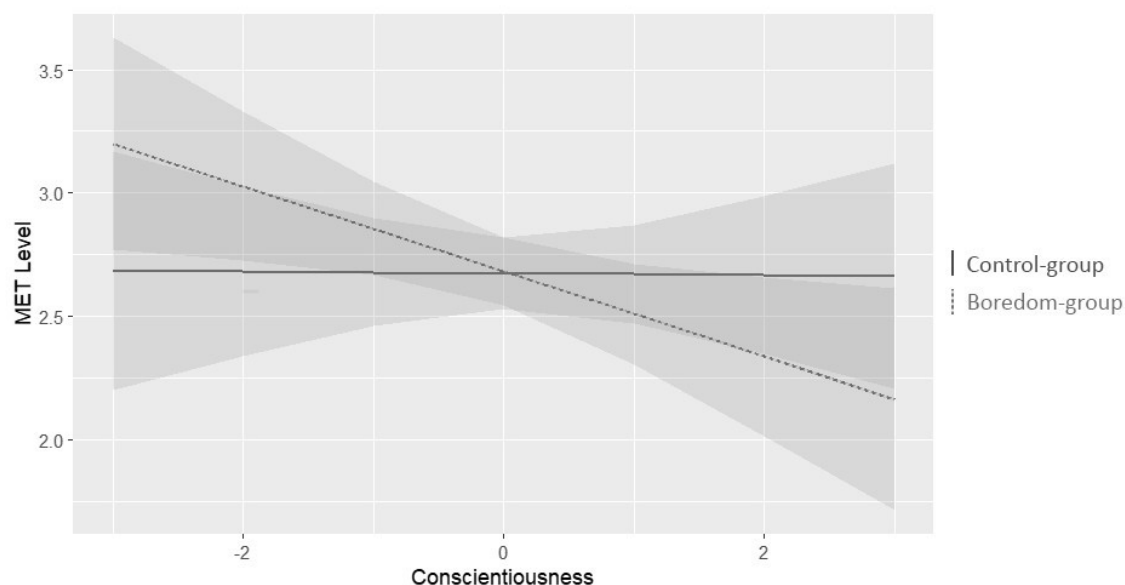


Table 3.

Effect of conscientiousness and Math-Self-Concept on Effort Seeking (MET-Level) and the interaction effect between group and conscientiousness.

Predictors	MET-Level				
	<i>B</i>	<i>SE</i>	95% CI	<i>t</i>	<i>p</i>
Intercept	2.68	0.07	[2.54, 2.82]	37.73	< .001***
Group	0.01	0.10	[-0.21, 0.2]	-0.07	.472
Conscientiousness	-0.17	0.07	[-0.31, -0.03]	-2.45	.007 *
MathSC	0.15	0.05	[0.05, 0.25]	2.841	.003 **.
Group:Con	0.17	0.10	[-0.03, 0.37]	1.637	.051.

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Controlling for Boredom Proneness

Firstly, Boredom Proneness significantly predicted ($p = .001$, 95% CI [0.06, 0.24]) how bored participants in each group were after watching the video (Figure 6). This affirms that boredom, as a trait, has a direct influence on boredom as a state. (Table 4)

Table 4.

Significant correlation between boredom proneness and experienced level of state boredom (MC-Scores) in each group.

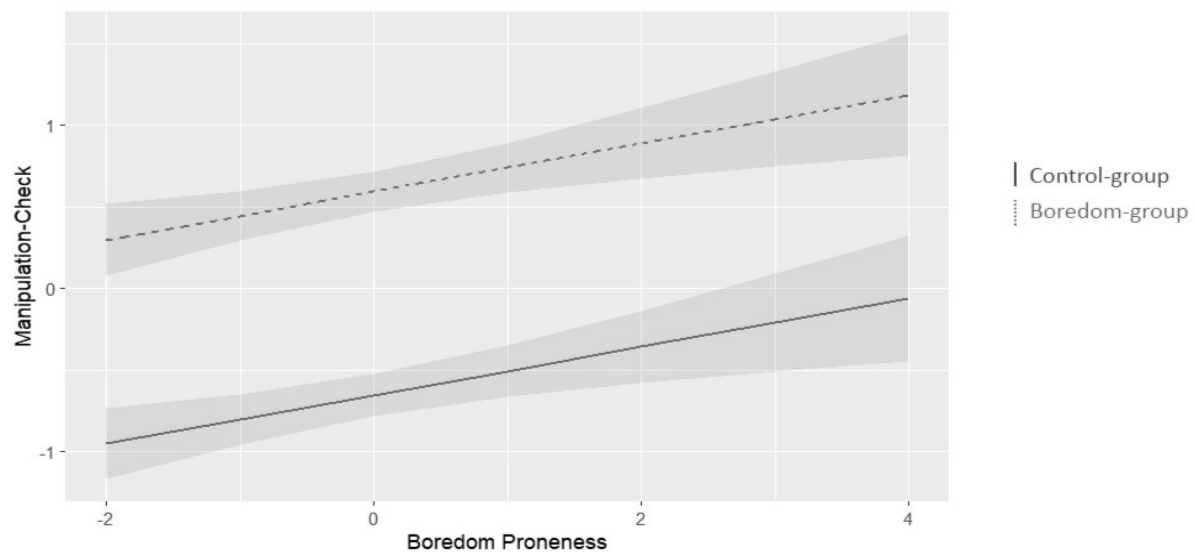
Predictors	MC-Scores				
	<i>B</i>	<i>SE</i>	95% CI	<i>t</i>	<i>p</i>
Intercept	0.60	0.06	[0.47, 0.72]	9.53	< .001***
Group	-1.25	0.90	[-1.42, -1.07]	-13.81	< .001***
Boredom Proneness	0.15	0.05	[0.06, 0.24]	3.28	.001 **.

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Secondly, the 4th Hypothesis, that is, conscientiousness being negatively correlated with boredom proneness, could be confirmed. Conscientiousness ($p < 2e-16$, 95% CI [-0.60, -0.40]) has a significant negative correlation with the participants level of Boredom Proneness, accounting for 25% of its variance (adjusted $R^2 = 0.25$).

Figure 6.

Simple slopes analysis for the effect of boredom proneness on state boredom controlled for group. Boredom Proneness significantly predicts a participant's level of state boredom (MC).



Due to the high covariance between BPS and conscientiousness, Hypothesis 2b was once again tested, this time being controlled for MathSC as well as BPS. The linear regression revealed that the MathSC ($\beta = 0.14, p=.007, 95\% \text{ CI } [0.04, 0.24]$), Conscientiousness ($\beta = -0.17, p=.004, 95\% \text{ CI } [-0.29, -0.05]$) and Boredom Proneness ($\beta = -0.15, p=.009, 95\% \text{ CI } [-0.27, -0.04]$) contributed significantly to the regression model, only the group did not show any significance.

The model overall was found to be significant $F(4,285)=4.51, p=.001$. and accounted for 4,6 % (adjusted $R^2 = 0.046$) of the change in average MET level. As a second step the interaction term of group and conscientiousness was added into the model which explained an additional 1.1% of variance which was significant for a one-tailed hypothesis ($p = .035$). The linear regression revealed that the MathSC ($\beta = 0.13, p=.01, 95\% \text{ CI } [0.03, 0.24]$), Conscientiousness ($\beta = -0.26, p<.001, 95\% \text{ CI } [-0.41, -0.11]$) and Boredom Proneness ($\beta = -0.16, p=.007, 95\% \text{ CI } [-0.27, -0.05]$) contributed significantly to the regression model $F(5,284)=4.303, p<.001$ (Table 5). Simple slopes analysis revealed significant effects of

conscientiousness on MET-level when participants experienced boredom $\beta = -0.26, p = .00$.

However, when students did not experience boredom (control-group) the MET-level was not significantly impacted, $\beta = -0.07, p = 0.35$.

Table 5.

Effect of conscientiousness and Math-Self-Concept on Effort Seeking (MET-Level) and the interaction effect between group and conscientiousness. Interaction effect yields a significant result for a one-tailed approach.

Predictors	MET-Level				
	<i>B</i>	<i>SE</i>	95% CI	<i>t</i>	<i>p</i>
Intercept	2.67	0.07	[2.54, 2.82]	38.15	< .001***
Group	- 0.01	0.10	[-0.21, 0.19]	-0.07	.472
Conscientiousness	-0.26	0.08	[-0.41, -0.11]	-3.39	< .001***
MathSC	0.13	0.05	[0.03, 0.24]	2.58	.003 *
BPS	-0.16	0.06	[-0.28, -0.05]	-2.73	< .001***
Group:Con	0.19	0.10	[-0.02, 0.39]	1.82	0.035 *

*Note. * $p < .05$, ** $p < .01$, *** $p < .001$*

Discussion

The findings presented in this study do not support to the notion that individuals engage in more demanding tasks to alleviate the subjectively unpleasant experience of boredom (H1). There also was no evidence found for H2a, that is, high levels of conscientiousness leading to higher levels of effort seeking in the control condition. However, when controlling for variables such as Math-Self-Concept, and Boredom Proneness, conscientiousness shows significant moderating effects on Effort Seeking in the boredom condition (H2b). The following section discusses general considerations and limitations of the study.

In the context of Hypotheses 2a and 2b, associations between boredom, Effort Seeking and conscientiousness were explored. Conscientious individuals are generally characterized

by hardworking and achievement-striving tendencies (Roberts et al., 2009; Costa & McCrae, 1993), leading to the assumption that higher levels of conscientiousness would correspond to increased Effort Seeking when participants were not bored (H2a). However, no evidence supporting this assumption was found. Participants in the control group, as seen in Figure 5, selected the difficulty level in the MET independently of their Conscientiousness. This result contrasts with prior research that found evidence supporting the idea that conscientious individuals strive to perform (Dudley et al., 2006). The lack of visibility of participants' results and the absence of tangible achievements might explain this discrepancy. Without insight into their own performance and a recognizable added value, conscientious individuals may lack the incentives to exert effort, warranting investigation in future research.

The third hypothesis (H2b) explored whether high levels of conscientiousness moderate the effects of boredom. When controlling for Math-Self-Concept and Boredom Proneness, this was found to be true. A participant's conscientiousness score negatively moderated their average MET-Level choice, even exceeding the expected effect. When bored, participants with high levels of conscientiousness exhibited significantly lower levels of Effort Seeking compared to participants with low levels of conscientiousness. This supports the notion that being conscientious alters a person's susceptibility to the immediate effects of state boredom. Additionally, there was strong evidence for hypothesis 4, which stated that conscientiousness negatively predicts trait boredom (measured by Boredom Proneness). This aligns with previous research (Sansone et al., 1999; Heslop, 2014).

Since conscientiousness is shown to alter the effects of state boredom, the preferred coping strategies of conscientious individuals could offer an intriguing avenue for a deeper understanding of the relationships between boredom and conscientiousness. Although, given the absence of a general effect of boredom on Effort Seeking, these results should be interpreted independently of the first hypothesis. However, when investigating the construct

of boredom in future research, the moderating effects of conscientiousness should be considered.

Interestingly, the average chosen MET level of participants scoring high in conscientiousness was significantly lower in the boredom condition than in the control group. This contradicts previous research and again raises the hypothesis that there needs to be a tangible achievement for conscientious individuals to be motivated to strive for achievement.

Motivators, in general, should be acknowledged at this juncture. Participants had diverse incentives for participating in the study. On one hand, university students were rewarded with credits for a module in the psychology bachelor program at the University of Vienna. On the other hand, external participants were motivated by a monetary incentive. This could have resulted in participants having different reasons for undertaking the MET. Although we endeavored to make the MET part of the study seem meaningful, given its contribution to the development of a master's thesis, the varied initial incentives may still have led to a shift in motivation.

Boredom Proneness significantly predicted the post-video boredom levels in both the control and boredom groups. Given the efficacy of the boredom manipulation, this strongly suggests that Boredom Proneness provides accurate predictions regarding an individual's susceptibility to experiencing boredom.

Limitations were identified concerning the Math effort tasks. Some participants perceived the MET as excessively lengthy, leading to premature discontinuation without completing the MET. The perception of the MET as either strenuous or tedious could potentially lead to participants not regarding it as an opportunity to alleviate boredom. To explore this, a second manipulation check could be conducted following the MET, allowing a comparison of state boredom before and after the task to ascertain whether engagement in the MET correlates with a reduction in boredom.

This research offers valuable insights for the exploration of effort seeking, boredom, and conscientiousness. To gain deeper insights into this topic, future research should focus on refining the operationalizations of the above-mentioned constructs and take into account the identified effects of conscientiousness on boredom and Effort Seeking.

Conclusion

The present study does not provide evidence that the acute sensation of boredom leads to individuals exhibiting higher levels of Effort Seeking. Therefore, Effort Seeking does not seem to be a viable coping strategy to alleviate state boredom.

Conscientiousness does not result in generally elevated levels of Effort Seeking in the absence of boredom. However, when considering a person's math self-concept and their boredom proneness, there is significant evidence that conscientiousness moderates the effects of state boredom, leading to lower levels of effort seeking. Additionally, conscientiousness negatively predicts a person's general tendency to experience boredom which proves conscientiousness to be a contrasting construct compared to boredom. This leads to the conclusion that highly conscientious individuals have different coping strategies against boredom than individuals with low levels of conscientiousness and are, in fact, less susceptible to the experience of boredom.

References

- Ashton, M. C., & Lee, K. (2009). The HEXACO–60: *A short measure of the major dimensions of personality*. *Journal of personality assessment*, 91(4), 340-345.
- Bartley, C. E., & Roesch, S. C. (2011). *Coping with daily stress: The role of conscientiousness*. *Personality and individual differences*, 50(1), 79-83.
- Benson, J. (1989). *Structural components of statistical test anxiety in adults: An exploratory model*. *The Journal of Experimental Education*, 57(3), 247-261.
- Besser, A., & Shackelford, T. K. (2007). *Mediation of the effects of the big five personality dimensions on negative mood and confirmed affective expectations by perceived situational stress: A quasi-field study of vacationers*. *Personality and Individual Differences*, 42(7), 1333-1346.
- Bogg, T., & Roberts, B. W. (2004). *Conscientiousness and health-related behaviors: a meta-analysis of the leading behavioral contributors to mortality*. *Psychological bulletin*, 130(6), 887.
- Boyce, M., & Sawang, S. (2014). *Unpacking the role of mindfulness in conscientiousness and spirituality*. *The Interdisciplinary Journal of Research on Religion*, 10(6), 6.
- Bruursema, K., Kessler, S. R., & Spector, P. E. (2011). *Bored employees misbehaving: The relationship between boredom and counterproductive work behaviour*. *Work & Stress*, 25(2), 93-107.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco: Jossey-Bass.
- Costa, P. T., & McCrae, R. R. (2008). *The revised neo personality inventory (neo-pi-r)*. *The SAGE handbook of personality theory and assessment*, 2(2), 179-198.
- DeLongis, A., Coyne, J. C., Dakof, G., Folkman, S., & Lazarus, R. S. (1982). *Relationship of daily hassles, uplifts, and major life events to health status*. *Health psychology*, 1(2), 119.
- De Raad, B., & Mlačić, B. (2017). *The lexical foundation of the big five factor model*. *The Oxford handbook of the five factor model*, 191-216.
- Dudley, N. M., Orvis, K. A., Lebiecki, J. E., & Cortina, J. M. (2006). *A meta-analytic investigation of conscientiousness in the prediction of job performance: examining the intercorrelations and the incremental validity of narrow traits*. *Journal of applied psychology*, 91(1), 40.
- Eastwood, J. D., Frischen, A., Fenske, M. J., & Smilek, D. (2012). *The unengaged mind: Defining boredom in terms of attention*. *Perspectives on Psychological Science*, 7(5), 482-495.

- Engle-Friedman, M., Riela, S., Golan, R., Ventuneac, A. M., Davis, C. M., Jefferson, A. D., & Major, D. (2003). *The effect of sleep loss on next day effort*. *Journal of Sleep Research*, 12(2), 113–124.
<https://doi.org/10.1046/j.1365-2869.2003.00351.x>
- Fahlman, S. A., Mercer-Lynn, K. B., Flora, D. B., & Eastwood, J. D. (2013). *Development and validation of the multidimensional state boredom scale*. *Assessment*, 20(1), 68-85.
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). *G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences*. *Behavior research methods*, 39(2), 175-191.
- Heslop, S. (2014). *Driver boredom: Its individual difference predictors and behavioural effects*. *Transportation research part F: traffic psychology and behaviour*, 22, 159-169.
- Inzlicht, M., Shenhav, A., & Olivola, C. Y. (2018). *The effort paradox: Effort is both costly and valued*. *Trends in cognitive sciences*, 22(4), 337-349.
- John, O. P., & Srivastava, S. (1999). *The Big-Five trait taxonomy: History, measurement, and theoretical perspectives*. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (Vol. 2, pp. 102–138). New York: Guilford Press.
- Kendler, K. S., & Myers, J. (2010). *The genetic and environmental relationship between major depression and the five-factor model of personality*. *Psychological medicine*, 40(5), 801-806.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer publishing company.
- Lang, F. R., Lüdtke, O., & Asendorpf, J. B. (2001). *Testgüte und psychometrische Äquivalenz der deutschen Version des Big Five Inventory (BFI) bei jungen, mittelalten und alten Erwachsenen*. *Diagnostica*, 47(3), 111-121.
- Lee, K. S. F. (2017). *Boredom Proneness and Symptoms of Depression, Anxiety and Stress: The Moderating Effect of Mindfulness* (Order No. 10616594). Available from ProQuest Dissertations & Theses Global. (1949789171).
- Lee, F. K., & Zelman, D. C. (2019). *Boredom proneness as a predictor of depression, anxiety and stress: The moderating effects of dispositional mindfulness*. *Personality and Individual Differences*, 146, 68-75.
- Martin, M. (2007). *The phenomenon of boredom and its relationship to mindfulness* (Order No. U232901). Available from ProQuest Dissertations & Theses Global. (301701236).
- Merrifield, C., & Danckert, J. (2014). *Characterizing the psychophysiological signature of boredom*. *Experimental brain research*, 232, 481-491.

- Mikulas, W. L., & Vodanovich, S. J. (1993). *The essence of boredom*. *The Psychological Record*, 43(1), 3.
- Nett, U. E., Goetz, T., & Daniels, L. M. (2010). *What to do when feeling bored?: Students' strategies for coping with boredom*. *Learning and Individual Differences*, 20(6), 626-638.
- Noftle, E. E., & Robins, R. W. (2007). *Personality predictors of academic outcomes: big five correlates of GPA and SAT scores*. *Journal of personality and social psychology*, 93(1), 116.
- Oprea, B., Iliescu, D., Burtăverde, V., & Dumitrache, M. (2019). *Personality and boredom at work: the mediating role of job crafting*. *Career Development International*, 24(4), 315-330.
- R Core Team. (2024). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. <https://www.R-project.org/>
- Reijseger, G., Schaufeli, W. B., Peeters, M. C., Taris, T. W., Van Beek, I., & Ouwenel, E. (2013). *Watching the paint dry at work: Psychometric examination of the Dutch Boredom Scale*. *Anxiety, Stress & Coping*, 26(5), 508-525.
- Roberts, B. W., Jackson, J. J., Fayard, J. V., Edmonds, G., & Meints, J. (2009). *Conscientiousness*. In M. Leary & R. Hoyle (Eds.), *Handbook of individual differences in social behavior* (pp. 369–381). New York, NY: Guilford Press.
- Roberts, B. W., Lejuez, C., Krueger, R. F., Richards, J. M., & Hill, P. L. (2014). What is conscientiousness and how can it be assessed?. *Developmental psychology*, 50(5), 1315.
- Sansone, C., Wiebe, D. J., & Morgan, C. (1999). *Self-regulating interest: The moderating role of hardiness and conscientiousness*. *Journal of personality*, 67(4), 701-733.
- Skowronski, M. (2012). *When the bored behave badly (or exceptionally)*. *Personnel Review*, 41(2), 143-159.
- Smith, C. A., & Ellsworth, P. C. (1985). *Patterns of cognitive appraisal in emotion*. *Journal of personality and social psychology*, 48(4), 813.
- Struk, A. A., Carriere, J. S., Cheyne, J. A., & Danckert, J. (2017). *A short boredom proneness scale: Development and psychometric properties*. *Assessment*, 24(3), 346-359.
- TEDx Talks. (2013, 12. December). *Hör! Mir! Zu! Warum wir gute Kommunikation lieben: Bert Helbig at TEDxStuttgart* [Video]. YouTube. <https://www.youtube.com/watch?v=VNZPM1qvce0>
- Troutwine, R., & O'Neal, E. C. (1981). *Volition, performance of a boring task and time estimation*. *Perceptual and Motor Skills*, 52(3), 865-866.
- Van Hooff, M. L., & van Hooft, E. A. (2014). *Boredom at work: Proximal and distal consequences of affective work-related boredom*. *Journal of occupational health psychology*, 19(3), 348.

- Van Tilburg, W. A., & Igou, E. R. (2017). *Boredom begs to differ: Differentiation from other negative emotions*. *Emotion*, 17(2), 309.
- Vodanovich, S. J. (2003). *Psychometric measures of boredom: A review of the literature*. *The Journal of psychology*, 137(6), 569-595.
- Westgate, E. C., & Wilson, T. D. (2018). *Boring thoughts and bored minds: The MAC model of boredom and cognitive engagement*. *Psychological Review*, 125(5), 689.
- Wiesner, M., Windle, M., & Freeman, A. (2005). *Work stress, substance use, and depression among young adult workers: an examination of main and moderator effect model*. *Journal of occupational health psychology*, 10(2), 83.
- Wilson, T. D., Reinhard, D. A., Westgate, E. C., Gilbert, D. T., Ellerbeck, N., Hahn, C., ... & Shaked, A. (2014). *Just think: The challenges of the disengaged mind*. *Science*, 345(6192), 75-77.