

OPEN ACCESS

EDITED BY

Ana Luísa Rodrigues,
University of Lisbon, Portugal

REVIEWED BY

Buratin Khampirat,
Suranaree University of Technology, Thailand
Joana Carneiro Pinto,
Catholic University of Portugal, Portugal

*CORRESPONDENCE

Tom Reschke
✉ tom.reschke@jurs.uni-heidelberg.de

RECEIVED 23 December 2022

ACCEPTED 19 May 2023

PUBLISHED 13 June 2023

CITATION

Reschke T, Lobinger T and Reschke K (2023)
The potential of an exam villa as a structural
resource during prolonged exam preparation at
university. *Front. Educ.* 8:1130648.
doi: 10.3389/educ.2023.1130648

COPYRIGHT

© 2023 Reschke, Lobinger and Reschke. This is
an open-access article distributed under the
terms of the [Creative Commons Attribution
License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or
reproduction in other forums is permitted,
provided the original author(s) and the
copyright owner(s) are credited and that the
original publication in this journal is cited, in
accordance with accepted academic practice.
No use, distribution or reproduction is
permitted which does not comply with these
terms.

The potential of an exam villa as a structural resource during prolonged exam preparation at university

Tom Reschke^{1*}, Thomas Lobinger¹ and Katharina Reschke²

¹Institute for Civil Law, Labor and Commercial Law, Heidelberg University, Heidelberg, Germany,

²Institute for Education Studies, Heidelberg University, Heidelberg, Germany

Introduction: Drawing on the Demand-Control Model, this study examined whether using an exam villa as a supportive learning environment provides a structural resource for law students during exam preparation. First, we hypothesized that villa students show higher decision latitude and satisfaction and less stress compared to non-villa students. Second, we expected villa use to predict stress and satisfaction over and beyond the demand-control dimensions. Third, decision latitude was tested to mediate of the relationship between villa use and both outcomes.

Methods: Our cross-sectional study included $N = 205$ advanced law students that gave self-reports on their stress and satisfaction, villa use, their perceived demands and decision latitude along with some control variables. All students were within a period of long-lasting exam preparation stretching over 12 to 18 months whereas $n = 41$ students used the villa.

Results: Using the exam villa was associated with both less subjective stress and more satisfaction. SEMs revealed villa use to predict stress but not satisfaction over and beyond the demand-control dimensions with 73% of overall explained variance in stress and 62% of variance in satisfaction. Decision latitude mediated the relationship between villa use and both outcomes.

Discussion: The findings support the potential of structural resources in reducing stress among students undergoing prolonged academic stress.

KEYWORDS

academic stress, satisfaction, university students, decision latitude (DL), structural resource, setting-based approaches

1. Introduction

High-stress levels and growing mental health problems have been shown to challenge university students (Robotham and Julian, 2006; Beiter et al., 2015; Ribeiro et al., 2018; Rabkow et al., 2020), while exam periods appear to be particularly stressful (Zunhammer et al., 2013; Lyndon et al., 2014; Campbell et al., 2018). Stress is defined as an unpleasant experience that results from the perceived discrepancy between certain demands and the individual resources to cope within a given situation. Therefore, stress depends upon individual cognitive appraisal and emerges when demands are numerous and prolonged, and coping resources are taxed or even exceeded (Lazarus and Folkman, 1984). There is ample evidence that study programs with state examination formats such as in medical and law school have characteristics of prolonged academic stress given the time-consuming and academically challenging nature of exam preparation (e.g., Duan et al., 2013; Multrus et al., 2017; Giglberger et al., 2022). Studies have found prolonged academic examination stress to be not only related to high-stress levels but also to potential health problems such as

symptoms of anxiety, depression, or somatization (Weik and Deinzer, 2010; Zunhammer et al., 2013; Giglberger et al., 2022).

We based our study on the Demand-Control Model (DCM; Karasek, 1979) which is one of the predominant models for explaining stress in work-related contexts. The DCM makes predictions about stressful work environments by postulating two important dimensions: psychosocial demands and control (decision latitude) within a given work situation. Demands refer to physical, psychological, social, or structural conditions that require an individual to invest effort to complete certain tasks (e.g., workload and time pressure). Control refers to physical, psychological, social, or structural resources that provide an individual with opportunities to make use of different inherent skills in order to complete a task as well as decide to which task attention is allocated under which circumstances. The DCM distinguishes four types of work activities: passive, active, low-strain, and high-strain work activities, which are all characterized by scoring either low or high on the demand-control dimensions that can lead to the development of stress and health-related problems. High-strain work activities are existing when an individual perceives high work-related demands and low decision latitude at the same time and the model assumes such a constellation to be associated with elevated stress as well as risks to physical and mental health (Karasek, 1979; Karasek and Theorell, 1990). A more positive constellation results from an active work activity where an individual experiences high work-related demands combined with high decision latitude. Research that applied the DCM in the university context found empirical support that perceiving high demands and low decision latitude were associated with more stress and less satisfaction as well as symptoms of depression and anxiety (Karasek, 1979; Karasek and Theorell, 1990; Cotton et al., 2002; Chambel and Curral, 2005). More recent research demonstrated that high demands were associated with high levels of study-related stress and decision latitude could positively predict study-related satisfaction (Sieverding et al., 2013; Schmidt et al., 2015).

In this framework, past studies have not only explored explaining factors of study-related stress but also pointed to setting-based initiatives (i.e., utilizing structural opportunities and resources) to reduce stress in university students (Fernandez et al., 2016; Upsher et al., 2022). The other major direction of research focused on individual-based initiatives (i.e., utilizing individual opportunities and resources) to explain and reduce stress among students. Recent evidence suggests that stress management interventions are an effective means to reduce stress as well as symptoms of anxiety and depression among students (e.g., for a recent review and meta-analysis by Amanvermez et al., 2020). Cognitive-behavioral therapy, and mindfulness- and mind-body-oriented programs have continuously been reported to be most effective especially when lasting over several weeks (Worsley et al., 2022). While many of those programs are effective at building and improving students' individual resources, few interventions aim at the potential of structural resources. In fact, focusing on setting-based initiatives would be promising because it could act on the potential sources of stress. For the situation of students, this could translate into curriculum-embedded strategies that

reduce academic demands and enhance decision latitude, for instance. Setting-based initiatives such as creating specific learning environments may even help to prevent the need for individual intervention efforts. Currently, more research in this direction would lead to a better understanding of the effectiveness of setting-based initiatives (Fernandez et al., 2016; Upsher et al., 2022).

The law faculty of one large German university established an innovative structural approach to address students' needs during prolonged and stressful exam preparation for their first state examination (Lobinger, 2016). This offered support is an exclusive villa that is open to advanced law students to use while preparing their final examinations. Students apply for one out of 50 personal workspaces to use up to 12 months. Selection is not based on previous grades but determined based on the highest need and most expected benefit for the individual student. Students are invited to use their fixed personal workspaces on a 24/7 basis which helps them avoid crowded libraries and study at their own pace. The villa provides a conducive learning environment including rooms for group learning, a small law-specific library, and a kitchen where students of the same field of study can meet and exchange ideas. Given such amenities, it appears worthwhile to examine the role of such an exam villa as a structural resource for study-related stress and satisfaction. The exam villa provides a systematic means of empowering students to arrange and organize their current study situation (e.g., deciding over individual study hours and separating work from leisure). It provides a special work environment that helps students to perceive more individual control over their exam preparation.

The present study aimed at exploring the potential of the exam villa as a setting-based initiative to reduce stress in university students. The DCM states decision latitude to be a central factor that is directly associated with positive effects. Therefore, we assume that using the villa would lead to an increase in decision latitude which can in turn reduce study-related stress and enhance satisfaction. To our knowledge, no empirical studies have examined whether such a structural initiative to reduce stress among students turns out to be an effective means. In addition, little is known about resourceful influential factors during prolonged academic examination stress in higher education contexts. Accordingly, we derived the following research hypotheses:

Hypothesis 1a. Villa students perceive significantly higher levels of decision latitude compared to non-villa students with no between-group differences on demands.

Hypothesis 1b. Villa students report both significantly lower levels of stress and higher levels of satisfaction compared to non-villa students.

Hypothesis 2a. Villa use significantly predicts stress even when important predictors such as the demand-control dimensions and other control variables are considered.

Hypothesis 2b. Villa use significantly predicts satisfaction even when important predictors such as the demand-control dimensions and other control variables are considered.

Hypotheses 3a. Decision latitude significantly mediates the relationship between villa use and stress.

Hypotheses 3b. Decision latitude significantly mediates the relationship between villa use and satisfaction.

2. Method

2.1. Sample and procedure

Our study consisted of $N = 205$ students (65% female) from one large German university. All of them were advanced law students enrolled for at least six semesters ($M = 9.21$, $SD = 1.64$). To participate in the study, students had to meet the inclusion criterion of being in the midst of their exam preparation to pursue their first law degree. At the time of data collection, there was a total number of $N = 393$ students in exam preparation. There were no exclusion criteria other than that. Students varied in time spent for their exam preparation which ranged from 12 to 24 months. An amount of $n = 41$ students used a personal workspace in the exam villa (“villa students”). Since there are only 50 spaces available in the exam villa, we reached 82% of all villa students which can be interpreted as a representative subsample. All other students did not use a workspace in the villa (“non-villa students”). The mean age was 24.22 years ($SD = 2.19$). Data were collected cross-sectionally in early 2017 using economic self-report measures. Paper-and-pencil questionnaires were handed out in exam-relevant seminars and in the exam villa itself. We also informed students about the study on the faculty’s website. To obtain a representative sample, we also contacted various cohorts of students who were in the process of preparing for their examinations via an internal faculty email distribution list. Identical online questionnaires were made available by sending students emails that included a questionnaire link. This made it possible to reach more participants because the majority of students no longer attend regular courses during exam preparation. Each questionnaire took about 20 min to complete, and informed consent was obtained. Students completed the questionnaires mostly at their homes or at the exam villa if they owned a personal workspace. The paper questionnaires could be anonymously dropped into a designated ballot box. Students received no financial compensation for their participation. The entire study got supervised and approved by the local ethics committee.

2.2. Measures

2.2.1. Demands and decision latitude

We measured perceived study demands and decision latitude using the questionnaire on structural conditions (*StrukStud*; Schmidt et al., 2018). The questionnaire stems from research based on the DCM and its corresponding Job Content Questionnaire (Karasek, 1979, 1985; Karasek et al., 1998) that received further refinement and adaptation to fit the situation of university students (Schmidt et al., 2018). We focused on the two core dimensions, namely study demands and decision latitude. Decision latitude includes the subdimensions skill discretion and decision authority to assess structural study conditions during exam preparation. Students were asked to answer demands with seven items [e.g., “In my studies, I have to work hard” and “In my studies, I have enough time to get tasks done (reverse coded)”] and decision latitude with eight items (e.g., “In my studies, I develop my own special abilities” and “My studies allow me to make my own decisions”). The answer

format was a rating scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). We decided to remove one demand item and three decision latitude items due to better fit to the situation of advanced law students as well as to insufficient singular factor loadings of these items within the structural equation models. Internal consistencies were $\alpha = 0.76$ for demands and $\alpha = 0.69$ for decision latitude.

2.2.2. Study-related stress

We assessed students’ stress with the Leipzig Short Questionnaire on Chronic Stress (LKCS; Reschke and Schröder, 2016; Reschke and Mätzchen, 2020). This measure was developed as a screening tool in the realm of a stress management training program targeting adults in their working contexts (Reschke and Schröder, 2010). We applied it to the situation of advanced law students and considered prolonged exam preparation to be the students’ working context. The brief questionnaire contains seven items that intend to measure seven different domains of chronic stress: (1) loss of control (“I have the feeling of being rushed, trapped or cornered”), (2) loss of meaning (“I sometimes ask myself if all the effort is actually worth it”), (3) negative emotions (“Dissatisfaction and frustration are parts of my everyday life”), (4) early psychosomatic symptoms/sleep disorder (“I wake up regularly during the night or long before I have to get up”), (5) inability to rest (“Even after days off and hours of rest, I feel drained and lethargic”), (6) burden of critical life event (“There are sensitive aspects of my life that upset me when I merely think of them”), and (7) lack of social support (“When I want to talk about my problems, it is hard to find someone who will listen and understand”). Students answered all items on a rating scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). We excluded the single item on social support from our analyses due to the assumed confounding effect of other people. The internal consistency was $\alpha = 0.79$.

2.2.3. Study-related satisfaction

We measured satisfaction with the Satisfaction with Life and Studies Scale (LSZ; Holm-Hadulla and Hofmann, 2007). This questionnaire builds on the Satisfaction With Life Scale (Diener et al., 1985) and concentrates on the satisfaction component of subjective wellbeing and its cognitive evaluation. The scale we used contained seven items and was tailored to higher education research by including study satisfaction as a subdomain of life satisfaction. We assumed both life and study satisfaction to be mutually important during exam preparation, and previous studies report all items to load on a single factor with $\alpha = 0.79$ (Holm-Hadulla et al., 2009; Schmidt et al., 2018). The life satisfaction domain included four items that measured students’ satisfaction with their personal life situation in terms of their perceived performance and functioning as well as overall life satisfaction (“How healthy and productive do you currently feel?” “How well do you currently manage yourself?” “How well do you currently get along with others?” and “How satisfied are you with your current life?”). The study satisfaction subdomain contained three items that focused on performance and situational aspects of studying (“How satisfied are you with your current academic achievements?” “How

satisfied are you with your current study situation?” and “How satisfied are you with your current general study conditions?”). Students were asked to refer back to the last 7 days and answer all items on a rating scale ranging from 1 (*not at all*) to 5 (*very much*). We excluded one life satisfaction item from our analyses because we assumed a confounding effect of other people (“How well do you currently get along with others?”). The internal consistency was $\alpha = 0.83$.

2.2.4. Use of exam villa

We also wanted to know whether students used a personal workspace in the exam villa during exam preparation. Compared to students that did not use the villa, villa students could benefit from an exclusive learning environment with rooms for group learning and other amenities. Students could use their workspaces day and night including weekends for up to 12 months and reported their frequency of use on a brief rating scale with 0 (*never*), 1 (*sometimes*), and 2 (*often*).

2.2.5. Control variables

We added three more variables to control for potential confounding effects. First, we included workload to assess the overall study effort that students would dedicate to their exam preparation in terms of hours spent per week (“How much time per week do you usually spend on your studies?”). Second, we considered time to examination as we expected this variable to influence subjective stress and satisfaction levels. Studies have shown increased subjective stress levels during examination periods when compared to pre-examination periods (e.g., Lyndon et al., 2014; Giglberger et al., 2022). Students got to choose their temporal distance to their planned exam campaign (*March 2017*, *September 2017*, *March 2018*, and *September 2018*). Third, we also included a brief measure to assess students’ personality traits because neuroticism is known to serve as a potential negativity bias in studies with subjective stress ratings (Schmidt et al., 2015). We applied the Big Five Inventory-10 to measure important personality dimensions with 10 items (*BFI-10*; Rammstedt and John, 2007). To account for negative affectivity, we focused on the neuroticism subscale that contained two items (“I see myself as someone who is relaxed, handles stress well (reverse coded)” and “I see myself as someone who gets nervous easily”). Students rated both items on a rating scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*).

2.3. Statistical analyses

2.3.1. *t*-tests for independent samples

We applied a set of *t*-tests for independent samples to examine the role of villa use on the demand-control dimensions between villa students and non-villa students (Hypothesis 1a). We also wanted to know whether both groups differed on study-related stress and satisfaction (Hypothesis 1b). For interpreting the magnitude of the mean differences, we calculated effect sizes (Cohen’s *d*).

2.3.2. Structural equation models

We used structural equation modeling (SEM) to predict study-related stress and satisfaction during exam preparation. Specifically, we wanted to know whether villa use would serve as a significant predictor of both outcomes over and beyond the demand-control dimensions as well as relevant control variables. Based on the findings of previous research, we modeled the data with a hierarchical approach and included the variables in three subsequent steps depending on their presumed importance and novelty (Sieverding et al., 2013; Schmidt et al., 2015). Therefore, we specified three models for each outcome that would each take more variables into consideration. In the first step, we set up a baseline model that included sex, age, time to examination, workload, and neuroticism as relevant control variables. In this first model, all predictor variables were assessed with one item and thus modeled as manifest variables except for neuroticism. In the second step, we added demands and decision latitude as further predictor variables. Both dimensions were specified as latent variables with about five indicators each. The third and last step introduced villa use as our central between-subject variable to examine whether it would still make a relevant contribution toward explaining both outcomes. Villa use was assessed with one item and thus specified as a manifest variable. Both study-related stress and satisfaction were modeled as latent variables with six indicators each. All SEMs were computed using Mplus 7.11 (Muthén and Muthén, 2013).

2.3.3. Mediation

We also used SEM to analyze the role of the demand-control dimensions and whether decision latitude in particular would mediate the relationship between villa use and study-related stress and satisfaction (Hypothesis 3a+b). We computed the indirect effects of villa use over the demand-control dimensions on both outcomes. Therefore, we first specified a basic model with villa use as a predictor for each outcome. We then computed two mediation models and specified the demand-control dimensions as mediators of the relationship between villa use and both outcomes.

2.3.4. Evaluation of model fit

To evaluate the model fits of our SEMs, we assessed the χ^2 -value with its degrees of freedom, the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Due to its dependency on sample size often leading to significant values, we interpreted the χ^2 value with caution (Ullman, 2007). CFI values >0.95 , RMSEA values <0.06 , and SRMR values <0.08 are considered good model fits (Hu and Bentler, 1999; West et al., 2012). Because the literature remains inconclusive about the final definition of a “good” model, we considered the fit of a model as satisfactory when the majority of the three fit indices (CFI, RMSEA, and SRMR) were within an acceptable range (Lai and Green, 2016).

2.3.5. Missing data

To handle missing data, we used the full information maximum likelihood (FIML) approach within Mplus. This method has the advantage to produce less biased estimates than traditional methods

such as listwise or pairwise deletion. FIML estimates the model parameters by taking cases with missing values into consideration while maintaining statistical power (Schafer and Graham, 2002; Enders, 2010).

2.3.6. Confidence intervals

We computed confidence intervals (95%) to examine the significance of an indirect effect within the mediation models. Each mediator was tested using the bootstrap method in Mplus with 10,000 drawn samples. Mediation occurred when indirect effects significantly differed from zero in that the confidence intervals did not include zero.

3. Results

3.1. Descriptive statistics and intercorrelations

Means (*M*), standard deviations (*SD*), and intercorrelations between the examined variables are presented in Table 1 and briefly mentioned in the following. Villa use was related to study-related stress ($r = -0.20, p < 0.01$) and satisfaction ($r = 0.15, p < 0.05$) as well as to decision latitude ($r = 0.15, p < 0.05$) and time to examination ($r = -0.16, p < 0.05$). Stress was associated with demands ($r = 0.56, p < 0.001$) and decision latitude ($r = -0.39, p < 0.001$) as well as neuroticism ($r = 0.44, p < 0.001$) and age ($r = 0.16, p < 0.05$). Satisfaction was correlated with all variables [e.g., stress ($r = -0.70, p < 0.001$), demands ($r = -0.47, p < 0.001$), and decision latitude ($r = 0.46, p < 0.001$)] except for workload. The demand-control dimensions also correlated with each other ($r = -0.32, p < 0.001$). There were also other significant intercorrelations that can be seen in Table 1.

3.2. *t*-tests

With regard to hypothesis 1a, the results of the independent *t*-tests supported that villa students differed on their perceived decision latitude but not on demands. On average, villa students ($M = 2.57, SD = 0.47$) perceived significantly higher levels of decision latitude than non-villa students [$(M = 2.38, SD = 0.53), t_{(198)} = -2.06, p = 0.041, d = 0.36$], although they did not differ on demands [$t_{(198)} = 0.66, p = 0.51$]. The effect size of the difference in decision latitude is small to medium and suggests that villa students perceived more control over their study situation during exam preparation than non-villa students.

Turning to hypothesis 1b, the results of independent *t*-tests supported that students who used the exam villa differed in their experienced study-related stress and satisfaction compared to students who did not use it. On average, villa students ($M = 2.34, SD = 0.7$) reported significantly lower stress levels than non-villa students [$(M = 2.68, SD = 0.66), t_{(198)} = 2.91, p = 0.004, d = 0.51$]. In addition, villa students ($M = 2.75, SD = 0.70$) reported significantly higher satisfaction levels than non-villa students [$(M = 2.49, SD = 0.73), t_{(198)} = -2.01, p = 0.046, d = 0.35$]. Both effect sizes are about medium in magnitude and indicate meaningful

TABLE 1 Descriptive statistics and intercorrelations among the study variables.

Variables	<i>M</i>	<i>SD</i>	Min	Max	<i>S</i>	<i>K</i>	2	3	4	5	6	7	8	9
1. Age	24.22	2.19	21	42	3.52	23.30	-0.12	0.00	0.12	0.06	-0.05	0.16*	-0.16*	0.08
2. Time to examination	1.75	0.83	1	4	0.75	-0.42		-0.19**	0.19**	0.16*	0.02	-0.06	0.18**	-0.16*
3. Workload	45.93	12.15	10	80	0.04	0.50			-0.03	0.19**	0.10	0.10	-0.10	0.12
4. Neuroticism	3.25	1.03	1	5	-0.16	-0.89				0.30***	-0.19**	0.44***	-0.33***	-0.13
5. Study demands	3.35	0.45	1.67	4.00	-0.64	0.12					-0.32***	0.56***	-0.47***	-0.05
6. Decision latitude	2.41	0.53	1	3.80	-0.11	-0.19						-0.39***	0.46***	0.15*
7. Stress	2.62	0.69	1.17	4.00	-0.04	-0.62							-0.70***	-0.20**
8. Satisfaction	2.54	0.74	1	4.50	0.26	-0.35								0.15*
9. Villa use	0.40	0.80	0	1	1.47	0.17								---

S, Skewness; *K*, Kurtosis.
 * $p < 0.05$.
 ** $p < 0.01$.
 *** $p < 0.001$.

TABLE 2 Results of confirmatory factor analyses (CFA) for demands, decision latitude, study-related stress, and satisfaction.

Factor loadings and fit statistics	Demands	Decision latitude	Stress	Satisfaction
	β (SE)	β (SE)	β (SE)	β (SE)
Items				
Item 1	0.63 (0.06)	0.53 (0.07)	0.75 (0.04)	0.58 (0.06)
Item 2	0.53 (0.07)	0.75 (0.07)	0.59 (0.05)	0.71 (0.05)
Item 3	0.74 (0.05)	0.54 (0.07)	0.88 (0.03)	0.80 (0.04)
Item 4	0.56 (0.06)	0.42 (0.08)	0.34 (0.07)	0.56 (0.06)
Item 5	0.47 (0.07)	0.30 (0.08)	0.58 (0.05)	0.75 (0.04)
Item 6	0.64 (0.06)		0.56 (0.06)	0.51 (0.06)
Model fit				
χ^2	7.08	6.05	12.55	12.48
<i>df</i>	8	4	8	7
CFI	1.00	0.99	0.99	0.99
RMSEA	0.00	0.05	0.05	0.06
SRMR	0.02	0.02	0.03	0.03

SE, standard error.

differences which provides support that students who used the villa were both less stressed and more satisfied than students that did not use the villa to prepare their exams.

3.3. Structural equation models

The results of confirmatory factor analyses (CFA) for demands, decision latitude, study-related stress, and satisfaction are presented in Table 2. The results of a set of hierarchical SEMs are summarized in Table 3. When turning to the prediction of study-related stress, the first model (M1) including only control variables showed an acceptable fit [$\chi^2_{(43, N=205)} = 99.31, p < 0.001, CFI = 0.896, RMSEA = 0.080, SRMR = 0.053$]. We found time to examination ($\beta = -0.15, p < 0.05$) and neuroticism ($\beta = 0.64, p < 0.001$) to significantly predict stress. Both control variables explained 43% of variance in the outcome. The next model (M2) including the control variables and the demand-control dimensions also fitted the data to an acceptable degree [$\chi^2_{(205, N=205)} = 365.47, p < 0.001, CFI = 0.866, RMSEA = 0.062, SRMR = 0.061$]. Demands ($\beta = 0.59, p < 0.001$) significantly contributed to the prediction, while decision latitude did not predict stress. The overall explained variance increased to nearly 71%. The third model (M3) including the control variables, the demand-control dimensions, and villa use as predictors showed an acceptable fit as well [$\chi^2_{(220, N=205)} = 395.12, p < 0.001, CFI = 0.856, RMSEA = 0.062, SRMR = 0.060$]. We found that using the exam villa ($\beta = -0.13, p < 0.05$) significantly predicted the outcome and did so over and beyond the control variables as well as demands and decision latitude. Including the exam villa made up an additional amount of 2% in explained variance. Taken together, all predictors within the third model explained an overall variance of 73% in study-related stress. These results supported hypothesis 2a that using

the exam villa significantly predicted study-related stress during exam preparation.

When looking at the prediction of study-related satisfaction, the first model (M1) including only control variables showed a good fit [$\chi^2_{(41, N=205)} = 54.06, p = 0.08, CFI = 0.977, RMSEA = 0.039, SRMR = 0.040$]. Time to examination ($\beta = 0.31, p < 0.001$) and neuroticism ($\beta = -0.51, p < 0.001$) were significant predictors of satisfaction. These variables explained 32% of variance in the outcome. The next model (M2) including the control variables and the demand-control dimensions fitted the data well [$\chi^2_{(202, N=205)} = 273.03, p < 0.001, CFI = 0.941, RMSEA = 0.041, SRMR = 0.058$]. Demands ($\beta = -0.32, p < 0.01$) and decision latitude ($\beta = 0.41, p < 0.001$) significantly contributed to the prediction of satisfaction. The overall explained variance increased to nearly 61%. The third model (M3) including the control variables, the demand-control dimensions, and villa use as predictors also showed a good fit [$\chi^2_{(217, N=205)} = 314.50, p < 0.001, CFI = 0.922, RMSEA = 0.047, SRMR = 0.059$]. We found that villa use ($\beta = 0.06, p = 0.35$) did not significantly predict satisfaction. However, including villa use as a predictor made up an additional amount of 1% in explained variance. All in all, the predictors within the third model explained an overall variance of 62% in study-related satisfaction. Contrary to hypothesis 2b, villa use did not significantly predict satisfaction. Even though using the villa did not have a direct effect on satisfaction, it might be possible that villa use exerts an indirect effect. The upcoming section addresses the results of mediational analyses.

3.4. Mediation

With regard to hypotheses 3a and 3b, the results of two mediation models supported decision latitude to fully mediate

TABLE 3 Structural equation models predicting study-related stress and satisfaction.

Predictor variables, explained variance, and fit statistics	Stress			Satisfaction		
	M1	M2	M3	M1	M2	M3
Control variables						
Sex	−0.03	−0.03	−0.03	0.02	0.07	0.07
Age	0.07	0.04	0.05	−0.07	−0.06	−0.06
Time to examination	−0.15*	−0.21***	−0.23***	0.31***	0.29***	0.30***
Workload	0.11	−0.02	−0.01	−0.06	−0.06	−0.06
Neuroticism	0.64***	0.34***	0.33***	−0.51***	−0.21*	−0.21*
Main variables						
Demands		0.59***	0.59***		−0.32**	−0.33***
Decision latitude		−0.07	−0.06		0.41***	0.40***
Villa use			−0.13*			0.06
Explained variance	0.43	0.71	0.73	0.32	0.61	0.62
Model fit						
χ^2	99.31	365.47	395.12	54.06	273.03	314.50
<i>df</i>	43	205	220	41	202	217
CFI	0.896	0.866	0.856	0.977	0.941	0.922
RMSEA	0.080	0.062	0.062	0.039	0.041	0.047
SRMR	0.053	0.061	0.060	0.040	0.058	0.059

M1–M3, Models 1–3; *df*, degrees of freedom; CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.

Sex: 0 = female, 1 = male.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

the relationship between villa use as well as study-related stress and satisfaction. The mediational models and model fit indices are depicted in Figures 1A, B. The model fit indices indicated an acceptable model fit for both mediational models.

While villa use significantly predicted study-related stress and satisfaction in the basic models, these effects became non-significant when including demands and decision latitude as joint mediators. We found a significant indirect effect of villa use on stress through decision latitude [$\beta = -0.05$, CI (−0.14, −0.01)]. In addition, we found a significant indirect effect of villa use on satisfaction through decision latitude [$\beta = 0.09$, CI (0.01, 0.20)]. Demands did not significantly mediate the aforementioned relationships with none of the outcomes.

4. Discussion

This was the first study that examined whether using an exam villa as a supportive learning environment would act as a structural resource for study-related stress during a prolonged exam preparation period.

4.1. Villa as a structural resource

In line with hypothesis 1a, students that used the villa to prepare their final exams perceived more decision latitude (i.e., more

control over their study situation) than non-villa students, but there were no differences on demands. Previous studies showed academic demands to play an important role at the university level (Chambel and Curral, 2005; Sieverding et al., 2013; Schmidt et al., 2015). We, therefore, assumed that the academic pressures associated with exam preparation were challenging for all students in our sample. However, villa use did account for differences in decision latitude suggesting that villa students felt more empowered to master academic challenges. In line with the theoretical assumptions of the DCM, the villa appears to be a structural resource that helps students make their own decisions (e.g., starting to study early in the morning when libraries are still closed). This becomes especially important when high demands make students' individual resources such as health-promoting behaviors less likely to be maintained during exam preparation (e.g., sufficient sleeping or regular physical activity; Lobinger, 2016).

When shifting the focus to hypothesis 1b, villa students did indeed report lower levels of experienced stress and higher levels of satisfaction than non-villa students. These findings suggest that villa students that perceived higher levels of decision latitude also experience less stress. This is in line with previous work where students that reported higher levels of decision latitude (along with lower demands) were also less stressed during an examination period (Schmidt et al., 2015). Moreover, students that took advantage of the villa environment were more satisfied than students that did not use this structural resource. Meeting students' special needs during exam preparation periods could therefore

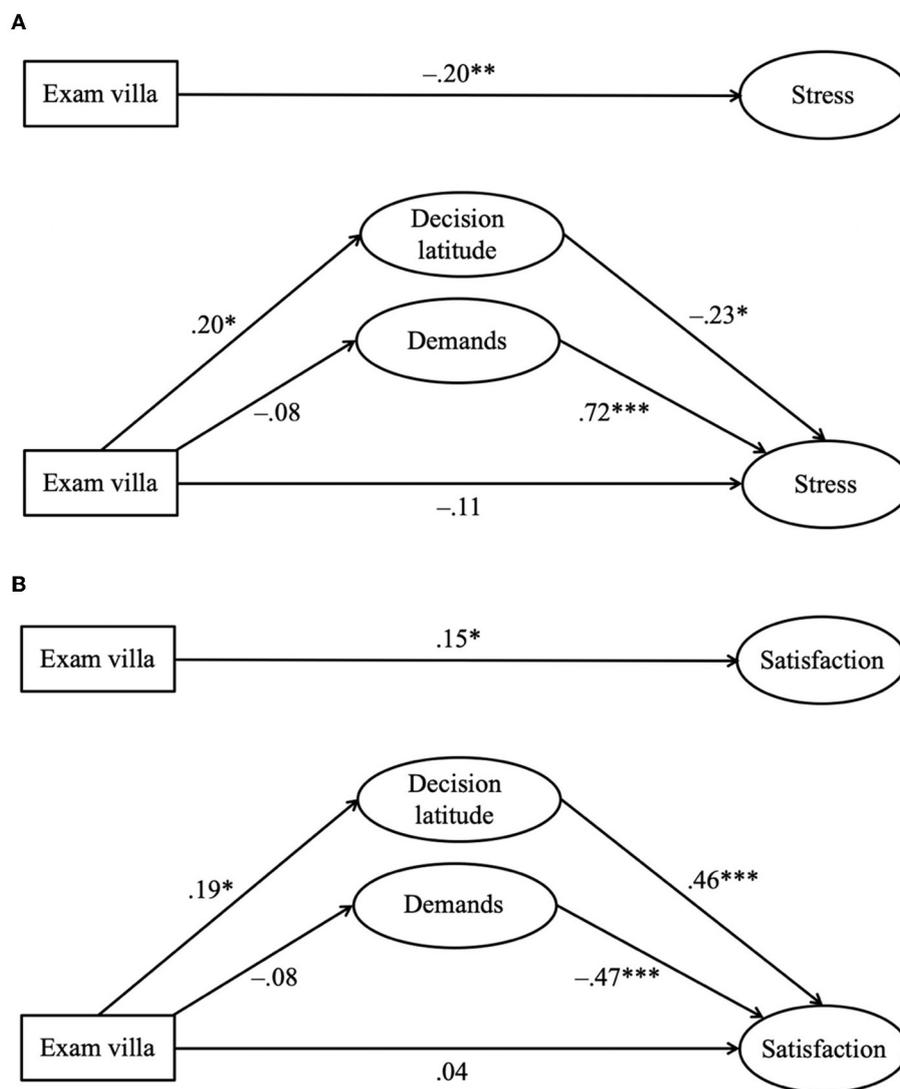


FIGURE 1

(A) Basic and mediational model for the relationship between villa use and study-related stress and its direct effects. Demands and decision latitude were included as mediators. Model fit: $\chi^2_{(129, N=205)} = 218.68, p < 0.001, CFI = 0.911, RMSEA = 0.058, SRMR = 0.089$. (B) Basic and mediational model for the relationship between villa use and study-related satisfaction and its direct effects. Demands and decision latitude were included as mediators. Model fit: $\chi^2_{(129, N=205)} = 251.38, p < 0.001, CFI = 0.884, RMSEA = 0.068, SRMR = 0.090$. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

be a promising way for improving both study conditions and students' wellbeing.

In line with our hypothesis 2a, villa use predicted study-related stress and did so over and beyond demands and decision latitude. Consistent with previous studies, demands were the strongest predictor of students' experienced stress (Chambel and Curral, 2005; Sieverding et al., 2013; Schmidt et al., 2015). Therefore, it was not surprising that stress was also strongly predicted by time to examination and neuroticism. The closer students were to the date of their respective exam campaign, the more stressed they felt. Our results point to the stress-reducing potential of the villa as a structural resource. Even though the additional amount of variance in stress explained by villa use was small, the villa had incremental validity. The villa had the power to assert itself as an important variable even over study demands as a strong

predictor. Therefore, the villa environment seems to play a role on how students experience the stressors associated with exam preparation. For the situation of advanced law students, this seems to be especially relevant because previous studies indicated students to suffer from high levels of stress during exam preparation (Busch, 1990; Sanders and Dauner-Lieb, 2013; Giglberger et al., 2022). Our results underline the importance of the villa as a structural resource because of its power to predict stress in the face of prolonged and challenging study periods.

When turning to hypothesis 2b, villa use did not make a significant contribution to explaining study-related satisfaction over the demand-control dimensions. Consistent with previous studies, decision latitude was the strongest predictor of students' experienced satisfaction (Chambel and Curral, 2005; Sieverding et al., 2013). Satisfaction was also strongly predicted by time to

examination and neuroticism. That means that students felt more satisfied when there was more time left until they had to face the examination. There are two potential reasons why the villa could not significantly predict satisfaction. First, demands and decision latitude were both strong predictors of students' satisfaction in our study. This is why villa use most likely did not make a surmounting contribution to explaining satisfaction. Second, we assumed decision latitude to be a mediator of the relationship between villa use and study-related satisfaction and stress.

4.2. Decision latitude as a mediator

In line with hypothesis 3a, we did indeed find decision latitude to mediate between villa use and stress. We found an indirect effect of villa use on students' stress over decision latitude. This means that decision latitude explains the relationship between villa use and stress. Turning to hypothesis 3b, we did also find decision latitude to be a mediator of the relationship between villa use and satisfaction. Again, we found an indirect effect of villa use on students' satisfaction over decision latitude. These findings support the role of the villa as a structural resource in impacting stress and satisfaction by increasing decision latitude. The villa constitutes a structural resource because of decision latitude being the crucial component by providing students with more control over their study situation. The villa is a supportive environment that offers different learning opportunities. Students become empowered to take an active role in selecting and organizing learning tasks.

We did not find an indirect effect of villa use on stress and satisfaction via demands. Consistent with our expectations, villa use did not have an effect on students' perceived demands. Again, this indicates the villa to be a structural resource that provides a structure in which students can experience more space and freedom in a literal meaning (Lobinger, 2016). Consistent with what is known in stress research, it is not about the demands but rather about the resources that make the difference for successful coping with a given situation. The villa is a structural resource that has positive effects on students' stress and satisfaction mediated by decision latitude. Our findings are in line with research on setting-based initiatives for stress reduction that showed available study resources to have positive effects on various student outcomes (e.g., Robins et al., 2015; Fernandez et al., 2016).

4.3. Limitations and implications for future research

The present study has some limitations that need to be mentioned. First, our cross-sectional design limits causal conclusions, and future research should follow students over longer periods of time to examine the positive effects of setting-based initiatives. We gathered data using self-reports which should be accompanied by physiological stress assessments such as cortisol levels in saliva. Furthermore, the sample consisted of advanced law students only which could make it difficult to generalize the results to other groups of students. We only reached nearly 50% of the total sample of law students in their exam preparation.

It is possible that students who took part in the study were more interested in the topic and had higher levels of motivation. However, we tried to avoid bias in the effects on the outcomes by including a set of control variables (e.g., neuroticism). Due to limited workspaces available in the exam villa, there also was a large difference in the number of villa students vs. non-villa students. It is important to note, however, that villa students did not significantly differ on any of the control variables compared to non-villa students. Nonetheless, future studies should use randomization to avoid self-selection biases and allocate students to the villa (experimental group) vs. non-villa (control group). An experimental manipulation should include a pre-post design to examine the causal effects of exam villa use. Yet, this would be challenging because this approach would limit students' freedom to decide how they want to study to prepare for their examinations. In turn, students would likely experience less decision latitude which could make exam preparation more stressful and less satisfying. Future research should also consider assessing the actual time of villa use by asking students how many hours per day/week they use their individual workspace. This approach would also create more variance in the villa variable which is likely to have a positive effect on the relationships with the outcomes. Additionally, we only focused on study-related stress and satisfaction as outcomes. Future work should examine whether villa use and the demand-control dimensions can also predict students' achievement. It would be worthwhile to know whether structural resources such as an exam villa can have positive effects on academic grades both in mock examinations within exam preparation and in the final examinations themselves. In this context, it would also be interesting to examine whether the relationship between villa use and grades is mediated by satisfaction. Finally, even though the data on which the study is based date from 2017, we assume that this does not diminish the significance of the results. The examination structure of law studies in Germany has remained unchanged for centuries (Heidebach, 2022).

4.4. Implications for theory and practice

Our study has important theoretical and practical implications for preventing and intervening efforts in higher education contexts. Our study showed that the DCM (Karasek, 1979) can be applied to university students to predict and explain stress. Going beyond previous studies, we were able to apply the model to the situation of students who were in a study phase of prolonged academic stress. Consistent with the DCM, the use of a structural resource appears to have a positive effect on both students' stress experiences and satisfaction and this effect is due to an increased perception of decision latitude. Law students undergoing exam preparation have to deal with high academic demands, but their perceived capacity to influence decisions that affect their everyday learning seems to be an important resource. Decision latitude is exerting an effect that goes beyond demands. This leads us to assume that high levels of decision latitude are more important than high levels of demands for certain work-related contexts such as in exam preparation. In terms of DCM, it is possible that a work situation with a high demand profile does not require exactly the same

level of decision latitude, but rather that its level must exceed demands to be experienced as an active work situation. According to the DCM, students who used the villa can be counted to the active job category. In contrast, students who did not have access to the villa can be counted in the high-strain job category. The findings that villa students had lower stress levels and higher levels of satisfaction compared to non-villa students can be seen as a confirmation of the DCM in the university context. Our study goes beyond prior work because it looked at the demand-control dimensions as potential mediators between work-related initiatives and psychological outcomes.

As practical implications, the results suggest to act on structural conditions by increasing decision latitude. Structural resources that are rooted within the study environment are likely to be more profound and sustainable than common individual-based initiatives such as student counseling or stress management seminars. This is because supportive learning environments help students better cope with academic demands as they occur in everyday study situations. Universities would do well to realize concepts like the exam villa to contribute to a better learning atmosphere. Such study environments bring with them motivational effects that create a common learning spirit and contribute to facilitating supportive action at universities. Once established, concepts like the villa can make students of different cohorts benefit from the same structure over years. This brings with it an important advantage when compared to individual-based initiatives that are usually finite in time and require staff for maintenance (e.g., student counseling services). Universities are advised to not only create supportive initiatives but also spread the word and actively invite students to take part and benefit.

5. Conclusion

Higher education institutions pose unique environments where the setting has a substantial impact for helping students to pursue their studies successfully (Fernandez et al., 2016). This was the first study to show that using an exam villa poses an innovative structural resource during challenging study periods. As a setting-based initiative, advanced law students that used the villa for preparing their final exams experienced less study-related stress and more satisfaction. Decision latitude played a central role for these positive effects to unfold. Structural initiatives such as the villa make up promising learning environments that contribute to the reduction of stress beyond individual-based initiatives.

References

- Amanvermez, Y., Rahmadiana, M., Karyotaki, E., de Wit, L., Ebert, D. D., Kessler, R. C., et al. (2020). Stress management interventions for college students: A systematic review and meta-analysis. *Clin. Psychol.: Sci. Pract.* doi: 10.1111/cpsp.12342
- Beiter, R., Nash, R., McCrady, M., Rhoades, D., Linscomb, M., Clarahan, M., et al. (2015). The prevalence and correlates of depression, anxiety, and stress in a sample of college students. *J. Affect. Disord.* 173, 90–96. doi: 10.1016/j.jad.2014.10.054
- Busch, M. (1990). Die Vorbereitung auf das Erste juristische Staatsexamen – Eine Umfrage unter Freiburger Examensabsolventen [Preparation for the First State Examination in Law - A Survey Among Freiburg Graduates]. *Juristische Schulung* 12, 1028–1029.
- Campbell, R., Soenens, B., Beyers, W., and Vansteenkiste, M. (2018). University students' sleep during an exam period: The role of basic psychological needs and stress. *Motivat. Emot.* 42, 671–681. doi: 10.1007/s11031-018-9699-x
- Chambel, M. J., and Curral, L. (2005). Stress in academic life: Work characteristics as predictors of student well-being and performance. *Appl. Psychol.* 54, 135–147. doi: 10.1111/j.1464-0597.2005.00200.x

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Ethikkommission der Fakultät für Verhaltens- und Empirische Kulturwissenschaften der Ruprecht-Karls-Universität Heidelberg. The patients/participants provided their written informed consent to participate in this study.

Author contributions

TR conducted data collection, designed the study, and wrote the manuscript. TL supervised data collection and manuscript. KR performed the data analyses and wrote the methods section of the manuscript. All authors contributed to the article and approved the submitted version.

Funding

This work was funded by the Federal Ministry of Education and Research (BMBF) and Baden-Württemberg under the Excellence Strategy of the Federal Government and the Länder.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

- Cotton, S. J., Dollard, M. F., and de Jonge, J. (2002). Stress and student job design: Satisfaction, well-being, and performance in university students. *Int. J. Stress Manag.* 9, 147–162. doi: 10.1023/A:1015515714410
- Diener, E., Emmons, R. A., Larsen, R. J., and Griffin, S. (1985). The satisfaction with life scale. *J. Personal. Assess.* 49, 71–75. doi: 10.1207/s15327752jpa4901_13
- Duan, H., Yuan, Y., Zhang, L., Qin, S., Zhang, K., Buchanan, T. W., et al. (2013). Chronic stress exposure decreases the cortisol awakening response in healthy young men. *Stress* 16, 630–637. doi: 10.3109/10253890.2013.840579
- Enders, C. K. (2010). *Applied Missing Data Analysis*. New York, NY: Guilford Press.
- Fernandez, A., Howse, E., Rubio-Valera, M., Thorncraft, K., Noone, J., Luu, X., et al. (2016). Setting-based interventions to promote mental health at the university: A systematic review. *Int. J. Public Health* 61, 797–807. doi: 10.1007/s00038-016-0846-4
- Giglberger, M., Peter, H., Kraus, E., Kreuzpointner, L., Zänkert, S., Henze, G.-I., et al. (2022). Daily life stress and the cortisol awakening response over a 13-months stress period—Findings from the LawSTRESS project. *Psychoneuroendocrinology* 2022, 105771. doi: 10.1016/j.psyneuen.2022.105771
- Heidebach, M. (2022). “Didaktik der Examensvorbereitung [Didactics of exam preparation],” in *Rechtswissenschaft lehren - Handbuch der juristischen Fachdidaktik*, ed J. Krüper (Tübingen: Mohr Siebeck), 1147–1179.
- Holm-Hadulla, R. M., and Hofmann, F.-H. (2007). *Lebens- und Studienzufriedenheitsskala [Satisfaction With Life and Studies Scale]*. Berlin: Deutsches Studentenwerk.
- Holm-Hadulla, R. M., Hofmann, F.-H., Sperth, M., and Funke, J. (2009). Psychische Beschwerden und Störungen von Studierenden. Vergleich von Feldstichproben mit Klienten und Patienten einer psychotherapeutischen Beratungsstelle [Psychological complaints and mental disorders of students. Comparison of field study samples with clients and patients of a psychotherapeutic counseling center]. *Psychotherapeut* 54, 346–356. doi: 10.1007/s00278-009-0693-3
- Hu, L. T., and Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Eq. Model.* 6, 1–55. doi: 10.1080/10705519909540118
- Karasek, R. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Admin. Sci. Quart.* 24, 285–308. doi: 10.2307/2392498
- Karasek, R. (1985). *Job Content Questionnaire and User's Guide*. Lowell: University of Massachusetts, Lowell, Department of Work Environment.
- Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., and Amick, B. (1998). The job content questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics. *J. Occup. Health Psychol.* 3, 322–355. doi: 10.1037/1076-8998.3.4.322
- Karasek, R., and Theorell, T. (1990). *Healthy Work: Stress, Productivity, and the Reconstruction of Working Life*. New York, NY: Basic Books.
- Lai, K., and Green, S. B. (2016). The problem with having two watches: Assessment of fit when RMSEA and CFI disagree. *Multivar. Behav. Res.* 51, 220–239. doi: 10.1080/00273171.2015.1134306
- Lazarus, R. S., and Folkman, S. (1984). *Stress, Appraisal, and Coping*. New York, NY: Springer Publishing Company.
- Lobinger, T. (2016). “Verbesserungen in der juristischen Examensvorbereitung: Das Heidelberg Modell (HeidelPräp!) [Improvements in legal exam preparation: The Heidelberg Model (HeidelPräp!)],” in *Handbuch Qualität in Studium und Lehre*, eds J. Kohler, P. Pohlentz, and U. Schmidt (Berlin: DUZ Verlags- und Medienhaus GmbH), 115–128.
- Lyndon, M. P., Strom, J. M., Alyami, H. M., Yu, T.-C., Wilson, N. C., Singh, P., et al. (2014). The relationship between academic assessment and psychological distress among medical students: A systematic review. *Perspect. Med. Educ.* 3, 405–418. doi: 10.1007/S40037-014-0148-6
- Multrus, F., Majer, S., Bargel, T., and Schmidt, M. (2017). *Studiensituation und studentische Orientierungen. 13. Studierendensurvey an Universitäten und Fachhochschulen [Study Situation and Student Orientation. 13th Student Survey at Universities and Universities of Applied Sciences]*. Bonn; Berlin: BMBF.
- Muthén, L. K., and Muthén, B. O. (2013). *Mplus Version 7.11 [Computer Software]*. Los Angeles, CA: Muthén & Muthén.
- Rabkow, N., Pukas, L., Sapalidis, A., Ehring, E., Keuch, L., Rehnisch, C., et al. (2020). Facing the truth—A report on the mental health situation of German law students. *Int. J. Law Psychiatry* 71, 101599. doi: 10.1016/j.ijlp.2020.101599
- Rammstedt, B., and John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *J. Res. Personal.* 41, 203–212. doi: 10.1016/j.jrp.2006.02.001
- Reschke, K., and Mätzchen, F. (2020). *Leipziger Kurzfragebogen für Chronischen Stress LKCS*. Berichte aus der Psychologie. Düren: Shaker Verlag.
- Reschke, K., and Schröder, H. (2010). *Optimistisch den Stress meistern: Ein Programm für Gesundheitsförderung, Therapie und Rehabilitation [Mastering Stress Optimistically: A Program for Health Promotion, Therapy, and Rehabilitation]*. Tübingen: DGVT-Verlag.
- Reschke, K., and Schröder, H. (2016). Der Leipziger Kurzfragebogen Chronischer Stress [The Leipzig short questionnaire chronic stress]. *Verhaltenstherapie Psychosoziale Praxis* 48, 621–642.
- Ribeiro, I. J. S., Pereira, R., Freire, I. V., de Oliveira, B. G., Casotti, C. A., and Boery, E. N. (2018). Stress and quality of life among university students: A systematic literature review. *Health Prof. Educ.* 4, 70–77. doi: 10.1016/j.hpe.2017.03.002
- Robins, T., Roberts, R., and Sarris, A. (2015). Burnout and engagement in health profession students: The relationships between study demands, study resources and personal resources. *Austral. J. Org. Psychol.* 8, E1. doi: 10.1017/orp.2014.7
- Robotham, D., and Julian, C. (2006). Stress and the higher education student: A critical review of the literature. *J. Further High. Educ.* 30, 107–117. doi: 10.1080/03098770600617513
- Sanders, A., and Dauner-Lieb, B. (2013). Lernlust statt Examensfrust: Strategien und Tipps erfolgreicher Absolventen [Desire to learn instead of exam frustration: Strategies and tips from successful graduates]. *Juristische Schulung* 4, 380–384.
- Schafer, J. L., and Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychol. Methods* 7, 147–177. doi: 10.1037/1082-989X.7.2.147
- Schmidt, L. I., Scheiter, F., Neubauer, A., and Sieverding, M. (2018). Anforderungen, Entscheidungsfreiräume und Stress im Studium: Erste Befunde zu Reliabilität und Validität eines Fragebogens zu strukturellen Belastungen und Ressourcen (StrukStud) in Anlehnung an den Job Content Questionnaire [Demands, decision latitude, and stress among university students: Findings on reliability and validity of a questionnaire on structural conditions (StrukStud) based on the job content questionnaire]. *Diagnostica* 65, 63–74. doi: 10.1026/0012-1924/a000213
- Schmidt, L. I., Sieverding, M., Scheiter, F., and Obergfell, J. (2015). Predicting and explaining students' stress with the demand-control model: Does neuroticism also matter? *Educ. Psychol.* 35, 449–465. doi: 10.1080/01443410.2013.857010
- Sieverding, M., Schmidt, L. I., Obergfell, J., and Scheiter, F. (2013). Stress und Studienzufriedenheit bei Bachelor- und Diplomstudierenden im Vergleich: Eine Erklärung unter Anwendung des Demand-Control-Modells [Study-related stress and satisfaction among bachelor and diploma students: An explanation with the demand-control model]. *Psychologische Rundschau* 64, 94–100. doi: 10.1026/0033-3042/a000152
- Ullman, J. B. (2007). “Structural equation modeling,” in *Using Multivariate Statistics*, eds B. G. Tabachnick and L. S. Fidell (Boston, MA: Allyn & Bacon/Pearson Education), 676–780.
- Upsher, R., Nobili, A., Hughes, G., and Byrom, N. (2022). A systematic review of interventions embedded in curriculum to improve university student wellbeing. *Educ. Res. Rev.* 37, 100464. doi: 10.1016/j.edurev.2022.100464
- Weik, U., and Deinzer, R. (2010). Alterations of postawakening cortisol parameters during a prolonged stress period: Results of a prospective controlled study. *Hormon. Behav.* 58, 405–409. doi: 10.1016/j.yhbeh.2010.06.001
- West, S. G., Taylor, A. B., and Wu, W. (2012). “Model fit and model selection in structural equation modeling,” in *Handbook of Structural Equation Modeling*, ed R. H. Hoyle (The Guilford Press), 209–231.
- Worsley, J. D., Pennington, A., and Corcoran, R. (2022). Supporting mental health and wellbeing of university and college students: A systematic review of review-level evidence of interventions. *PLoS ONE* 17, e0266725. doi: 10.1371/journal.pone.0266725
- Zunhammer, M., Eberle, H., Eichhammer, P., and Busch, V. (2013). Somatic symptoms evoked by exam stress in university students: The role of alexithymia, neuroticism, anxiety and depression. *PLoS ONE* 8, e84911. doi: 10.1371/journal.pone.0084911