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Fostering study crafting to increase engagement and reduce exhaustion among higher education students: A randomized controlled trial of the STUDYCoach online intervention

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Abstract

The study demands–resources framework states that study demands increase exhaustion and study resources increase engagement. Study crafting describes a student's proactive adaption to demands and resources. To date, no intervention in the higher education context has aimed to foster study crafting. Accordingly, this study developed and evaluated the STUDYCoach online intervention, which aimed to increase engagement and reduce exhaustion by promoting study crafting. The study was a randomized controlled trial with a waiting-list control group. All participants ($N = 209$) completed a questionnaire before (T1) and after (T2) the intervention and at a 20-week follow-up (T3). Participants in the intervention group ($n = 149$) used the STUDYCoach over three consecutive weeks. Results showed that overall study crafting, decreasing hindering demands, and engagement significantly increased in the intervention group

compared to the control group after the intervention. All effects remained stable at follow-up. Notably, exhaustion decreased significantly in the intervention group from T1 to T3 and T2 to T3. Study crafting mediated the intervention's effect on engagement and exhaustion. Our study extends the study demands–resources framework and the literature on job crafting by confirming that study crafting interventions can be effective in higher education.

KEYWORDS

engagement, exhaustion, higher education, online intervention, study crafting

INTRODUCTION

The Ottawa Charter identifies higher education institutions as an important area for health promotion (World Health Organization, 1986). Because many students will hold influential positions in organizations in the future, it is beneficial for them to gain experience in the field of health promotion during their studies to enable them to apply these skills in their professional lives to improve their health and the health of their employees (Dietz et al., 2020; Wörfel et al., 2016).

The study demands–resources (SD–R) framework (Lesener et al., 2020)––derived from the job demands–resources (JD–R) model (Demerouti et al., 2001)––states that demands are positively associated with burnout, whereas resources are positively associated with engagement and negatively associated with burnout (Lesener et al., 2020). However, students, like employees, are not passively exposed to demands and resources, meaning they can actively change them through crafting (i.e., "self-initiated change behaviors that employees engage in with the aim to align their jobs with their own preferences, motives, and passions," Tims et al., 2012, p. 173). Given the positive effects of job crafting, interventions to foster this behavior have been developed for the work context. Meta-analytic evidence indicates that job crafting interventions can significantly increase job crafting behavior and engagement (Oprea et al., 2019). The concept of job crafting has recently been incorporated into the SD–R framework as study crafting (cf., Choi & Shin, 2018; Dormann & Guthier, 2019; Mülder et al., 2022), but no interventions to increase study crafting behavior exist, despite the possibility that such interventions could positively impact higher education students as well (Körner et al., 2021).

The present study intends to close this gap by evaluating the STUDYCoach online intervention, an adaption of the EngAGE-Coach intervention developed for the work context (Janneck et al., 2018), that aims to foster study crafting. In doing so, we make three contributions to the literature. First, we developed the first intervention based on the SD–R framework that uses the bottom-up work design concept of study crafting for higher education students and investigated whether this STUDYCoach intervention can increase study crafting in the short and long term. Second, we contribute to research on student well-being by testing whether the STUDYCoach intervention can increase engagement and decrease exhaustion in the short and long term.

Third, we examined whether the effects of the intervention on engagement and exhaustion are mediated by study crafting. This approach contributes to further validation of the SD–R framework by examining whether an intervention can actively influence the paths postulated in that framework. Finally, this research should add to the often inconsistent research on job crafting interventions in general.

The study demands–resources framework

The SD–R framework (Lesener et al., 2020) enables the investigation of health-promoting and health-impairing processes in the higher education context (Lesener et al., 2020). The SD–R framework distinguishes two types of study characteristics: study demands and study resources.

Study demands are found at social, physical, organizational, and mental levels and are associated with physical or psychological costs because they require a high level of effort to manage (Lesener et al., 2020). Students are exposed to numerous study demands, including time pressure, overload, personal expectations, job search anticipation, and constant accessibility (Gusy et al., 2016; Herbst et al., 2016). Furthermore, the life phase of studying can produce demands by separating students from family and friends (Lesener et al., 2020). The COVID-19 pandemic has created further study-related demands via the shift to online classes, concerns about delayed graduation, increases to student workload, and social isolation (Koob et al., 2021; Werner et al., 2021). Additionally, students have experienced major uncertainties and concerns about their health and the health of family members and friends as well as financial worries due to unemployment (Wang et al., 2020).

Study resources are also present at social, physical, organizational, or mental levels and help students achieve goals, minimize study demands, and develop personally (Lesener et al., 2020). Important study resources include social support from lecturers or fellow students, autonomy, and opportunities for personal development (Gusy et al., 2016; Lesener et al., 2020). However, the COVID-19 pandemic has depleted resources such as social contacts due to online teaching. Additionally, extracurricular or social events have been canceled or postponed (Lederer et al., 2021).

Exhaustion and engagement in higher education students

According to Schaufeli et al. (2002), *burnout* describes a sense of exhaustion, an attitude of cynicism and detachment toward one's studies, and a sense of incompetence as a student. The exhaustion component is characterized by the feeling of being overwhelmed and represents the core dimension of burnout (Maslach et al., 2001). In an international review, Rosales-Ricardo et al. (2021) observed a 55% prevalence of exhaustion among higher education students. Given this high prevalence and following Demerouti et al. (2001), this study focuses on this core dimension of burnout.

Engagement is defined as a sustained positive motivational sense of fulfillment characterized by vigor, dedication, and absorption. Engagement is strongly related to academic performance and negatively associated with burnout (Salanova et al., 2009). Notably, engagement is significantly lower during online classes compared to face-to-face classes (Salta et al., 2022).

In response to the call for intervention programs aimed at reducing demands and increasing resources for higher education students (Jagodics & Szabó, 2022), the introduction of the

STUDYCoach aims to empower higher education students to decrease their study-related demands and increase their available resources. By enabling students to perform study crafting behavior, we expect to reduce exhaustion and increase engagement.

Job crafting and its applicability to the higher education context

Employees have long been considered passive performers of management-designed jobs, promoting job design based on top-down approaches (Tims & Bakker, 2010). However, these top-down measures cannot optimize the individual fit between employee and job, suggesting the need for measures initiated by the employee (Devotto & Wechsler, 2019). Accordingly, recent approaches have adopted a bottom-up perspective in response to insights demonstrating that employees can actively influence their workplace as job crafters (Tims & Bakker, 2010; Wrzesniewksi & Dutton, 2001).

Job crafting was originally defined as the physical and cognitive changes employees make to their tasks or relationships at work to better align their work with their needs and abilities (Wrzesniewksi & Dutton, 2001). Tims and Bakker (2010) embedded the concept of job crafting into the JD–R model and defined job crafting as changing one's job demands and job resources.

Tims et al. (2012) distinguished four job crafting strategies: increasing structural resources, increasing social resources, increasing challenging demands, and reducing hindering demands. Increasing structural resources refers to the design of the job and includes behaviors such as seeking development opportunities (Tims et al., 2012). Increasing social resources includes, for example, increasing the amount of feedback in the workplace (Tims et al., 2013). Increasing challenging demands includes taking on new tasks when employees feel as though their job does not utilize all of their existing skills (Tims et al., 2013; Tims & Bakker, 2010). Finally, reducing hindering demands involves employees relinquishing tasks or reducing demanding contacts when they feel overwhelmed (Tims & Bakker, 2010).

Meta-analytic evidence also suggests that job crafting relates positively to engagement and negatively to job strain and burnout (Lichtenthaler & Fischbach, 2019; Rudolph et al., 2017). Furthermore, JD–R theory recognizes job crafting as the mechanism by which employees achieve higher engagement (Bakker & Demerouti, 2017). Empirical findings confirm this theoretical assumption. A three-wave study by Vogt et al. (2016) confirmed that job crafting predicts engagement over time, research by Tims et al. (2013) demonstrated that job crafting helps build resources, which leads to a reduction in burnout and an increase in engagement. Oprea et al. (2019) confirmed in their meta-analysis that job crafting increases engagement.

The concept of job crafting has recently been incorporated into the SD–R framework with *study crafting* describing the student's proactive modification of the study environment (i.e., study demands and study resources). This behavior also aims to improve the fit between the study environment and the student's preferences, needs, and abilities (Körner et al., 2021).

Job crafting interventions

Given the positive effects of job crafting, interventions to promote job crafting behavior have been developed for the work context. Previous job crafting interventions have significantly increased both overall job crafting (e.g., van Wingerden et al., 2016; van Wingerden, Bakker, & Derks, 2017b) and the four strategies of increasing structural resources (e.g., van Wingerden,

Derks, & Bakker, 2017), increasing social resources (e.g., van Wingerden, Derks, & Bakker, 2017), increasing challenging demands (e.g., van Wingerden, Bakker, & Derks, 2017b), and reducing hindering demands (e.g., Gordon et al., 2018). Although most studies have examined effects immediately after the intervention, one study also examined the long-term effects of a job crafting intervention (van Wingerden, Bakker, & Derks, 2017a). Here, job crafting was found to increase immediately after the intervention and at follow-up 1 year after the intervention, suggesting that job crafting interventions may also have long-term effects. In the reported studies, the effect sizes for the significant time effect in the intervention group for the different job crafting strategies ranged from $\eta_p^2 = .04$ to $\eta_p^2 = .17$ (van Wingerden, Bakker, & Derks, 2017b, 2017a). Gordon et al. (2018) reported effect sizes between $\eta_p^2 = .04$ and $\eta_p^2 = .08$ for the significant interaction effect on reducing hindering demands. Several recent reviews and meta-analyses have been conducted due to the growing number of job crafting interventions. For instance, Devotto and Wechsler (2019) considered eight job crafting intervention studies in their review and found that each intervention significantly increased the implementation of at least one job crafting strategy. Elsewhere, Oprea et al. (2019) recently published a meta-analysis that considered 13 job crafting interventions. They confirmed statistically significant effects of the interventions on overall job crafting, increasing challenges, and reducing demands.

Concerning employee well-being, many intervention studies have observed increased engagement following job crafting interventions (e.g., Gordon et al., 2018; van Wingerden, Bakker, & Derks, 2017b). This has been confirmed via meta-analysis (Oprea et al., 2019). For engagement, van Wingerden, Bakker, and Derks (2017b) reported an effect size of $\eta_p^2 = .03$ for the significant time effect in the intervention group and Gordon et al. (2018) reported effect sizes between $\eta_p^2 = .07$ and $\eta_p^2 = .22$ for the significant interaction effect of time and group. Meanwhile, other studies have indicated that job crafting interventions can also reduce psychological distress (e.g., Sakuraya et al., 2016). Notably, all the studies mentioned thus far involved face-to-face interventions. However, more recently, Verelst et al. (2021) tested an electronic job crafting intervention and concluded that it represents an effective alternative to traditional interventions based on the observation of significant increases in job crafting following the tested intervention. Elsewhere, testing an online intervention as part of the EngAGE-Coach program, Uglanova and Dettmers (2022) recorded a significant reduction in irritation among participants of the intervention group.

Health promotion in higher education

Given the high rates of common mental health disorders among higher education students (Auerbach et al., 2018), various interventions target the mental health of this population. However, there are mixed results regarding effectiveness of these interventions. Reviews have predominantly revealed small effect sizes for interventions designed to prevent depression or anxiety (Amanvermez et al., 2020; Reavley & Jorm, 2010). In their review, Winzer et al. (2018) confirmed small but partially sustained effects of preventive interventions and interventions aimed at positive mental health.

Dietz et al. (2020) presented the criticism that most interventions are directed exclusively at certain students (i.e., from certain fields of study) who tend to be particularly at risk of health impairments. Indeed, students do not seek professional help for various reasons, including skepticism about treatment and preferring to solve problems alone or with the help of friends and family (Ebert et al., 2019; Eisenberg et al., 2007).

Notably, online interventions demonstrate several advantages over face-to-face interventions and can lower the threshold for student participation. For example, there is no waiting time for treatment, access is available regardless of time or location, and such interventions are cost-effective and counter stigma by ensuring anonymity (Ebert et al., 2013; Lutz-Kopp et al., 2019). However, although online interventions represent a valuable alternative––especially during the COVID-19 pandemic, with students largely off-campus (Benjet, 2020)––reviews of internet interventions to improve the mental health of higher education students have observed relatively small effects (Farrer et al., 2013; Harrer et al., 2019).

Recognizing the often limited effectiveness of previous interventions in the higher education context, Jagodics and Szabó (2022) recommended using interventions designed for other populations. Following this recommendation, this study adapts a job crafting intervention from the work context to the higher education context. We used an online intervention to reach many students and investigated long-term effects by conducting a follow-up measurement after 20 weeks.

The similarity between study and work (Ouweneel et al., 2011) and the theoretical and empirical findings from the work context concerning the impact of job crafting interventions on job crafting and employee well-being, as well as the mediation effects, led to the following hypotheses (see Figure 1):

Hypothesis 1. The intervention group (IG), as compared to the waiting-list control group (WCG), will show significantly higher levels of (a) overall study crafting, (b) increasing structural resources, (c) increasing social resources, (d) increasing challenging demands, and (e) decreasing hindering demands after the intervention (T2 and T3) compared with pre-intervention (T1) levels.

Hypothesis 2. The IG, as compared with the WCG, will show (a) significant increases in engagement and (b) significant decreases in exhaustion after the intervention (T2 and T3) compared with the pre-intervention (T1) levels.

Hypothesis 3. Study crafting after the intervention (T2) mediates the relationship between the intervention and (a) engagement and (b) exhaustion at follow-up (T3).

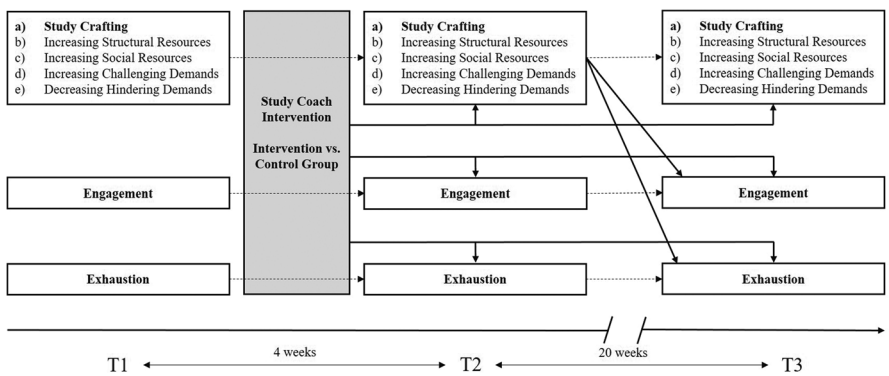

FIGURE 1 Overview of the study design and hypotheses. T1, pre-intervention; T2, post-intervention; T3, follow-up

METHOD

Participants and procedure

To estimate the required sample size, we conducted an a priori power analysis for a repeated measures analysis of variance in a 3×2 factorial design. Based on the results of prior job crafting intervention evaluations, we conducted our analysis assuming a small effect of $f = .1$ and a power of 80%. This indicated a sample of 164 participants. Therefore, we aimed to obtain full participation from at least 170 students. In accordance with meta-analytic evidence, we assumed an attrition rate of approximately 30% (cf., Farris et al., 2020) for the intervention and the control group (cf., Crutzen et al., 2013). This was taken into account accordingly during recruitment. The study population included all students at German higher education institutions. Student advisors and student councils at all German universities were contacted and asked to forward an email with information about the study to their students. To participate in our study, participants had to be enrolled at a German university and be at least 18 years old. Students could register for the study via email. In accordance with the ethical guidelines of the American Psychological Association, participation was voluntary, no financial compensation was provided, and informed consent was obtained before the study began (American Psychological Association, 2017). Psychology students could receive credits. Additionally, students who completed the study could access the STUDYCoach platform for three additional months. Approval for the study was obtained from the local ethics committee.

The study was a randomized controlled trial with a WCG. After students registered, they were randomly assigned (in turn) to one of three IGs or the WCG, with participants distributed equally among the four groups. The three IGs only differed in the sequence of presentation of the intervention modules, and they were combined into a single IG for further analyses. Participant information informed participants about the randomized group allocation and the fact that there would be two start dates for the intervention. The information about which group the participants were assigned to was sent to them by email before the intervention started. No blinding was used in our study. At the beginning of the study, all students received an email with their STUDYCoach login link, which allowed them to create their personal account. Students then completed the pre-intervention questionnaire (T1) on the STUDYCoach platform. The intervention comprised of three modules, with each module completed over 1 week. After completing the STUDYCoach intervention, participants completed the post-intervention questionnaire (T2). Twenty weeks after T2, participants completed the follow-up questionnaire (T3). After completing the follow-up questionnaire, the WCG was granted access to the STUDYCoach platform. Figure 1 illustrates the study design.

A total of 675 higher education students registered for the study. Of these, 518 completed the questionnaire at T1 (23.3% non-responders). The T2 questionnaire was completed by 352 participants (32.1% dropout from T1 to T2), and the follow-up questionnaire (T3) was completed by 213 participants (39.5% dropout from T2 to T3). Our final sample for data analysis included 209 participants who answered the questionnaire at all three measurement time points. A visualization of randomization and sample size over the course of the study is provided by the CONSORT flow diagram (Figure 2).

Of the 209 participants who completed the three questionnaires, 165 were women, 37 were men, and 4 were diverse (not specified: $n = 3$). Participants were, on average, 24.05 years old ($SD = 5.35$). Most participants (83.3%) were in a bachelor's degree program, 12.4% were in a master's degree program, and 0.5% were in a doctoral degree program (other: 3.8%). On average,

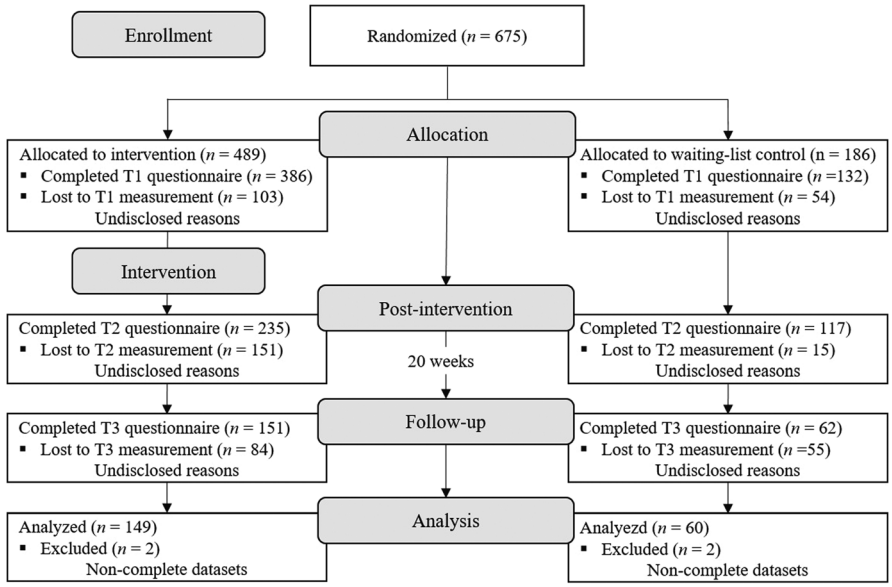

FIGURE 2 CONSORT flowchart showing participant flow. T1, pre-intervention; T2, post-intervention; T3, follow-up

participants were in their fourth semester of higher education ($M = 4.22$, $SD = 2.77$). Almost half of the participants indicated that they already had work experience ($n = 86$, 41.1%). Of the 209 participants, 149 were allocated to an IG (IG1: $n = 53$, IG2: $n = 52$, and IG3: $n = 44$). These participants were, on average, 24.01 years old ($SD = 5.32$), and 118 were female, 27 were male, and 2 were diverse, (not specified: $n = 2$). The 60 participants in the WCG were, on average, 24.13 years old ($SD = 5.47$), and 47 were female, 10 were male, and 2 were diverse (not specified: $n = 1$).

The STUDYCoach

The STUDYCoach intervention was adapted from the EngAGE-Coach intervention (Janneck et al., 2018) for the target group of higher education students by shortening some content and relating it to the study context and adding the Study Crafting module. The STUDYCoach intervention comprises three online modules, each of which participants complete independently over 1 week: My Study, My Study Environment, and Study Crafting. Each module features three submodules. All modules involve theoretical input and practical exercises supplemented by video and audio inputs. In the Study Crafting module, a fictional person is used to guide participants. The duration of each module is between 60 and 120 min. Table 1 provides an overview of the STUDYCoach intervention.

Measures

The questionnaires were identical across the three measurement time points (T1, T2, and T3), with the T1 questionnaire collecting the following demographic variables in addition to the

TABLE 1 The STUDYCoach modules and submodules with their respective contents

Modules	Submodules	Topics
My Study	Study organization	Setting priorities according to the Eisenhower method for efficient and structured study; analysis of own interruptions and strategies for reduction
	Self-motivation	Dealing with unpleasant tasks by implementing rewards
	Ergonomics	Analysis and ergonomic optimization of the workplace; analysis and ergonomic optimization of mobile workplaces; ergonomic exercises for in between, for example, back exercises
My Study Environment	Accessibility	Analysis of one's accessibility; definition of limits of one's accessibility for the creation of free spaces
	Social resources	Analysis and resolution of social conflicts; search for social support; dealing with difficult fellow students
	Networking	Analysis of the current network and strategies to increase/reduce contact; analysis of communication with the four-sided model (Schulz von Thun, 2021)
Study Crafting	Person and task analysis	Identification of one's tasks in the study; identification of one's values, needs, and strengths; increasing the fit between tasks and personal values, needs, and strengths (Berg et al., 2008)
	My study crafting	Reflection on one's study crafting behavior; getting to know the different study crafting strategies
	SMART goals	Setting two study crafting goals for the following two weeks using the SMART method (Doran, 1981)

outcome variables: age, gender, study degree, semester of higher education, and work experience. Cronbach's alphas appear in Table 2.

Study crafting was measured using a version of the German Job Crafting Scale (Lichtenthaler & Fischbach, 2016) adapted to the study context and shortened to 16 items. The subdimensions of *increasing structural resources* (e.g., "I try to develop myself further"), *increasing social resources* (e.g., "I ask my fellow students for advice"), *increasing challenging demands* (e.g., "I look for challenges in my activities"), and *reducing hindering demands* (e.g., "I make sure that my studies are less mentally demanding") were each surveyed via four items. Response to all items were collected using a 5-point Likert-type scale (1 = *not at all true*, 5 = *completely true*).

Engagement was measured using the Utrecht Work Engagement Scale-Student Form (Schaufeli et al., 2002), which includes three dimensions: vigor (e.g., "When I study, I feel like I am bursting with energy"), dedication (e.g., "I am enthusiastic about my studies"), and absorption (e.g., "I feel happy when I am studying intensely"). Each dimension includes three items answered on a 7-point Likert-type scale (1 = *never*, 7 = *always*).

Exhaustion was measured using the German version of the Maslach Burnout Inventory-Student Survey (Schaufeli et al., 2002). The scale comprises three items, for example, "I feel tired when I get up in the morning and I have to face another day at university". The items were answered on a 7-point Likert-type scale (1 = *never*, 7 = *always*).

TABLE 2 Correlation matrix and descriptive statistics

Variable	M	*SD*	1	2	3	4	5	6	7	8	9	10
1. Engagement T1	4.21	1.11	(.93)									
2. Exhaustion T1	3.36	1.30	−.51**	(.86)								
3. Study crafting T1	3.08	.44	.52**	−.23**	(.68)							
4. Increasing structural resources T1	4.02	.54	.52**	−.28**	.54**	(.65)						
5. Increasing social resources T1	2.60	.75	.31**	−.11	.62**	.18**	(.61)					
6. Increasing challenging demands T1	3.01	.88	.29**	−.07	.69**	.20**	.27**	(.73)				
7. Decreasing structural hindering demands T1	2.78	.92	.07	−.21*	.31**	.06	−.01	−.05	(.68)			
8. Decreasing social hindering demands T1	2.59	1.08	.22**	−.04	.47**	.14*	.04	.10	.21**	(.73)		
9. Engagement T2	4.32	1.15	.81**	−.43**	.41**	.44**	.24**	.23**	.05	.16*	(.95)	
10. Exhaustion T2	3.28	1.16	−.48**	.77**	−.18**	−.21**	−.09	−.12	−.07	.01	−.55**	(.85)
11. Study crafting T2	3.20	.49	.43**	−.17*	.64**	.36**	.40**	.52**	.06	.29**	.50**	−.28
12. Increasing structural resources T2	3.92	.59	.46**	−.22**	.42**	.59**	.19**	.27**	−.06	.12	.52**	−.31**
13. Increasing social resources T2	2.69	.74	.22**	−.06	.38**	.08	.55**	.24**	−.06	.05	.29**	−.17*
14. Increasing challenging demands T2	3.03	.88	.30**	−.06	.56**	.24**	.27**	.74**	−.13	.12	.33**	−.15*
15. Decreasing structural hindering demands T2	3.20	.89	.11	−.15*	.22**	.08	.03	.00	.45**	.22**	.14*	−.15*
16. Decreasing social hindering demands T2	3.17	1.10	.18*	−.05	.28**	.12	.04	.05	.21**	.47**	.21*	−.08
17. Engagement T3	4.31	1.16	.75**	−.38**	.37**	.39**	.21**	.25**	−.01	.12	.83**	−.49**
18. Exhaustion T3	3.14	1.21	−.44**	.64**	−.19**	−.24**	−.08	−.12	−.10	.00	−.46**	.70**
19. Study crafting T3	3.22	.54	.41**	−.21**	.55**	.30**	.32**	.48**	.07	.23**	.44**	−.33**

TABLE 2 (Continued)

Variable	M	*SD*	1	2	3	4	5	6	7	8	9	10
20. Increasing structural resources T3	3.99	.58	.42**	−.18**	.39**	.47**	.13	.31**	−.04	.17*	.46**	
21. Increasing social resources T3	2.65	.82	.28**	−.22**	.34**	.07	.48**	.22**	−.03	.04	.34**	−.34**
22. Increasing challenging demands T3	3.07	.90	.24**	−.08	.51**	.21**	.22**	.69**	−.06	.08	.23**	−.15**
23. Decreasing structural hindering demands T3	3.12	.94	.22**	−.13	.19**	.09	−.04	.01	.43**	.20**	.23**	−.16*
24. Decreasing social hindering demands T3	3.24	1.05	.20**	−.08	.30**	.18*	.09	.11	.11	.38**	.21**	−.10

Note: $N = 209$. Cronbach's alphas are presented in parentheses in the diagonal.
Abbreviations: T1, pre-intervention; T2, post-intervention; T3, follow-up.
*$p < .05$.
**$p < .01$.

TABLE 2 (Continued)

Variable	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Engagement T1														
2. Exhaustion T1														
3. Study crafting T1														
4. Increasing structural resources T1														
5. Increasing social resources T1														
6. Increasing challenging demands T1														
7. Decreasing structural hindering demands T1														
8. Decreasing social hindering demands T1														

TABLE 2 (Continued)

Variable	11	12	13	14	15	16	17	18	19	20	21	22	23	24
9. Engagement T2														
10. Exhaustion T2														
11. Study crafting T2	(.77)													
12. Increasing structural resources T2	.63**	(.68)												
13. Increasing social resources T2	.64**	.20**	(.66)											
14. Increasing challenging demands T2	.73**	.40**	.36**	(.72)										
15. Decreasing structural hindering demands T2	.43**	.16*	.01	.02	(.80)									
16. Decreasing social hindering demands T2	.54**	.16*	.15*	.10	.51**	(.87)								
17. Engagement T3	.45**	.46**	.27**	.30**	.14*	.18**	(.94)							
18. Exhaustion T3	−.25**	−.28**	−.17*	−.11	−.15*	−.08	−.55**	(.86)						
19. Study crafting T3	.73**	.49**	.50**	.53**	.26**	.37**	.50**	−.38**	(.82)					
20. Increasing structural resources T3	.54**	.68**	.24**	.35**	.16*	.21**	.57**	−.37**	.71**	(.70)				
21. Increasing social resources T3	.48**	.25**	.63**	.30**	.04	.12	.34**	−.35**	.73**	.36**	(.72)			
22. Increasing challenging demands T3	.56**	.27**	.36**	.69**	.05	.10	.31**	−.17*	.73**	.43**	.41**	(.77)		
23. Decreasing structural hindering demands T3	.32**	.23**	.04	.05	.49**	.36**	.23**	−.18*	.47**	.28**	.17*	.06	(.79)	
24. Decreasing social hindering demands T3	.42**	.23**	.16*	.10	.33**	.61**	.19**	−.17*	.54**	.29**	.20**	.15*	.37**	(.86)

Note: $N = 209$. Cronbach's alphas are presented in parentheses in the diagonal.
Abbreviations: T1, pre-intervention; T2, post-intervention; T3, follow-up.
*$p < .05$.
**$p < .01$.

Strategy of analysis

Data were analyzed using IBM SPSS version 26. First, we tested for sociodemographic differences between the IG and the WCG using chi-square tests and *t*-tests. Then, we used multivariate analysis of variance (ANOVA) to test whether there were significant differences between the two groups at T1 for all research variables. To test Hypotheses 1 and 2, we conducted 3 × 2 repeated measures (RM) ANOVAs for all study variables with time (T1, T2, and T3) as the within-subject factor and group (IG and WCG) as the between-subject factor. Prior to analysis, the prerequisites of RM ANOVA were checked. Normal distribution testing was unnecessary given the sample size ($N > 25$). We tested for homogeneity of error variances using the Levene test. Sphericity was tested using the Mauchly test (Salkind, 2010). When the sphericity assumption was violated, the Greenhouse–Geisser epsilon (ε) was considered. For $\varepsilon < .75$, the Greenhouse–Geisser correction was selected. For $\varepsilon > .75$, the Huynh–Feldt correction was selected (Girden, 1992). In the event of a significant interaction effect, the main effect for time was examined separately for both groups. Additionally, in the event of a significant main effect of time, differences between two measurement time points (T1–T2, T1–T3, and T2–T3) were investigated via additional RM ANOVAs. Partial eta squared (η_p^2) is reported as effect size and interpreted as follows: $\eta_p^2 > .01$ = small effect; $\eta_p^2 > .06$ = medium effect; and $\eta_p^2 > .14$ = large effect. In addition we also report Cohen's *d* as an alternative effect size, indicating small ($d = .2$), medium ($d = .5$), and large ($d = .8$) effects according to Cohen (1988). Hypothesis 3 was tested using mediation analyses. Model 4 of the Hayes Process macro for SPSS was used (Hayes, 2017). Group membership (IG and WCG) was included as the X variable. Study crafting at T2 was included as the mediator, and engagement or exhaustion at T3 was included as the Y variable. Study crafting at T1 and the value of the investigated Y variable at T1 were included as control variables. For indirect effects, 95% confidence intervals were calculated using 5000 bootstrap samples.

RESULTS

Means, standard deviations, reliabilities, and correlations between all study variables at the three measurement time points appear in Table 2.

Test of model fit

We conducted confirmatory factor analyses using Mplus version 8.5 to test our hypothesized factor structure. A one factor model for engagement fitted the data satisfactorily, though indicating potential item redundancy ($\chi^2 = 496.38$, df = 27, CFI = .85, RMSEA = .18). The three items to measure exhaustion, constraining the factor variance on 1, showed a good fit to a one-factor model ($\chi^2 = 4.32$, df = 1, CFI = 1.00, RMSEA = .08). For study crafting, a five factor model with two separate factors for the strategy decreasing hindering demands resulted in a significant better fit ($\chi^2 = 292.59$, df = 94, CFI = .91, RMSEA = .06) as compared with the hypothesized four factor model ($\chi^2 = 496.11$, df = 98, CFI = .81, RMSEA = .09). Based on the items, we therefore separated the factor decreasing hindering demands in decreasing structural hindering demands and decreasing social hindering demands and conducted our analyses separately for both factors.

Dropout analysis

We conducted dropout analyses to examine whether participants who did not complete the questionnaire at T2 or T3 differed from participants who completed all stages of the study. Participants who dropped out of the study at T2 and participants who completed the three questionnaires did not differ in terms of gender, semester of higher education, study degree, and work experience. Multivariate ANOVA showed no significant differences in the study variables at T1 between participants who dropped out at T2 and participants who completed the three questionnaires, $F(7, 370) = .85$, $p = .55$, Wilk's $\Lambda = .98$. Although, participants who dropped out at T3 and participants who completed the three questionnaires did not differ in terms of gender, study degree, and work experience, participants who dropped out at T3 were, on average, in a later semester of their studies than participants who completed the three questionnaires, $t(254.34) = -2.54$, $p < .05$. Nonetheless, multivariate ANOVA based on differences in our study variables at T1 and T2 revealed no significant differences between the two groups, $F(14, 328) = .89$, $p = .58$, Wilk's $\Lambda = .96$.

Test of hypotheses

There were no significant differences between the IG and the WCG in terms of gender, $\chi^2(3) = .97$, $p = .81$, age, $t(204) = -.15$, $p = .88$, study degree, $\chi^2(3) = 3.98$, $p = .26$, work experience, $\chi^2(1) = .05$, $p = .83$, or semester of higher education, $t(207) = .29$, $p = .77$, or regarding our study variables at T1, $F(7, 200) = 1.15$, $p = .336$, Wilk's $\Lambda = .96$.

Study crafting

For overall study crafting (H1a), we found a statistically significant time × group interaction effect, $F(1.90, 393.72) = 5.55$, $p < .01$, $\eta_p^2 = .03$. We found a significant main effect of time for the IG, $F(1.85, 274.36) = 17.61$, $p < .001$, $\eta_p^2 = .11$. Within the IG, study crafting was significantly higher at T2 compared with T1, $F(1, 148) = 21.39$, $p < .001$, $\eta_p^2 = .13$, and significantly higher at T3 compared with T1, $F(1, 148) = 24.63$, $p < .001$, $\eta_p^2 = .14$. We found no significant main effect of time for the WCG, $F(2, 118) = .59$, $p = .56$. These findings confirm H1a.

Concerning the study crafting strategy increasing structural resources (H1b), we found no statistically significant time × group interaction effect, $F(1.90, 394.10) = .01$, $p = .99$. We observed a significant main effect of time for the overall group, $F(1.90, 394.10) = 3.28$, $p < .05$, $\eta_p^2 = .02$. In the overall group, increasing structural resources was significantly lower at T2 compared with T1, $F(1, 208) = 7.69$, $p < .01$. We also found a significant main effect of group, $F(1, 207) = 5.59$, $p < .05$, $\eta_p^2 = .03$. Increasing structural resources was higher on average in the IG than in the WCG. Hence, H1b was rejected.

Concerning the study crafting strategy increasing social resources (H1c), we found no statistically significant time × group interaction effect, $F(1.94, 400.90) = 2.27$, $p = .11$. We found no significant main effect of time, $F(1.94, 400.90) = 1.55$, $p = .22$, but a significant main effect of group, $F(1, 207) = 4.46$, $p < .05$, $\eta_p^2 = .02$, indicating that increasing social resources was, on average, higher in the IG than in the WCG. Thus, H1c was rejected.

Concerning the study crafting strategy increasing challenging demands (H1d), we found no statistically significant time × group interaction effect, $F(2, 414) = .91$, $p = .40$. We found no

significant main effect of time, $F(2, 414) = .19$, $p = .83$, and no significant main effect of group, $F(1, 207) = 2.85$, $p = .09$. Thus, H1d was rejected.

Concerning the study crafting strategy decreasing hindering demands (H1e), we found a statistically significant time × group interaction effect for decreasing structural hindering demands, $F(2, 414) = 6.18$, $p < .01$, $\eta_p^2 = .03$. There was a significant main effect of time for the IG, $F(2, 296) = 24.28$, $p < .001$, $\eta_p^2 = .14$. Within the IG, decreasing structural hindering demands was significantly higher at T2 compared with T1, $F(1, 148) = 34.85$, $p < .001$, $\eta_p^2 = .19$, and significantly higher at T3 compared with T1, $F(1, 148) = 34.09$, $p < .001$, $\eta_p^2 = .19$. We found no significant main effect of time for the WCG, $F(2, 118) = 2.90$, $p = .06$. We also found a statistically significant time × group interaction effect for decreasing social hindering demands, $F(1.93, 399.25) = 10.31$, $p < .001$, $\eta_p^2 = .05$. There was a significant main effect of time for the IG, $F(1.91, 282.60) = 52.13$, $p < .001$, $\eta_p^2 = .26$. Within the IG, decreasing social hindering demands was significantly higher at T2 compared with T1, $F(1, 148) = 71.35$, $p < .001$, $\eta_p^2 = .33$, and significantly higher at T3 compared with T1, $F(1, 148) = 68.75$, $p < .001$, $\eta_p^2 = .32$. We found no significant main effect of time for the WCG, $F(2, 118) = 2.22$, $p = .11$. These findings confirm H1e.

Engagement

For engagement (H2a), we found a statistically significant time × group interaction effect, $F(1.93, 404.78) = 3.48$, $p < .05$, $\eta_p^2 = .02$. We found a significant main effect of time for the IG, $F(1.87, 277.85) = 5.33$, $p < .01$, $\eta_p^2 = .04$. Within the IG, engagement was significantly higher at T2 compared with T1, $F(1, 149) = 10.76$, $p < .01$, $\eta_p^2 = .07$, and significantly higher at T3 compared with T1, $F(1, 149) = 5.44$, $p < .05$, $\eta_p^2 = .04$. We found no significant main effect of time for the WCG, $F(1.88, 114.46) = .57$, $p = .56$. These findings confirm H2a.

Exhaustion

For exhaustion (H2b), we found no statistically significant time × group interaction effect, $F(1.89, 393.88) = 2.35$, $p = .10$. However, we found a significant main effect of time within the IG, $F(1.81, 268.25) = 8.39$, $p < .001$, $\eta_p^2 = .05$. Within the IG, exhaustion was significantly lower at T3 compared with T1, $F(1, 148) = 12.44$, $p < .001$, $\eta_p^2 = .08$, and significantly lower at T3 compared with T2, $F(1, 148) = 6.47$, $p < .05$, $\eta_p^2 = .04$. We found no significant main effect of time for the WCG, $F(2, 120) = .08$, $p = .92$. These findings partially confirm H2b. Table 3 shows the means and standard deviations of the study variables at each measurement time point for each group. Figure 3 represents the significant effects graphically.

Mediation

The intervention significantly predicted the mediator study crafting, $b = .14$, $SE = .06$, $p < .05$. Study crafting at T2 significantly predicted engagement at T3, $b = .56$, $SE = .14$, $p < .001$. The indirect effect of the STUDYCoach intervention on engagement (T3) via study crafting (T2) was also significant, $b = .08$, $SE = .04$, 95% CI [.02, .17]. These findings confirm H3a.

TABLE 3 Means and standard deviations of the study variables for the intervention group and control group, and effect sizes for significant effects

	Intervention group									
	T1		T2		Time-effect		T3		Time-effect	
	M	*SD*	M	*SD*	η_p^2	*d*	M	*SD*	η_p^2	*d*
Study crafting	3.10	.44	3.26a	.49	.13	.77	3.31c	.53	.14	.81
Increasing structural resources	4.07	.56	3.97	.60			4.04	.59		
Increasing social resources	2.64	.77	2.73	.72			2.75	.79		
Increasing challenging demands	3.06	.89	3.07a	.89			3.15c	.87		
Decreasing structural hindering demands	2.73	.91	3.22a	.86	.19	.97	3.21c	.92	.33	1.40
Decreasing social hindering demands	2.57	1.08	3.35a	1.11	.19	.97	3.38c	1.06	.32	1.37
Engagement	4.26	1.11	4.44a	1.13	.07	.55	4.42c	1.13	.04	.41
Exhaustion	3.34	1.31	3.20	1.11			3.02bc	1.19	.04/.08	.41/.59

Note: a = significant change from T1 to T2, b = significant change from T2 to T3, and c = significant change from T1 to T3.
Abbreviations: T1, pre-intervention; T2, post-intervention; T3, follow-up.

TABLE 3 (Continued)

	Control group							
	T1		T2		T3		Time × group effect	
	M	*SD*	M	*SD*	M	*SD*	η_p^2	*d*
Study crafting	3.02	.44	3.06	.47	3.01	.51	.03	.35
Increasing structural resources	3.89	.50	3.80	.55	3.88	.52		
Increasing social resources	2.50	.70	2.59	.78	2.41	.85		
Increasing challenging demands	2.89	.87	2.91	.85	2.87	.93		
Decreasing structural hindering demands	2.92	.93	3.13	.96	2.89	.95	.03	.35
Decreasing social hindering demands	2.65	1.06	2.72	.95	2.91	.95	.05	.46
Engagement	4.11	1.10	4.03	1.12	4.03	1.16	.02	.29
Exhaustion	3.42	1.26	3.46	1.23	3.42	1.20		

Note: a = significant change from T1 to T2, b = significant change from T2 to T3, and c = significant change from T1 to T3.
Abbreviations: T1, pre-intervention; T2, post-intervention; T3, follow-up.

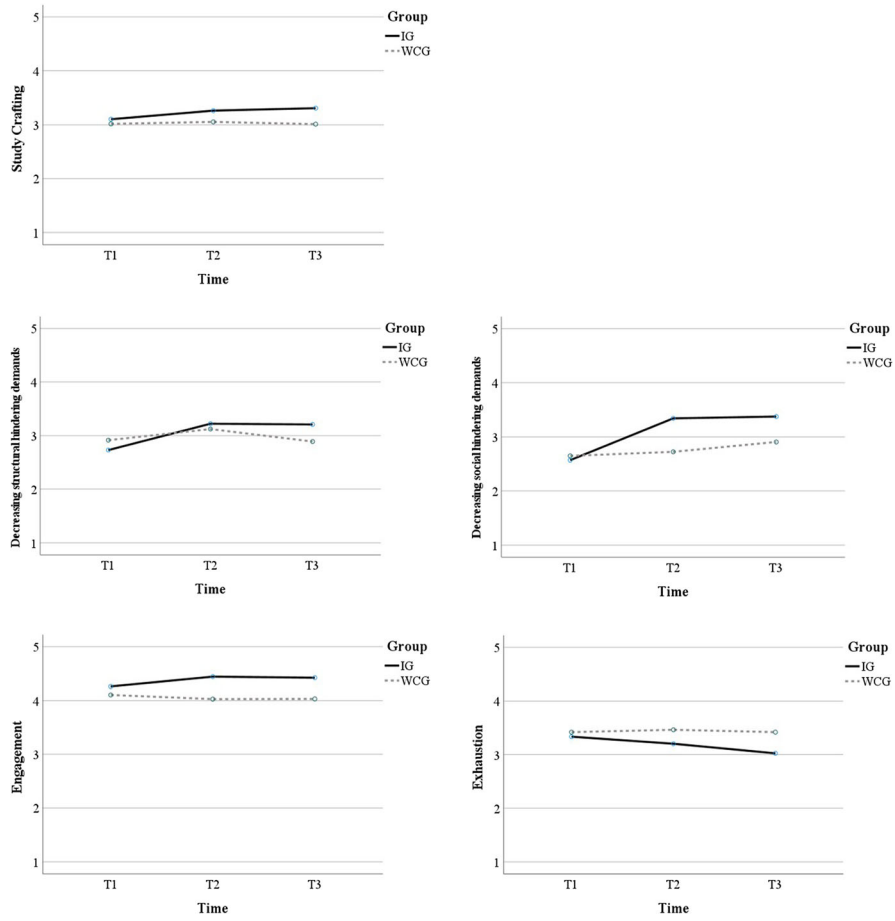

FIGURE 3 Intervention effects on study crafting, decreasing hindering demands, engagement, and exhaustion. IG, intervention group; T1, pre-intervention; T2, post-intervention; T3, follow-up; WCG, waiting-list control group

Study crafting at T2 significantly predicted exhaustion at T3, $b = -.43$, $SE = .17$, $p < .05$. The indirect effect of the STUDYCoach intervention on exhaustion (T3) via study crafting (T2) was also significant, $b = -.06$, $SE = .04$, 95% CI [−.14, −.01]. These findings confirm H3b.

DISCUSSION

Higher education students face many demands during the course of their studies, and they have lost some resources due to the COVID-19 pandemic (Herbst et al., 2016; Lederer et al., 2021). The SD–R framework proposes that high demands can promote exhaustion, whereas resources foster engagement (Lesener et al., 2020). Thus, optimizing demands and resources via study crafting should foster engagement and reduce exhaustion. However, because the optimal balance between demands and resources is highly individualized (van Wingerden, Bakker, & Derks, 2017b), this study has developed and evaluated the STUDYCoach, an online intervention that includes a module on study crafting. Building on the JD–R model and SD–R framework,

we hypothesized that our intervention would increase study crafting and improve student well-being. RM ANOVA results demonstrated that overall study crafting, decreasing hindering demands, and engagement significantly increased in the IG compared to the WCG after the intervention. These effects were maintained at the 20-week follow-up. Exhaustion significantly decreased in the IG at follow-up compared to the measurements before and after the intervention. Additionally, study crafting after the intervention mediated the relationship between the intervention and engagement and exhaustion at follow-up.

To the best of our knowledge, this is the first intervention built on the SD–R framework and employing the concept of study crafting, meaning no comparison with previous interventions of this type is possible. However, our finding that a study crafting intervention increased overall study crafting is consistent with findings from the work context that suggest that overall job crafting increases following job crafting interventions (e.g., van Wingerden et al., 2016). Meta-analytic and systematic review evidence also supports this finding (Devotto & Wechsler, 2019; Oprea et al., 2019). In line with the intervention study by van Wingerden, Bakker, and Derks (2017a), confirming that the effects on job crafting remained stable at the 1-year follow-up, we also found that the effects on study crafting remained present at the 20-week follow-up. This demonstrates that our intervention can sustainably increase study crafting behavior, even over a semester.

Regarding the different study crafting strategies, only the strategy decreasing hindering demands significantly increased following the intervention. This is also consistent with findings from the work context (e.g., Demerouti et al., 2017; Gordon et al., 2018). A review by Oprea et al. (2019) confirmed this finding. In contrast to van Wingerden, Bakker, and Derks (2017a), where this strategy was lower at the 1-year follow-up, the effect remained stable at the 20-week follow-up in our study. Van Wingerden, Bakker, and Derks (2017a) offered the following explanation for this result: By conducting a task analysis as part of the intervention, employees became aware of the many demands they were facing, making them want to reduce those demands; after 1 year, they might have succeeded doing so sufficiently or stopped trying. We assumed the same to be true for higher education students: As part of the intervention, they performed a task analysis that likely made them aware of their many demands. This is unsurprising given the intervention took place shortly before the exam period, one of the biggest stressors for higher education students (Herbst et al., 2016). Additionally, data collection took place during the COVID-19 pandemic, which further increased demands on higher education students (Lederer et al., 2021). Demerouti (2014) described the strategy of decreasing hindering demands as a "health-protecting coping mechanism when demands are excessively high" (p. 239). Tims et al. (2016) confirmed that when job demands overwhelm employees, demands can be proactively reduced to restore the balance between job demands and individual capabilities. Thus, reducing hindering demands seems to be an effective strategy for higher education students during such demanding times.

We observed no significant effects of the intervention on increasing social resources or structural resources. These findings are consistent with some job crafting intervention studies (e.g., Gordon et al., 2018; van Wingerden, Bakker, & Derks, 2017b) and the meta-analysis by Oprea et al. (2019). This suggests that the strategies to increase resources are only partially affected by job crafting interventions. The lack of effect on increasing social resources in our study may be due to data collection taking place during the COVID-19 pandemic––and thus, during periods of social distancing and online lectures––which may have reduced opportunities for social interaction (Benjet, 2020). However, the results do show that the mean scores increased slightly from T1 to T3 in the IG and decreased slightly from T1 to T3 in the WCG.

This enables us to conclude that there was a tendency to increase social resources in the IG, but insufficient opportunities were available due to the COVID-19 pandemic. Regarding the strategy of increasing structural resources, van Wingerden, Bakker, and Derks (2017b) explained that the successful application of this strategy often requires a longer period because opportunities for personal development must first be present. In their longitudinal study, van Wingerden, Bakker, and Derks (2017a) observed an increase in this strategy at the 1-year follow-up, empirically confirming their assumption. Due to the COVID-19 pandemic, many events that contribute to personal development were canceled (Lederer et al., 2021), likely resulting in insufficient opportunities for increasing structural resources for our participants.

We observed no effect on increasing challenging demands, which is consistent with some job crafting intervention studies (van Wingerden, Derks, & Bakker, 2017). This result is unsurprising given that seeking challenges includes, for example, taking on new tasks (Tims et al., 2013). The finding that our participants primarily chose the strategy of reducing hindering demands suggests that students were not able to face additional challenges at the time of the intervention due to the already high level of demands.

Our intervention successfully increased engagement, which is consistent with job crafting intervention studies (e.g., van Wingerden, Bakker, & Derks, 2017b) and meta-analyses and reviews (Devotto & Wechsler, 2019; Oprea et al., 2019) that confirm this finding for the work context. According to the JD–R theory, the optimal balance of job demands and resources results in engagement (Bakker & Demerouti, 2014). We conclude that our intervention successfully optimized the balance between demands and resources, increasing vigor, dedication, and absorption among our participants.

We observed no significant interaction effect regarding exhaustion. However, exhaustion significantly decreased from T1 to T3 and from T2 to T3 in the IG, whereas no time effect was found for the WCG. Although, to the best of our knowledge, no job crafting intervention study has examined the impact on exhaustion, one study did examine the effect of job crafting on psychological distress. In that study, psychological distress significantly decreased at the 1-month follow-up, but the authors did not use a control group for comparison (Sakuraya et al., 2016). Our finding that exhaustion was significantly lower in the IG at T3 than at T1 and T2 suggests that this variable can be influenced by a study crafting intervention, but it seemingly takes time, as the effect was not apparent until follow-up.

The mediation analyses show that study crafting was the mechanism by which our STUDYCoach intervention contributed to higher levels of engagement and lower levels of exhaustion. This is consistent with the theoretical assumptions of JD–R theory, which assumes that job crafting helps employees foster engagement and prevent burnout (Bakker & Demerouti, 2014), and the empirical findings that job crafting positively predicts engagement (Tims et al., 2013; Vogt et al., 2016) and negatively predicts burnout (Tims et al., 2013) over time.

Theoretical contributions

Our study contributes to the literature in three ways. First, to the best of our knowledge, this is the first intervention study for higher education students that builds on the theoretical assumptions of the SD–R framework and aims to increase study crafting behavior. We have confirmed that the STUDYCoach intervention increases overall study crafting and decreasing hindering demands and that the effects are sustained over a semester. These findings extend the job

crafting literature because our results show that such interventions can be successful for not only employees but also higher education students. In particular, with regard to the strategy of decreasing hindering demands, our study makes a theoretical contribution, as we were able to show for the first time that this strategy can be divided into two factors in the higher education context, namely decreasing structural hindering demands and decreasing social hindering demands. This is in accordance with a study from the work context, which also confirms a separation into the strategies decreasing social job demands and decreasing hindering job demands for blue collar workers (Nielsen & Abildgaard, 2012). In the work context, the strategy of decreasing hindering demands is often viewed with skepticism because it is negatively related with engagement (Lichtenthaler & Fischbach, 2019; Rudolph et al., 2017). However, engagement increased after our study's intervention. Another criticism of this strategy in the work context is that reducing hindering demands can add to the workload of other employees, potentially causing conflict (Tims et al., 2015). However, this does not apply to the higher education context. Our study responds to the call from Gordon et al. (2018) to investigate the effects of this strategy on different populations to determine when it is useful. Students in higher education apparently represent a population for which reducing hindering demands seems to be helpful.

Second, we contribute to the literature on student well-being by demonstrating that engagement increased significantly following the intervention and that exhaustion decreased significantly in the IG. Thus, our intervention, based on the SD–R framework, can contribute to both promoting positive states and mitigating negative states among higher education students.

Third, we contribute to the SD–R framework by demonstrating that an intervention can actively influence the postulated processes. Optimizing the study environment via study crafting in the form of adjusting one's resources and demands leads to an increase in student well-being (i.e., more engagement, less exhaustion). Thus, we contribute to the further validation of the SD–R framework.

Practical implications

A practical implication of our study is that universities should be aware of the potential of study crafting interventions to increase study crafting behavior and, in turn, increase engagement and reduce exhaustion. This is of particular importance because engagement is associated with academic performance (Schaufeli et al., 2002), and burnout is associated with common mental disorders and high dropout (Mokgele & Rothmann, 2014). Given the optimal level of demands and resources is highly individualized, a bottom-up approach such as study crafting seems to be useful to optimize the study environment at the individual level. Additionally, study characteristics can change rapidly over the course of a degree program––or even over a semester––due to external factors, such as the COVID-19 pandemic, which made new demands of students. Study crafting can help students flexibly adapt to changing conditions and thereby stay healthy and motivated.

However, because higher education students cannot be expected to adopt study crafting on their own, universities should provide interventions, such as the STUDYCoach, to introduce students to these behaviors. Given online interventions have many advantages over face-to-face interventions, this type of intervention should continue to be offered after the pandemic or online courses are over. Notably, the impact of our intervention was sustained, lasting more than a semester, suggesting the value of universities investing in interventions of this kind.

We further assume that the behaviors learned in the study will be used later in the professional context. Students who learn and apply the concept of study crafting during their studies might be more likely to use job crafting later in their professional lives.

A practical implication for lecturers and university staff is that they can support the successful application of study crafting strategies. Lecturers can help higher education students increase their social resources by providing more feedback and encouraging social interaction among higher education students. In addition, universities should create opportunities to increase structural resources and challenges. Such opportunities might include extracurricular activities, language courses, and study-abroad programs.

Limitations and suggestions for further research

Several limitations of our study should be mentioned. First, we experienced a high dropout between the post-measurement and the follow-up measurement. However, this is unsurprising given the follow-up measurement took place one semester after the pre- and post-measurements. Therefore, it is likely that some higher education students graduated, dropped out, took a semester abroad, or completed an internship. Nonetheless, having the third measurement time point at 20 weeks post-intervention was a strength of our study because it allowed us to examine the long-term effects of the intervention. Thus, we address the criticism that most intervention studies have not collected follow-up data and, in particular, lacked follow-up periods of more than 3 months (Winzer et al., 2018). Furthermore, despite the high dropout, our final sample size of 205 participants was larger than the required sample size calculated in the a priori power analysis, enabling us to achieve sufficiently high power. Nonetheless, further intervention studies could test additional time frames.

Second, female students were overrepresented in our study, limiting generalizability. However, representative surveys show that female students report significantly more exhaustion and significantly less engagement than male students (Grützmacher et al., 2017), suggesting that female students have a greater need for interventions such as the STUDYCoach. In addition, a strength of our study was that our intervention targeted all higher education students, rather than only those at particular health risk, the approach adopted by most previous studies (Dietz et al., 2020). Future research could examine whether differential effects of the intervention exist concerning sociodemographic variables (e.g., gender or semester of study) and whether certain groups consequently benefit more from the intervention than others. To increase the generalizability of our findings, the intervention could be studied in other populations, such as other cultural contexts, in the future.

Third, our study used only self-assessments, potentially resulting in common method bias (Podsakoff et al., 2012). Although the constructs examined in our study are best captured by the self-assessment approach, also including assessments from lecturers or fellow students could provide a more complete picture. This could be considered in future studies. Similarly, objective data, such as performance, could be collected as shown in the work context that job crafting interventions can also improve performance (van Wingerden, Bakker, & Derks, 2017a).

Fourth, our intervention comprised three modules, and we cannot determine which components of the STUDYCoach produced the effects we found. In the future, additional post-module questionnaires or qualitative interviews could provide insights into which modules and submodules participants found most helpful. Qualitative interviews could also clarify

barriers encountered in implementing the three study crafting strategies for which no intervention effects were observed.

Fifth, we cannot rule out the possibility of contamination of study participants. Although this seems rather unlikely, as participants were informed exclusively by email, future studies could use a cluster-random design.

Finally, our study only examined the effect of the intervention on study crafting and well-being. Future studies should, on the one hand, examine the concept of study crafting in more detail, especially because we found that the strategy decreasing hindering demands can be separated into two factors. On the other hand, it would be interesting to investigate the effect of the intervention on study demands and resources. In addition, recent studies confirm that personal resources (Robins et al., 2015) and personal demands (Zeijen et al., 2021) also play an important role in the SD–R framework, suggesting that future intervention studies could also investigate the influence on these variables.

Conclusion

We can conclude that the STUDYCoach intervention represents a valuable tool that can help higher education students adapt their study environment to create an individually optimized balance between study demands and resources, thereby increasing engagement and reducing exhaustion. Given this represents the first research considering a study crafting intervention, further research is needed to more comprehensively understand the effects of study crafting interventions, especially in comparison to findings in the work context.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ETHICS APPROVAL STATEMENT

In accordance with the ethical guidelines of the American Psychological Association, participation was voluntary, no financial compensation was provided, and informed consent was obtained before the study began. The ethics committee of the Johannes Gutenberg-University Mainz approved the study.

DATA AVAILABILITY STATEMENT

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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