La *Study Crafting Scale* (SCS): uno studio delle sue proprietà psicometriche

Annamaria Di Fabio[1] e Andrea Svicher[2]

Sommario

La *Study Crafting Scale* (SCS) è uno strumento di recente sviluppo per misurare i comportamenti di crafting individuali e collaborativi nei contesti accademici con studenti. Questo studio ha valutato le proprietà psicometriche della SCS in 451 studenti universitari. I partecipanti hanno completato la *Study Crafting Scale* (SCS), la *Study Satisfaction Scale* (SSS) e la *Flourishing Scale* (FS). L'Analisi Fattoriale Confermativa (AFC) ha supportato una struttura bi-fattoriale composta da *Individual Study Crafting* (ISC), *Collaborative Study Crafting* (CSC), e un fattore generale di *Study Crafting*, con buoni indici di adattamento (CFI = .96, TLI = .94, RMSEA = .06, SRMR = .05). La coerenza interna è elevata per entrambe le dimensioni (ISC α = .88; CSC α = .89) e per la scala complessiva (SCS α = .89). La validità concorrente è stata confermata attraverso correlazioni statisticamente significative e positive tra la *Study Crafting Scale* e la *Study Satisfaction Scale*, nonché tra la *Study Crafting Scale* e la *Flourishing Scale*. Questi risultati suggeriscono che la SCS è uno strumento affidabile per valutare lo *Study Crafting* negli studenti universitari.

Parole chiave

Study Crafting, *Individual Study Crafting*, *Collaborative Study Crafting*, Proprietà psicometriche, Studenti universitari.

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The *Study Crafting Scale* (SCS): A Study of its Psychometric Properties

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Abstract

The *Study Crafting Scale* (SCS) is a newly developed tool for measuring individual and collaborative crafting behaviours in academic contexts with students. This study assessed the psychometric properties of the SCS in 451 university students. The participants completed the Study Crafting Scale (SCS), the *Study Satisfaction Scale* (SSS), and the *Flourishing Scale* (FS). Confirmatory factor analysis (CFA) supported a bi-factor structure comprising Individual Study Crafting (ISC), Collaborative Study Crafting (CSC), and a General Study Crafting factor, with good fit indices (CFI = .96, TLI = .94, RMSEA = .06, SRMR = .05). Internal consistency was high for both dimensions (ISC α = .88; CSC α = .89) and the overall scale (SCS α = .89). Concurrent validity was confirmed through statistically significant and positive correlations between the Study Crafting Scale and the Study Satisfaction Scale as well as the Study Crafting Scale and the Flourishing Scale. These findings suggest that the SCS is a reliable instrument for evaluating study crafting in university students.

Keywords

Study crafting, Individual study crafting, Collaborative study crafting, Psychometric properties, University students.

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Introduction

Recently some scholars have introduced the novel construct of study crafting to academia, applying the workplace-oriented job crafting concepts to learning contexts (Clements & Kamau, 2018; Choi & Shin, 2018; Dormann & Guthier, 2019; Ferreira, 2020; Körner et al., 2021, 2023; Lesener et al., 2020). In the job crafting approach to the workplace, employees utilize job crafting as a bottom-up approach to workplace design, customizing their roles to enhance personal satisfaction and purpose (Wrzesniewski & Dutton, 2001). The concept, as outlined by Wrzesniewski and Dutton (2001), involves individuals modifying their occupational environment to better suit their needs. This is achieved through three primary mechanisms: reshaping tasks (task crafting), reconfiguring professional relationships (relational crafting), and reframing one's perspective on work (cognitive crafting). Building upon this framework, Leana and colleagues (2009) extend job crafting by introducing the concept of collaborative crafting, distinct from individual crafting. In collaborative crafting groups, workers collectively reconfigure their professional practices. The study of Leana et al. (2009) observed that collaborative crafting is positively associated with quality of care, job satisfaction, and organizational commitment. This approach also emphasized the social embeddedness of job crafting and its potential organizational impacts, contrasting with previous literature's focus only on individual-level crafting. It involves dyads or groups jointly making «physical and cognitive changes... in the task or relational boundaries of their work» (Wrzesniewski & Dutton, 2001, p. 179). Collaborative crafting can be explicit but often occurs through informal, ongoing processes among workers. Moreover, Leana et al. (2009) emphasize that these forms of individual and collaborative job crafting are not mutually exclusive, and individuals may engage in both. Collaborative crafting appears to be a promising construct, as it aligns with one of the most prominent contemporary theories on work environments, namely Blustein's (2011) relational theory of working. According to this theory, working is an inherently relational act and work experiences and decisions are fundamentally shaped by internal and external relational contexts (Blustein, 2011).

Nowadays most of the job crafting literature is shaped by Tims and Bakker's (2010) conceptualization of job crafting (Lichtenthaler & Fischbach, 2016; Rudolph et al., 2017; Svicher & Di Fabio, 2021), developed according to the perspective of the job demands-resources (JD-R) theory (Bakker & Demerouti, 2017). This perspective involves making adjustments to balance job demands and job resources with personal abilities and needs, aiming to create or restore a good fit between individuals and their job (Tims & Bakker, 2010). In this context, job demands are aspects of work requiring effort and associated with various costs to the employee. On the other hand, job resources are elements that help in

managing these demands, support goal achievement, and foster personal development (Demerouti et al., 2001). To this end, individuals craft their jobs by: (a) increasing challenging job demands to maintain motivation and avoid boredom. To protect their health and energy, they engage themselves in (b) reducing hindering demands. They also focus on (c) increasing structural job resources, and (d) increasing social job resources to enhance working methods and optimize demands (Demerouti & Peeters, 2018; Petrou et al., 2012). Job crafting has been shown to be positively associated with intrinsic need satisfaction («the extent to which employees' intrinsic needs for autonomy, competence, and relatedness were satisfied on the job», Slemp & Vella-Brodrick, 2014, p. 964) as well as with improved health and well-being (e.g., Lichtenthaler & Fischbach, 2016), enhanced job satisfaction (Dierdorff & Jensen, 2017), increased work engagement (Rudolph et al., 2017), better job performance (Bakker et al., 2012; Tims et al., 2014), and higher person–job and demands–abilities fit (Lu et al., 2014; Shenavar, 2017).

Recent academic research has expanded on the JD-R model, introducing the student-centric concept of «study crafting» to the university context (Choi & Shin, 2018; Ferreira, 2020; Körner et al., 2021; Mülder et al., 2022). This advance stems from the observation that students encounter challenges and resources comparable to those employees face in the workplace (Mülder et al., 2022). The notion of study crafting suggests that students can proactively shape their learning environment to better align with their individual needs, preferences, and abilities, thereby making them feel more valued and integral to the overall learning process (Körner et al., 2021; Mülder et al., 2022,). Körner et al. (2021) define study crafting as the process by which students actively modify their academic surroundings, specifically focusing on study demands and resources. This concept encompasses: (a) Seeking out and engaging with new, intellectually stimulating projects to increase challenging study demands; (b) Mitigating or postponing tasks that are excessively mentally or emotionally taxing to reduce hindering study demands; (c) Negotiating with lecturers for greater autonomy or flexibility in their studies to enhance structural study resources; (d) Proactively soliciting feedback and guidance from instructors to bolster social study resources.

From this perspective, study crafting has been found to be associated with meaning in life (Choi & Shin, 2018), life satisfaction (Choi & Shin, 2018), academic satisfaction (Choi & Shin, 2018), meaning in academic work (Choi & Shin, 2018), study engagement (Ferreira, 2020; Körner et al., 2023), and study-course fit (Ferreira, 2020). Despite these advances in the field of study crafting, no study, to the best of our knowledge, has produced an adaptation of the study crafting construct considering Leana and colleagues' model (2009), which highlights the dimensions of individual crafting and collaborative crafting. The potential benefits of exploring this gap in research are promising, as it could reveal the untapped advantages of collaborative crafting in academic contexts. While col-

laborative behaviours among peers and in teacher-student dynamics have been extensively studied through collaborative instruction models (Vembye et al., 2024) and collaborative learning models (Muñoz Miguel et al., 2023), practices of collaborative crafting have not been studied yet. Moreover, the advances proposed by Blustein (2011) with the relational theory of working, set between the psychology of working framework (Blustein, 2006, 2008) and the psychology of working theory (Duffy et al., 2016), as well as studies on decent work (Duffy et al., 2016, 2017), have led these scholars to recently advance the decent education model (Duffy et al., 2022; Kenny et al., 2023, 2024).

The authors have identified the construct of decent education (Duffy et al., 2022; Kenny et al., 2023, 2024), as a pivotal predictor of decent and meaningful work. The construct of decent education includes six components: «physical safety, psychological safety, quality instruction, equitable learning environments, opportunities for social connection, and adequate educational/vocational programming» (Duffy et al., 2022, p. 6). According to the decent education model, study crafting can be a construct for enhancing students' educational experiences and future readiness. Study crafting can be seen as a tool to achieve decent education objectives by empowering students to actively shape their learning environment.

This aligns with decent education's emphasis on quality instruction, social belonging, and career preparation (Duffy et al., 2022), ultimately improving educational outcomes and preparing students for lifelong learning and adaptable careers in line with the principles of decent education. Therefore, to promote research in this area, the present study aims to investigate the psychometric properties of the *Study Crafting Scale,* a self-report instrument consisting of 12 items derived from Leana and colleagues' *Job Crafting Scale* (2009), with a specific focus on the study context, which assesses the two dimensions of Individual Study Crafting and Collaborative Study Crafting.

Methods

Participants and Procedure

This study involved 451 university students from Central Italy, with 180 females (47.50%) and 199 males (52.50%), with a mean age of 21.78 years (*SD* = 2.31). Participation was voluntary, and informed consent was obtained following Italian privacy regulations (DL-196/2003; EU 2016/679). To mitigate any potential presentation order effects, the sequence of questionnaire administration was counterbalanced. All the study self-report questionnaires were administered in English, and all participants had a B2 certification in English.

Measures

The *Study Crafting Scale* (SCS) developed by Di Fabio and Svicher, following the Job Crafting Scale (Leana et al., 2009) and the Job Crafting Scale adapted to the work context in general (Llorente-Alonso & Topa, 2019), modifying it to fit the study context, consists of twelve items rated on a 6-point Likert scale (ranging from 1 = «Never» to 6 = «Daily»). It assesses two distinct dimensions: Individual Study Crafting and Collaborative Study Crafting and a total score. Examples of items are: Individual Crafting — «On your own, change the way you study to make it easier for you»; Collaborative Crafting — «Decide together with your fellow students to make changes in the way you study to make it easier for you» (Appendix).

The *Study Satisfaction Scale* (SSS), developed by Di Fabio and Svicher (accepted), closely following the Job Satisfaction Scale by Judge et al. (1998) and adapting this scale to the study context, consists of a unidimensional scale. It is composed of five items rated on a seven-point Likert scale ranging from «Strongly agree» to «Strongly disagree». Cronbach's alpha is .86 in the study by Di Fabio and Svicher (accepted) and .88 in the present research. Examples of items are: «Most days I am enthusiastic about my studies» and «I find real enjoyment in my studies».

The *Flourishing Scale* (FS) (Diener et al., 2010) is an 8-item self-report scale that measures sociopsychological prosperity related to perceived success in relevant areas of the individual's life, such as self-esteem, relationships, and optimism. Respondents indicate their degree of agreement on a 7-point Likert scale (ranging from «Completely disagree» to «Strongly agree»). Cronbach's alpha is .87 both for the original version and in the present study. Examples of items are: «I am engaged and interested in my daily activities»; and «I lead a purposeful and meaningful life».

Statistical Analysis

The research employed confirmatory factor analysis (CFA) to examine three models of the Study Crafting Scale: unidimensional (all components contributing to a single factor), two correlated factors (representing distinct but related aspects), and bi-factor (items associated with both specific and general dimensions). Model fit was assessed using four indices: the comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Excellent fit was denoted by CFI and TLI values above .97, while scores between .95 and .97 indicated adequate fit. RMSEA outcomes were classified as: good (< .05), acceptable (.05-.08), mediocre (.08-.10), and unacceptable (> .10), following established guidelines

(Schermelleh-Engel et al., 2003). The scale's internal consistency was evaluated using Cronbach's alphas and coefficients exceeding .70 were deemed acceptable. Concurrent validity was examined through Pearson's correlations between the Study Crafting Scale and two measures: the Study Satisfaction Scale (SSS) and the Flourishing Scale (FS). All analyses were performed using R studio for Macintosh (2024.04.2+764), by Posit Software, Boston, MA, USA, implementing the following packages, *Lavaan* 0.6-18, *SemPlot* 1.1.6 and *Psych* 2.4.6.26.

Results

The results of the confirmatory factor analysis indicated that among the models evaluated, the bi-factor ones demonstrated superior fit (Table 1). A visual representation of each tested models can be observed in Figure 1, with the bi-factor model showing satisfactory factor loadings. Internal consistency coefficients for the bi-factor model (Individual Study Crafting and Collaborative Study Crafting dimensions as well as the overall Study Crafting factor) were found to be good (Table 2). The correlation between the *Study Crafting Scale* and the *Study Satisfaction Scale* were found to be positive and statistically significant, in addition the correlation between the *Study Crafting Scale* and the *Flourishing Scale* were found to be positive and statistically significant (Table 3).

Table 1

Study Crafting Scale (SCS): Confirmatory Factor Analysis — Fit Indices comparison (*N* = 451)

Model	c^2(df)	CFI	TLI	RMSEA (90%CI)	SRMR
One-factor	920.46 (65)	.67	.62	.14 (.13-.16)	.12
Correlated Two-factor	380.72 (63)	.89	.87	.08 (.07-.09)	.07
Bi-factor	110.84 (60)	.96	.94	.06 (.04-.07)	.05

Note: CFI = Comparative Fit Index; TLI = Tucker–Lewis index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Squared Residual; Bold characters displayed the model with the best fit.

Table 2

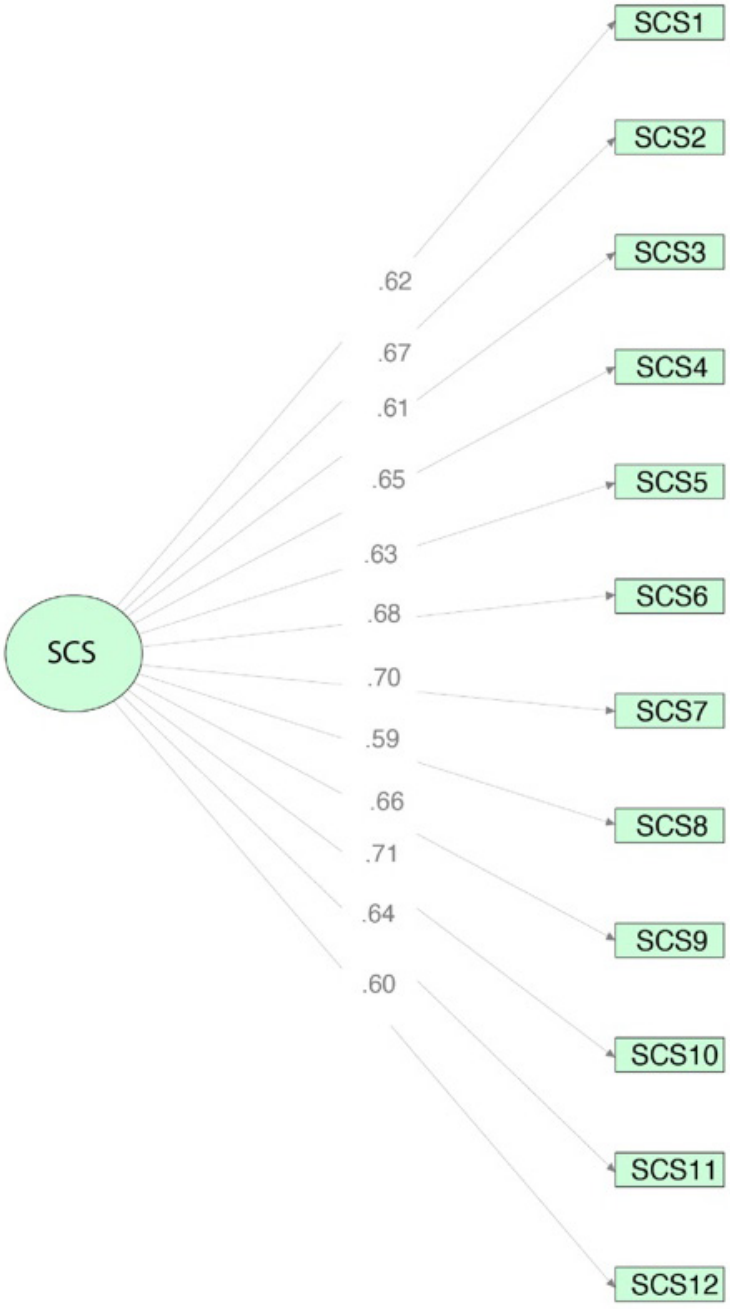
Cronbach's alphas for the bi-factor model (*N* = 451)

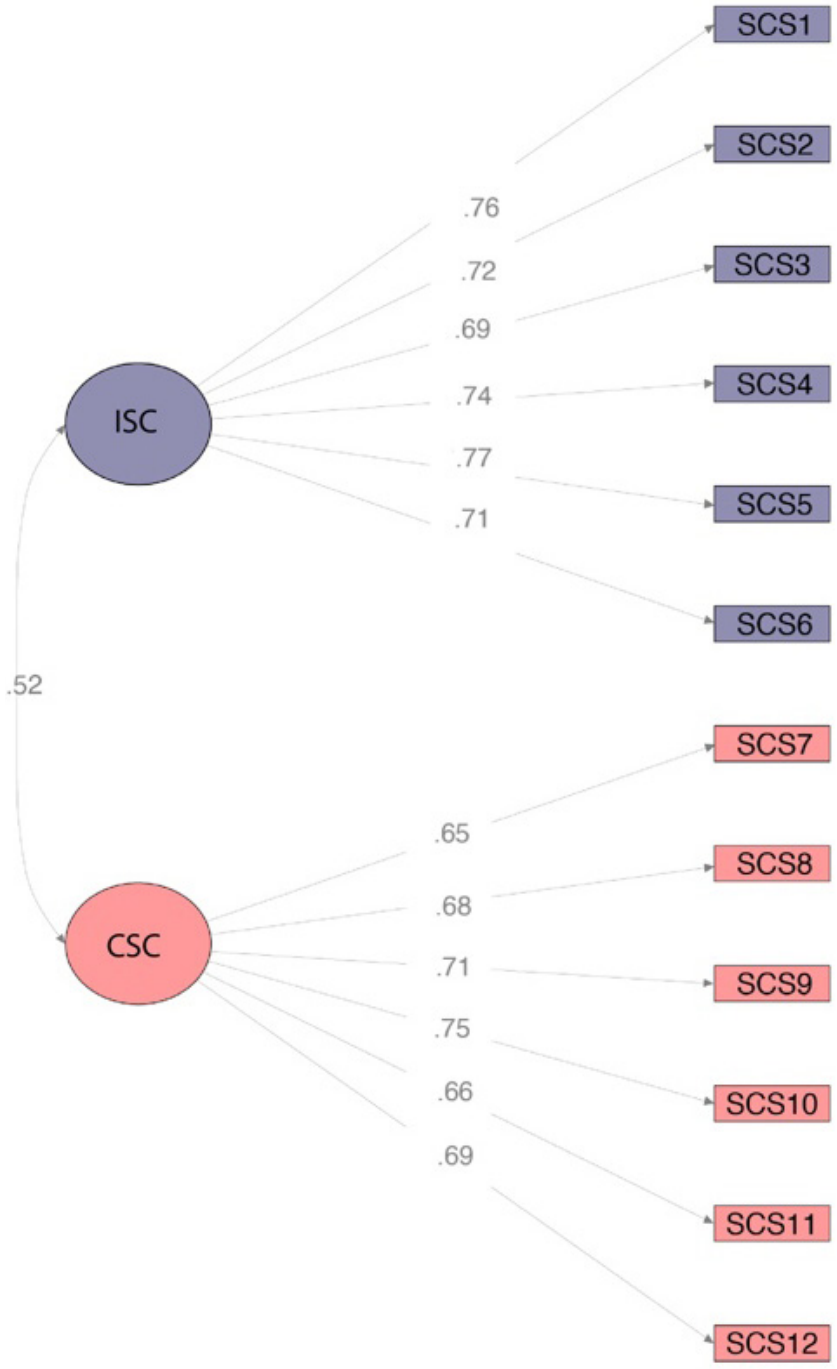
Factors	Cronbach's Alpha
ISC	.88
CSC	.89
SCS total	.89

Note: ISC = Individual Study Crafting; CSC = Collaborative Study Crafting; SCS = Study Crafting Scale-total factor.

Figure 1

Study Crafting Scale (SCS): Confirmatory Factor Analysis — Path Diagram of the tested models (*N* = 451)




SCS1
SCS2
SCS3
SCS4
SCS5
SCS6
SCS7
SCS8
SCS9
SCS10
SCS11
SCS12
ISC
CSC
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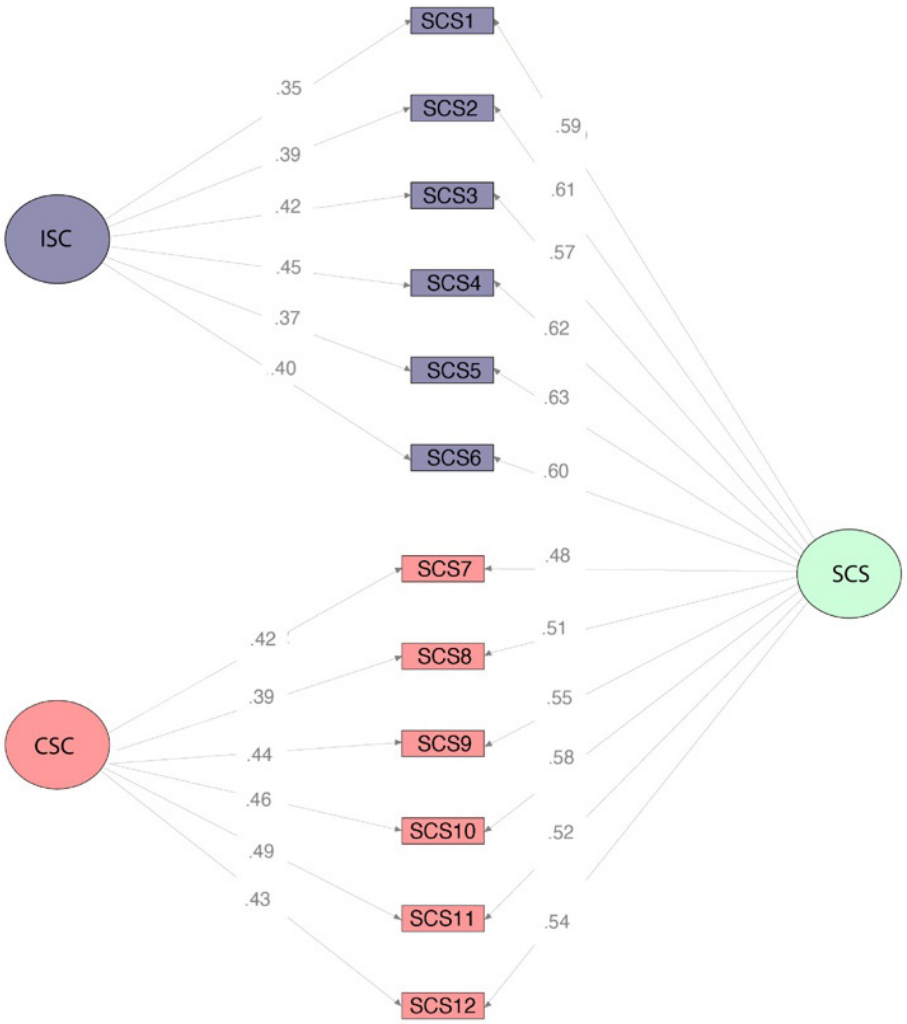
.69
.74
.77
.71
.65
.68
.71
.75
.66
.69
.52



Note: SCS = *Study Crafting Scale*. ISC = Individual Study Crafting; CSC = Collaborative Study Crafting; The first model from the left is the unifactorial model, the second is the correlated two-factor model, and the third is the bi-factor model.

Table 3

Correlations between the *Study Crafting Scale* (SCS) and the *Study Satisfaction Scale* (SSS) and between the *Study Crafting Scale* (SCS) and the *Flourishing Scale* (FS) (*N* = 451)

	Study Satisfaction Scale	Flourishing Scale
Individual Study Crafting	.32**	.38**

(*Continua*)

(*Continua*)

	Study Satisfaction Scale	Flourishing Scale
Collaborative Study Crafting	.36**	.42**
Study Crafting Scale Total	.35**	.40**

Note: ** $p < .01$.

Discussion

The concept of study crafting has garnered significant attention in recent years (Clements & Kamau, 2018; Choi & Shin, 2018; Dormann & Guthier, 2019; Ferreira, 2020; Körner et al., 2021, 2023; Lesener et al., 2020). Our study explored the model proposed by Leana and colleagues in 2009, which distinguishes between individual and collaborative crafting, contributing to a deeper understanding of study crafting. We investigated the psychometric properties of the Study Crafting Scale, derived from Leana et al.'s (2009) *Job Crafting Scale*, adapting it to the study context.

The psychometric assessment of the *Study Crafting Scale* indicated that a bi-factor structure yielded a good fit to the data. This model encompasses two distinct dimensions: Individual Study Crafting and Collaborative Study Crafting, in addition to an overarching study crafting general factor enabling the computation of a total score. The two dimensions (Individual Study Crafting and Collaborative Study Crafting) as well as the general factor demonstrated good internal consistency. These findings align with Leana et al.'s original Job Crafting Scale (2009).

The bi-factor structure of the *Study Crafting Scale* has several implications. It supports the theoretical distinction between individual and collaborative crafting proposed by Leana et al. (2009), suggesting that these are separate, though related, aspects of study crafting. This distinction is particularly relevant in academic settings, where individual effort and collaborative study are crucial to student success (Ifenthaler & Yau, 2020). This bi-factor structure allows for a more nuanced understanding of study crafting, as it provides two specific factors, one for individual study crafting and one for collaborative study crafting as well as one general study crafting factor. This aligns with the concept of Leana et al. (2009), which described crafting behaviours as different but also as executable together, contributing to an overall crafting process. Thus, while students may engage in individual and collaborative crafting behaviours, there is an overall tendency to craft one's study environment.

The presence of two specific factors, one related to individual study crafting and the other to collaborative study crafting, enables a fine-grained analysis consistent with the main advances and paradigms in research for academic settings

(Duffy et al., 2022; Kenny et al., 2023, 2024). Furthermore, a general factor could be helpful in understanding students' propensity to engage in study crafting behaviours across different contexts.

The scale's concurrent validity was established through positive, statistically significant correlations with measures of study satisfaction and flourishing. These correlations align with previous research that has linked study crafting to various positive outcomes. For instance, Choi and Shin (2018) found associations between study crafting and life satisfaction, academic satisfaction, and meaning in academic work. Similarly, Ferreira (2020) and Körner et al. (2023) reported links between study crafting and engagement.

These findings suggest that study crafting may be promising in enhancing students' overall well-being and academic experience. By actively shaping their learning environment, students may improve their academic performance and derive greater satisfaction and meaning from their studies (Körner et al., 2021, 2023; Lesener et al., 2020). This aligns with the broader concept of job crafting, which has been associated with improved health, well-being, job satisfaction, and work engagement in workplace settings (Dierdorff & Jensen, 2017; Lichtenthaler & Fischbach, 2016; Rudolph et al., 2017).

Moreover, the inclusion of collaborative crafting in Leana et al.'s construct addresses an important aspect of the crafting experience that has often been overlooked in previous approaches to learning environments (Körner et al., 2021, 2023; Lesener et al., 2020). As Leana et al. (2009) observed in workplace settings, collaborative crafting can lead to improved outcomes and organizational commitment. In a study context, this could be translated to better learning outcomes and stronger connections with the academic community.

The validation of this scale also has implications for the emerging concept of decent education (Duffy et al., 2022; Kenny et al., 2023, 2024). The Study Crafting Scale can be seen as a tool to achieve decent education objectives by empowering students to actively shape their learning environment. This aligns with decent education's emphasis on quality instruction, social belonging, and career preparation, potentially improving educational outcomes and preparing students for lifelong learning and adaptable careers (Duffy et al., 2022; Kenny et al., 2023, 2024). From a practical standpoint, the Study Crafting Scale offers a promising tool for both research and practical applications among university students. In conclusion, the Study Crafting Scale exhibits sound psychometric properties, offering a reliable measure of both individual and collaborative study crafting behaviours for research and intervention.

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APPENDIX

Items in English of the Study Crafting Scale (SCS)

1. Introduce new approaches on your own to improve your study
2. Change minor study procedures that you think are not productive on your own
3. On your own, change the way you study to make it easier for you
4. Rearrange equipment or furniture in your study areas on your own
5. Organize special events at the university (such as celebrating a student's birthday, suggesting a guest speaker, etc.) on your own
6. On your own, bring in other materials from home for your study areas
7. Work together with your fellow students to introduce new approaches that improve your study
8. Decide together with your fellow students to change minor study procedures that you think are not productive
9. Decide together with your fellow students to make changes in the way you study to make it easier for you
10. Decide together with your fellow students to rearrange equipment, furniture or other materials in the study areas
11. Decide together with your fellow students to organize special events at the university (such as celebrating a student's birthday, suggesting a guest speaker, etc.)
12. Decide together with your fellow students to bring in other materials from home for your study areas